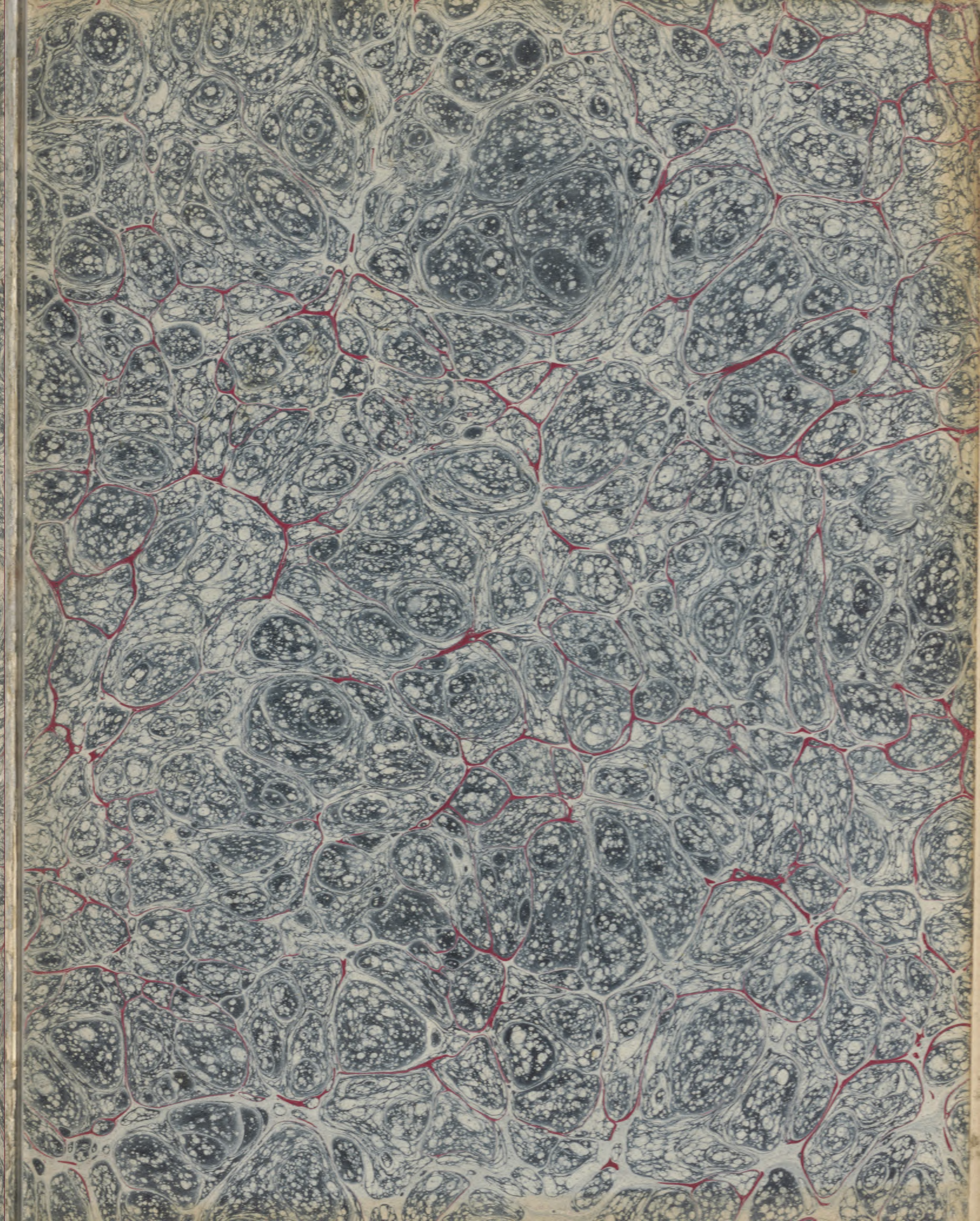
ABERDEEN
UNIVERSITY
LIBRARY

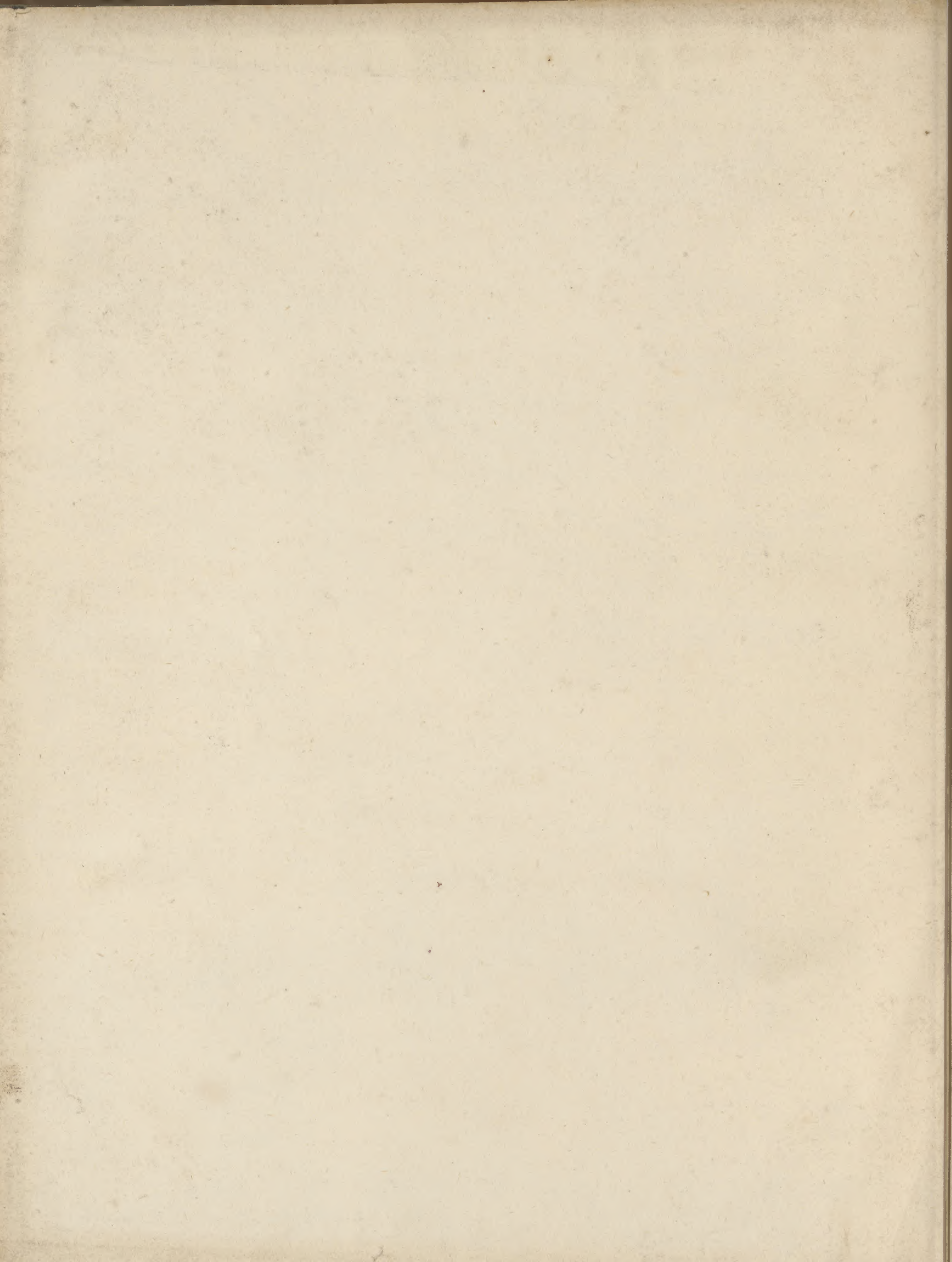
CANCELLED

University of Aberdeen

Presented in 1934
by Reginald Butcher

S 03
E.B.
5





~~ABS.8.95.3~~
EB.10

Encyclopaedia Britannica:

OR, A

DICTIONARY

OF

ARTS, SCIENCES, AND MISCELLANEOUS LITERATURE;

ENLARGED AND IMPROVED.

THE FIFTH EDITION.

Illustrated with nearly six hundred Engravings.

VOL. VI.

INDOCTI DISCANT; AMENT MEMINISSE PERITI.

EDINBURGH:
Printed at the Encyclopædia Press,
FOR ARCHIBALD CONSTABLE AND COMPANY, AND THOMSON BONAR, EDINBURGH:
GALE, CURTIS, AND FENNER, LONDON; AND THOMAS WILSON
AND SONS, YORK.

1815.

NATIONAL LIBRARY OF SCOTLAND
D
9 JY
1993

ENCYCLOPÆDIA BRITANNICA.

China.

1 Boundaries, extent, &c.

CHINA, a country of Aſia, ſituated on the moſt eaſterly part of that continent. It is bounded on the north by Tartary; from which it is divided, partly by a prodigious wall of 1500 miles in length, and partly by high, craggy, and inacceſſible mountains. On the eaſt, it is bounded by the ocean; on the weſt, by part of the Mogul's empire, and India beyond the Ganges, from which it is parted by other ridges of high mountains and ſandy deſerts; on the ſouth, it is bounded partly by the kingdoms of Lao, Tonquin, Ava, and Cochin-China, and partly by the ſouthern or Indian ſea, which flows between it and the Philippine iſlands. There are ſeveral ways of computing its length and breadth. According to ſome of theſe, it is reckoned 1269, 1600, or 1800 miles in length, and as much in breadth: however, by the beſt and lateſt accounts, this vaſt country is ſomewhat of an oval form, the breadth being leſs than the length by little more than a fourth part. It contains 15 provinces, excluſive of that of Lyau-tong, which is ſituated without the great wall, though under the ſame dominion. Their names are, 1. Shenſi, 2. Shanſi, 3. Pecheli, which are ſituated on the north ſide, along the wall; 4. Shantong, 5. Kyan-nang, 6. Che-kyang, 7. Fo-kyen, which are ſituated along the eaſtern ocean; 8. Quangtong, 9. Quang-ſi, 10. Yu-nan, 11. Se-chuen, which ſtretch themſelves towards the ſouth and ſouth-weſt; and, 12. Honan, 13. Hu-quand, 14. Quey-chew, 15. Kyang-ſi; which take up the middle part. For a particular deſcription of all theſe, ſee their proper articles.

2 Diviſion into provinces.

3 Chineſe pretenſions to antiquity.

The origin of all nations is involved in obſcurity and fable, but that of the Chineſe much more ſo than any other. Every nation is inclined to aſſume too high an antiquity to itſelf; but the Chineſe carry theirs beyond all bounds. Indeed, though no people on earth are more exact in keeping records of every memorable tranſaction, yet ſuch is the genius of the Chineſe for ſuperſtition and fable, that the firſt part of their hiſtory is deſervedly contemned by every rational perſon. What contributes more to the uncertainty of the Chineſe hiſtory is, that neither we, nor they themſelves, have any thing but fragments of their ancient hiſtorical books; for, about 213 years before Chriſt, the reigning emperor Si-whang-ti cauſed all the books in the empire to be burned, except thoſe written by lawyers and phyſicians. Nay, the more effectually to deſtroy the memory of every thing contained in them, he commanded a great number of learned men to be buried alive, leſt, from their memories, they ſhould commit to writing ſomething of the true memoirs of the empire. The inaccuracy of the Chineſe annals is complained of even by their moſt reſpected author Confucius himſelf; who alſo affirms, that before his time many of the oldeſt materials for writing ſuch annals had been deſtroyed.

4 Why their hiſtory is ſo uncertain.

5 Fabulous hiſtory of China.

According to the Chineſe hiſtories, the firſt monarch of the whole univerſe (that is, of China), was called *Puon-ku*, or *Puen-cu*. This, according to ſome, was the firſt man; but according to Bayer and Menzelius, two of the greateſt critics in Chineſe literature that have hitherto appeared, the word ſignifies *the higheſt antiquity*. Puon-ku was ſucceeded by *Tiene-hoang*, which ſignifies *the emperor of heaven*. They call him alſo the intelligent heaven, the ſupreme king of the middle heaven, &c. According to ſome of their hiſtorians, he was the inventor of letters, and of the cyclic characters by which they determine the place of the year, &c. Tiene-hoang was ſucceeded by Ti-hoang (the emperor of the earth), who divided the day and night, appointing 30 days to make one moon, and fixed the winter ſolſtice to the 11th moon. Ti-hoang was ſucceeded by Gine-hoang (ſovereign of men), who with his nine brothers ſhared the government among them. They built cities, and ſurrounded them with walls; made a diſtinction between the ſovereign and ſubjects; inſtituted marriage, &c.

The reigns of theſe four emperors make up one of what the Chineſe called *ki*, "ages," or "periods," of which there were nine before Fo-hi, whom their moſt ſenſible people acknowledge as the founder of their empire.

The hiſtory of the ſecond *ki* contradicts almoſt every thing ſaid of the firſt; for though we have but juſt now been told that Gine-hoang and his brethren built cities ſurrounded with walls; yet, in the ſucceeding age, the people dwelt in caves, or perched upon trees as it were in neſts. Of the third *ki* we hear nothing; and in the fourth, it ſeems matters had been ſtill worſe, as we are told that men were then only taught to retire into the hollows of rocks. Of the fifth and ſixth we have no accounts. Theſe ſix periods, according to ſome writers, contained 90,000 years; according to others, 1,100,750.

In the ſeventh and eighth *ki*, they tell us over again what they had ſaid of the firſt; namely, that men began

gan to leave their caves and dwell in houſes, and were taught to prepare clothes, &c. Tchine-fang, the firſt monarch of the eighth *ki*, taught his ſubjects to take off the hair from ſkins with rollers of wood, and cover themſelves with the ſkins ſo prepared. He taught them alſo to make a kind of web of their hair, to ſerve as a covering to their heads againſt rain. They obeyed his orders with joy, and he called his ſubjects *people clothed with ſkins*. His reign laſted 350 years; that of one of his ſucceſſors, alſo, named Yeou-tſao-chi, laſted more than 300; and his family continued for 12 or 18,000 years. But what is very ſurpriſing, all theſe thouſands and millions of years had elapſed without mankind's having any knowledge of fire. This was not diſcovered till towards the cloſe of this period, by one Souigine. After ſo uſeful a diſcovery, he taught the people to dreſs their victuals; whereas before they had devoured the fleſh of animals quite raw, drunk their blood, and ſwallowed even their hair and feathers. He is alſo ſaid to have been the inventor of fiſhing, letters, &c.

In the ninth period, we find the invention, or at leaſt the origin of letters, attributed to one Tſang-hie, who received them from a divine tortoiſe that carried them on his ſhell, and delivered them into the hands of Tſang-hie. During this period alſo, muſic, money, carriages, merchandiſe, commerce, &c. were invented. There are various calculations of the length of theſe *ki* or periods. Some make the time from Puan-ku to Confucius, who flouriſhed about 479 years before Chriſt, to contain 279,000 years; others, 2,276,000; ſome, 2,759,860 years; others, 3,276,000; and ſome no leſs than 96,961,740 years.

6 Fabulous hiſtory explained.

Theſe extravagant accounts are by ſome thought to contain obſcure and imperfect hints concerning the coſmogony and creation of the world, &c. Puon-ku, the firſt emperor, they think, repreſents eternity preceding the duration of the world. The ſucceeding ones, Tiene-hoang, Ti-hoang, and Gine-hoang, they imagine, ſignify the creation of the heavens and earth, and the formation of man. The ten *ki* or ages, nine of which preceded Fo-hi, mean the ten generations preceding Noah. This may very poſſibly be the caſe; for about 300 years before Chriſt, ſome Jews travelled into China, who might have made the Moſaic writings known there.

What we have now related, contains the ſubſtance of that part of the Chineſe hiſtory which is entirely fabulous. After the nine *ki* or "ages" already taken notice of, the tenth commenced with Fo-hi; and the hiſtory, though ſtill very dark, obſcure and fabulous, begins to grow ſomewhat more conſiſtent and intelligible.

7 Reign of Fo-hi.

Fo-hi was born in the province of Shenſi. His mother walking upon the bank of a lake in that province, ſaw a very large print of a man's foot in the ſand there; and, being ſurrounded with an iris or rainbow, became impregnated. The child was named *Fo-hi*; and, when he grew up, was by his countrymen elected king, on account of his ſuperior merit, and ſtyled *Tyent-tſe*, that is, "the ſon of heaven." He invented the eight *qua*, or ſymbols, conſiſting of three lines each, which, differently combined, formed 64 characters that were made uſe of to expreſs every thing. To give theſe the greater credit, he pretended that he had ſeen them inſcribed on the back of a dragon-horſe (an animal ſhaped like a horſe, with the wings and ſcales of a dragon), which aroſe from the bottom of a lake. Having gained great reputation among his countrymen by this prodigy, he is ſaid to have created mandarins or officers, under the name of *dragons*. Hence we may aſſign a reaſon why the emperors of China always carry a dragon in their banners. He alſo inſtituted marriage, invented muſic, &c. Having eſtabliſhed a prime miniſter, he divided the government of his dominions among four mandarins, and died after a reign of 115 years.

8 Miraculous ſolſtice.

After Fo-hi followed a ſucceſſion of emperors, of whom nothing remarkable is recorded, except that in the reign of *Yau*, the ſeventh after Fohi, the ſun did not ſet for ten days, ſo that the Chineſe were afraid of a general conflagration.

9 Hypotheſis concerning this ſolſtice and Fo-hi.

This event the compilers of the Univerſal Hiſtory take to be the ſame with that mentioned in the book of Joſhua, when the ſun and moon ſtood ſtill for about the ſpace of a day. Fo-hi they will have to be the ſame with Noah. They imagine, that after the deluge this patriarch remained ſome time with his deſcendants; but on their wicked combination to build the tower of Babel, he ſeparated himſelf from them with as many as he could perſuade to go along with him; and that, ſtill travelling eaſtward, he at laſt entered the fertile country of China, and laid the foundation of that vaſt empire.—But, leaving theſe fabulous and conjectural times, we ſhall proceed to give ſome account of that part of the Chineſe hiſtory which may be more certainly depended on.

As the Chineſe, contrary to the practice of almoſt all nations, have never ſought to conquer other countries, but rather to improve and content themſelves with their own, their hiſtory for many ages furniſhes nothing remarkable. The whole of their emperors, abſtracting from thoſe who are ſaid to have reigned in the fabulous times, are comprehended in 22 dynaſties, mentioned in the following table.

	Emperors	Before Chriſt.
1. *Hya*, containing	17	2207
2. *Shang*, or *Ing*,	28	1766
3. *Chew*,	35	1122
4. *Tſin*,	4	248
5. *Han*,	25	206
		After Chriſt.
6. *Hew-han*,	2	220
7. *Tſin*,	15	465
8. *Song*,	8	220
9. *Tſi*,	5	479
10. *Lyang*,	4	502
11. *Chin*,	4	557
12. *Swi*,	3	
13. *Twang*,	20	618
14. *Hew-lyang*,	2	907
15. *Hew-tang*,	4	923
16. *Hew-tſin*,	2	936
17. *Hew-han*,	2	947
18. *Hew-chew*,	3	951
19. *Song*,	18	960
20. *Iwen*,	9	1280
21. *Ming*,	16	1368
22. *Tſing*,		1645

This

China.

This table is formed according to the accounts of the Jesuit Du Halde, and is commonly reckoned to be the most authentic; but according to the above-mentioned hypothesis of the compilers of the Universal History, who make *Yau* cotemporary with Joshua, the dynasty of *Hya* did not commence till the year before Christ 1357; and to accommodate the history to their hypothesis, great alterations must be made in the duration of the dynasties.

10 Incursions of the Tartars.

The most interesting particulars of the Chinese history relate only to the incursions of the Tartars, who at last conquered the whole empire, and who still continue to hold the sovereignty; though by transferring the seat of the empire to Peking, and adopting the Chinese language, manners, &c. Tartary would seem rather to have been conquered by China, than China by Tartary. These incursions are said to have begun very early; even in the time of the emperor Shun, successor to Yau above mentioned, in whose reign the miraculous solstice happened. At this time, the Tartars were repulsed, and obliged to retire into their own territories. From time to time, however, they continued to threaten the empire with invasions, and the northern provinces were often actually ravaged by the Tartars in the neighbourhood. About the year before Christ 213, Shi-whang-ti, having fully subdued all the princes, or kings as they were called, of the different provinces, became emperor of China with unlimited power. He divided the whole empire into 36 provinces; and finding the northern part of his dominions much incommoded by the invasions of the neighbouring barbarians, he sent a formidable army against them, which drove them far beyond the boundaries of China. To prevent their return, he built the famous wall already mentioned, which separates China from Tartary. After this, being elated with his own exploits, he formed a design of making posterity believe that he himself had been the first Chinese emperor that ever sat on the throne. For this purpose, he ordered all the historical writings to be burnt, and caused many of the learned to be put to death, as already mentioned.

11 Great wall built.

12 Kitan Tartars settle in China.

What effect the great wall for some time had in preventing the invasions of the Tartars, we are not told; but in the tenth century of the Christian era, those of Kitan or Lyau got a footing in China. The Kitan were a people of eastern Tartary, who dwelt to the north and north-east of the province of Pecheli in China, particularly in that of Lyau-tong, lying without the great wall. These people having subdued the country between Korea and Kashgar, became much more troublesome to the Chinese than all the other Tartars. Their empire commenced about the year 916, in the fourth year of Mo-ti-kyan-ti, second emperor of the 14th Chinese dynasty called *Hew-Lyang*. In 946, Mingt-song, second emperor of the 15th dynasty, being dead, Sheking-tang his son-in-law rebelled against Mingt-song, his son and successor, whom he deprived of his crown and life. This he accomplished by means of an army of 50,000 men furnished by the Kitan. Fi-ti, the son of Mingt song, being unable to resist the usurper, fled to the city Ghey-chew; where shutting himself up with his family and all his valuable effects, he set fire to the palace, and was burnt to ashes. On his death, Sheking-tang assumed the title of emperor; founded the 16th dynasty; and changed his name to that of *Kaut-su*. But the Kitan general refusing to acknowledge him, he was obliged to purchase a peace by yielding up to the Tartars 16 cities in the province of Pecheli, besides a yearly present of 300,000 pieces of silk.

China.

This submission served only to inflame the avarice and ambition of the Kitan. In 959, they broke the treaty when least expected, and invaded the empire afresh. Tsi-vang, the emperor at that time, opposed them with a formidable army; but through the treachery of his general Lyew-chi-ywen, the Tartars were allowed to take him prisoner. On this, Tsi-vang was glad to recover his liberty, by accepting of a small principality; while the traitor became emperor of all China, and, changing his name to *Kaut-su*, founded the 17th dynasty. The Tartars, in the mean time, ravaged all the northern provinces without opposition, and then marched into the southern. But being here stopped by some bodies of Chinese troops, the general thought proper to retire with his booty into Tartary. In 962, Kaut-su dying, was succeeded by his son In-ti. The youth of this prince gave an opportunity to the eunuchs to raise commotions; especially as the army was employed at a distance in repelling the invasions of the Tartars. This army was commanded by Ko-ghey, who defeated the enemy in several battles, and thus restored peace to the northern provinces. In the mean time, In-ti was slain by his eunuchs, and the empress placed his brother on the throne: but Ko-ghey returning in triumph, was saluted emperor by his victorious army; and the empress being unable to support the rights of her son, was obliged to submit, while Ko-ghey, assuming the name of *Tay-tsu*, founded the 18th dynasty. Nine years after this, however, the grandees of the empire, setting aside Kong-ti, the third in succession from Tay-tsu, on account of his non-age, proclaimed his guardian, named *Chau-quang-yu*, emperor; who, assuming the name of Kau-tsu, founded the 19th dynasty, called *Song* or *Tsong*.

Under this monarch the empire began to recover itself; but the Kitan still continued their incursions. The successors of Kau-tsu opposed them with various success; but at last, in 978, the barbarians became so strong as to lay siege to a considerable city. Tay-tsong, successor to Kau-tsu, detached 300 soldiers, each carrying a light in his hand, against them in the night-time, with orders to approach as near as possible to the Tartar camp. The barbarians imagining, by the number of lights, that the whole Chinese army was at hand, immediately fled, and, falling into the ambuscades laid for them by the Chinese general, were almost all cut to pieces.

This check, however, did not long put a stop to the ravages of the Kitan. In the year 999, they laid siege to a city in the province of Pecheli; but Ching-tsong, successor to Tay-tsong, came upon them with his army so suddenly, that they betook themselves to flight. The emperor was advised to take advantage of their consternation, and recover the country which had been yielded to them; but instead of pursuing his victory, he bought a peace by consenting to pay annually 100,000 tael (about 34,000l.), and 200,000 pieces of silk. The youth and pacific disposition of

Jin-tsong,

China.

Jin-tſong, ſucceſſor to the Ching-tſong, revived the courage of the Kitan; and, in 1035, war would have been renewed, had not the emperor condeſcended to as ſhameful a treaty as that concluded by his father. Two years after, the Tartars demanded reſtitution of ten cities in the province of Pecheli, which had been taken by Ko-ghey founder of the 18th dynaſty: upon which Jin-tſong engaged to pay them an annual tribute of 200,000 taels of ſilver, and 300,000 pieces of ſilk, in lieu of theſe cities.

13 Kitan driven out by the eaſtern Tartars;

From this time the Kitan remained in peaceable poſſeſſion of their Chineſe dominions till the year 1117. Whey-tſong, at that time emperor, being able neither to bear their ravages, nor by himſelf to put a ſtop to them, reſolved upon a remedy which at laſt proved worſe than the diſeaſe. This was to call in the Nu-che, Nyu-che, or Eaſtern Tartars, to deſtroy the kingdom of the Kitan. From this he was diſſuaded by the king of Korea, and moſt of his own miniſters; but, diſregarding their ſalutary advice, he joined his forces to thoſe of the Nu-che. The Kitan were then everywhere defeated; and at laſt reduced to ſuch extremity, that thoſe who remained were forced to leave their country, and fly to the mountains of the weſt.

14 who aſſume the name of *Kin*, and invade China.

Thus the empire of the Kitan was totally deſtroyed, but nothing to the advantage of the Chineſe; for the Tartar general, elated with his conqueſt, gave the name of *Kin* to his new dominion, aſſumed the title of emperor, and began to think of aggrandizing himſelf, and enlarging his empire. For this purpoſe, he immediately broke the treaties concluded with the Chineſe emperor; and, invading the provinces of Pecheli and Shenſi, made himſelf maſter of the greater part of them. Whey-tſong, finding himſelf in danger of loſing his dominions, made ſeveral advantageous propoſals to the Tartar; who, ſeeming to comply with them, invited him to come and ſettle matters by a perſonal conference. The Chineſe monarch complied: but, on his return, the terms agreed on ſeemed intolerable to his miniſters; ſo that they told him the treaty could not ſubſiſt, and that the moſt cruel war was preferable to ſuch an ignominious peace. The Kin monarch, being informed of all that paſſed, had recourſe to arms, and took ſeveral cities. Whey-tſong was weak enough to go in perſon to hold a ſecond conference; but, on his arrival, was immediately ſeized by the Tartar. He was kept priſoner under a ſtrong guard during the remaining part of his life; and ended his days in 1126, in the deſert of Shamo, having nominated his eldeſt ſon Kin-tſong to ſucceed him.

15 They take the emperor priſoner.

Kin-tſong began his reign with putting to death ſix miniſters of ſtate, who had betrayed his father into the hands of the Kin Tartars. The barbarians in the meantime purſued their conqueſts without oppoſition. They croſſed the Whang-ho, or Yellow river, which a handful of troops might have prevented; and marching directly towards the imperial city, took and plundered it. Then ſeizing the emperor and his conſort, they carried them away captives: but many of the principal lords, and ſeveral of the miniſters, preferring death to ſuch an ignominious bondage, killed themſelves. The Kin being informed by the empreſs

16 Imperial city and another emperor taken.

3

Meng that ſhe had been divorced, they left her behind. This proved the means of ſaving the empire; for by her wiſdom and prudence ſhe got the crown placed on the head of Kau-tſong, ninth ſon of the emperor Whey-tſong by his divorced empreſs.

Kau-tſong fixed his court at Nanking the capital of Kyang-nan; but ſoon after was obliged to remove it to Kang-chew in Che-kyang. He made ſeveral efforts to recover ſome of his provinces from the Kin, but without effect. Ili-tſong the Kin monarch, in the mean time, endeavoured to gain the eſteem of his Chineſe ſubjects by paying a regard to their learning and learned men, and honouring the memory of Confucius. Some time after he advanced to Nanking, from whence Kau-tſong had retired, and took it: but, receiving advice that Yo-ſi, general of the Song, or ſouthern Chineſe, was advancing by long marches to the relief of that city, they ſet fire to the palace, and retired northward. However, Yo-ſi arrived time enough to fall upon their rear-guard, which ſuffered very much; and from this time the Kin never dared to croſs the rivar Kyang. In a few years afterwards the Chineſe emperor ſubmitted to become tributary to the Kin, and concluded a peace with them upon very diſhonourable terms. This ſubmiſſion, however, was of little avail: for, in 1163, the Tartars broke the peace, and, invading the ſouthern province with a formidable army, took the city of Yang-chew. The king, having approached the river Kyang, near its mouth, where it is wideſt as well as moſt rapid, commanded his troops to croſs it, threatening with his drawn ſword to kill thoſe who refuſed. On receiving ſuch an unreaſonable command, the whole army mutinied; and the king being killed in the beginning of the tumult, the army immediately retired.

17 Progreſs of the Kin checked.

From this time to the year 1210, nothing remarkable occurs in the Chineſe hiſtory; but this year, Jenghiz-khan, chief of the weſtern Tartars, *Moguls*, or *Mungls*, quarrelled with Yong-tſi emperor of the Kin; and at the ſame time the king of Hya, diſguſted at being refuſed aſſiſtance againſt Jenghiz-khan, threatened him with an invaſion on the weſt ſide. Yong-tſi prepared for his defence; but in 1211, receiving news that Jenghiz-khan was advancing ſouthward with his whole army, he was ſeized with fear, and made propoſals of peace, which were rejected. In 1212, the Mogul generals forced the great wall; or, according to ſome writers, had one of the gates treacherouſly opened to them, to the north of Shanſi; and made incurſions as far as Peking, the capital of the Kin empire. At the ſame time the province of Lyau-tong was almoſt totally reduced by ſeveral Kitan lords who had joined Jenghiz-khan; ſeveral ſtrong places were taken, and an army of 300,000 Kin defeated by the Moguls. In autumn they laid ſiege to the city of Tay-tong-fu; where, although the governor Hujaku fled, yet Jenghiz-khan met with conſiderable reſiſtance. Having loſt a vaſt number of men, and being himſelf wounded by an arrow, he was obliged to raiſe the ſiege and retire into Tartary; after which the Kin retook ſeveral cities. The next year, however, Jenghiz-khan re-entered China; retook the cities which the Kin had reduced the year before; and overthrew their

18 They are attacked by Jenghiz-khan and the king of Hya.

19 Great wall forced by Jenghiz-khan.

China.

their armies in two bloody battles, in one of which the ground was ftrewed with dead bodies for upwards of four leagues.

The fame year Yong-tfi was flain by his general Hujaku; and Sun, a prince of the blood, advanced in his room. After this the Moguls, attacking the empire with four armies at once, laid wafte the provinces of Shanfi, Honan, Pecheli, and Shan-tong. In 1214 Jenghiz-khan fat down before Peking; but inftead of affaulting the city, offered terms of peace, which were accepted, and the Moguls retired into Tartary. After their departure, the emperor, leaving his fon at Peking, removed his court to Pyen-lyang near Kay-fong-fu, the capital of Honan. At this Jenghiz-khan being offended, immediately fent troops to befiege Peking. The city held out to the fifth month of the year 1215, and then furrendered. At the fame time the Moguls finifhed the conqueft of Lyau-tong; and the Song refufed to pay the ufual tribute to the Kin.

20 Peking taken.

21 Southern Chinefe declared war againft the Kin.

In 1216, Jenghiz-khan returned to purfue his conquefts in the weft of Afia, where he ftaid feven years; during which time his general Muhuli made great progrefs in China againft the Kin emperor. He was greatly affifted by the motions of Ning-tfong emperor of the Song, or fouthern China; who, incenfed by the frequent perfidies of the Kin, had declared war againft them, and would hearken to no terms of peace, though very advantageous propofals were made. Notwithftanding this, however, in 1220, the Kin, exerting themfelves, raifed two great armies, one in Shenfi, and the other in Shan-tong. The former baffled the attempts of the Song and king of Hya, who had united againft them; but the latter, though no fewer than 200,000, were entirely defeated by Muhuli. In 1221, that officer paffed the Whang-ho, and died after conquering feveral cities.

22 Jenghiz-khan deftroys the kingdom of Hya;

In 1224, the Kin emperor died; and was fucceeded by his fon Shew, who made peace with the king of Hya; but next year, that kingdom was entirely deftroyed by Jenghiz-khan. In 1226, Oktay, fon to Jenghiz-khan, marched into Honan, and befieged Kay-fong-fu, capital of the Kin empire, but was obliged to withdraw into Shenfi, where he took feveral cities, and cut in pieces an army of 30,000 men. In 1227 Jenghiz-khan died, after having defired his fons to demand a paffage for their army through the dominions of the Song, without which he faid they could not eafily vanquifh the Kin.

23 and dies.

After the death of that great conqueror, the war was carried on with various fuccefs; but though the Moguls took above 60 important pofts in the province of Shenfi, they found it impoffible to force Ton-quan, which it behoved them to do in order to penetrate effectually into Honan. In April 1231 they took the capital of Shenfi, and defeated the Kin army which came to its relief. Here one of the officers defired Prince Toley to demand a paffage from the Song through the country of Han-chong-fu. This propofal Toley communicated to his brother Oktay, who approved of it as being conformable to the dying advice of Jenghiz-khan. Hereupon Toley, having affembled all his forces, fent a meffenger to the Song generals to demand a paffage through their territories. This, however, they not only refufed, but put the meffenger to death; which fo enraged Toley that he fwore to make them repent of it, and was foon as good as his word. He decamped in Auguft 1231; and having forced the paffes, put to the fword the inhabitants of Wha-yang and Fong-chew, two cities in the diftrict of Hang-chong-fu. Then having cut down rocks to fill up deep abyffes, and made roads through places almoft inacceffible, he came and befieged the city of Hang-chong-fu itfelf. The miferable inhabitants fled to the mountains on his approach, and more than 100,000 of them perifhed. After this, Toley divided his forces, confifting of 30,000 horfe, into two bodies. One of thefe went weftward to Myen-chew: from thence, after opening the paffages of the mountains, they arrived at the river Kyaling, which runs into the great Kyang. This they croffed on rafts made of the wood of demolifhed houfes; and then, marching along its banks, feized many important pofts. At laft, having deftroyed more than 140 cities, towns, or fortreffes, they returned to the army. The fecond detachment feized an important poft in the mountains, called *Toutong*, fix or feven leagues to the eaftward of Hang-chong-fu. On the other fide Oktay advanced, in October, towards Pu-chew a city of Shanfi; which being taken after a vigorous defence, he prepared to pafs the Whang-ho. Toley, after furmounting incredible difficulties, arrived in December on the borders of Honan, and made a fhow as if he defigned to attack the capital of the Kin empire. On his firft appearance in Honan through a paffage fo little fufpected, every body was filled with terror and aftonifhment, fo that he proceeded for fome time without oppofition. At laft the emperor ordered his generals, Hota, Ilapua, and others, to march againft the enemy. Toley boldly attacked them; but was obliged to retire, which he did in good order. Hota was for purfuing him, faying that the Mogul army did not exceed 30,000 men, and that they feemed not to have eaten any thing for two or three days. Ilapua, however, was of opinion that there was no occafion for being fo hafty, as the Moguls were enclofed between the rivers Han and Whang-ho, fo that they could not efcape. This negligence they foon had occafion to repent of: for Toley, by a ftratagem, made himfelf mafter of their heavy baggage; which accident obliged them to retire to Tang-chew. From thence they fent a meffenger to acquaint the emperor that they had gained the battle, but concealed the lofs of their baggage. This good news filled the court with joy; and the people who had retired into the capital for its defence, left it again, and went into the country: but, in a few days after, the vanguard of the Moguls, who had been fent by the emperor Oktay, appeared in the field, and carried off a great number of thofe that had quitted the city.

24 Moguls quarrel with the Song.

25 Exploits of Toley.

26 Capital of the Kin empire befieged.

In January 1232, Oktay paffing the Whang-ho, encamped in the diftrict of Kay-fong-fu, capital of the Kin empire, and fent his general Suputay to befiege the city. At that time the place was near 30 miles in circumference; but having only 40,000 foldiers to defend it, as many more from the neighbouring cities, and 20,000 peafants, were ordered into it; while the emperor publifhed an affecting declaration, animating the people to defend it to the laft extremity. Oktay, having heard with joy of Toley's entrance into Honan, ordered him to fend fuccours to Suputay. On the

China.

the other hand, the Kin generals advanced with 150,000 men to relieve the city; but being obliged to divide their forces, in order to avoid in part the great road, which Toley had obstructed with trees, they were attacked by the prince at a disadvantage, and, after a faint resistance, defeated with great slaughter, and the loss of both their generals, one killed and the other taken. The emperor now ordered the army at Tong-quan and other fortified places to march to the relief of Kay-fong-fu. They assembled accordingly, to the number of 110,000 foot and 15,000 horse; and were followed by vast numbers of people, who expected by their means to be protected from the enemy. But many of these troops having deserted, and the rest being enfeebled by the fatigues of their march, they dispersed on the approach of their pursuers, who killed all they found in the highways. After this the Moguls took Tong-quan and some other considerable posts; but were obliged to raise the sieges of Quey-te-fu and Loyang by the bravery of the governors. Kyang-shin, governor of Loyang, had only 3 or 4000 soldiers under him, while his enemies were 30,000 strong. He placed his worst soldiers on the walls, putting himself at the head of 400 brave men; whom he ordered to go naked, and whom he led to all dangerous attacks. He invented engines to cast large stones, which required but few hands to play them, and aimed so true as to hit at 100 paces distance. When their arrows failed, he cut those shot by the enemy into four pieces; pointed them with pieces of brass coin; and discharged them from wooden tubes with as much force as bullets are from a musket. Thus he harassed the Moguls for three months so grievously, that they were obliged, notwithstanding their numbers, to abandon the enterprise.

27 Bravery of the besieged.

Oktay, at last, notwithstanding his successes, resolved to return to Tartary; and offered the Kin emperor peace, provided he became tributary, and delivered up to him 27 families which he named. These offers were very agreeable to the emperor; but Suputay, taking no notice of the treaty, pushed on the siege of the capital with more vigour than ever. By the help of the Chinese slaves in his army, the Mogul general soon filled the ditch; but all his efforts seemed only to inspire the besieged with new vigour. The Moguls at that time made use of artillery, but were unable to make the least impression upon the city walls. They raised walls round those they besieged, which they fortified with ditches, towers, and battlements. They proceeded also to sap the walls of the city; but were very much annoyed by the artillery of the besieged, especially by their bombs, which sinking into the galleries, and bursting under ground, made great havock among the miners. For 16 days and nights the attacks continued without intermission; during which time an incredible number of men perished on both sides; at length, Suputay, finding that he could not take the city, withdrew his troops, under pretence of conferences being on foot. Soon after the plague began in Kay-fong-fu; and raged with such violence, that, in 50 days, 900,000 biers were carried out, besides a vast multitude of the poorer sort who could not afford any.

28 Peace concluded;

29 and broken.

In a short time two unlucky accidents occasioned a renewal of the war; which now put an end to the empire of the Kin. Gan-yong, a young Mogul lord, having assumed the government of some cities in Kyang-nan, and killed the officer sent to take possession of them, declared for the Kin. The emperor unwarily took Gan-yong into his service, and gave him the title of prince. Upon this Oktay sent an envoy, attended by 30 other persons, to inquire into the affair; but the Kin officers killed them all, without being punished by the emperor. Suputay, having informed his master of all these proceedings, was ordered to continue the war in Honan. Shew-fu now commanded his officers to unite their troops for the defence of the capital; but before his orders could be obeyed, they were attacked and defeated, one after another, by the Moguls. This obliged him to raise soldiers from among the peasants, for whose subsistence the people were taxed $\frac{3}{10}$ths of the rice they possessed. The city began now to be distressed for want of provisions; and as it was but in a bad posture of defence, the emperor marched with an army against the Moguls. His expedition proved unfortunate; for, sending part of his army to besiege a city called *Why-chew*, it was totally cut in pieces, and Suputay a second time sat down before the capital.

30 Capital again besieged,

31 and taken.

On hearing this bad news, the emperor repassed the Whang-ho, and retired to Quey-te-fu. Here he had not been long before the capital was delivered up by treachery, and Suputay put all the males of the imperial race to death; but, by the express command of Oktay, spared the inhabitants, who are said to have amounted to 1,400,000 families. After this disaster, the unhappy monarch left his troops at Quey-te-fu, and retired to Juning-fu, a city in the southern part of Honan, attended only by 400 persons. Here the distance of the Moguls made him think of living at ease; but while he flattered himself with these vain hopes, the enemy's army arrived before the city and invested it. The garrison were terrified at their approach; but were encouraged by the emperor, and his brave general Hu-sye-hu, to hold out to the last. As there was not in the city a sufficient number of men, the women, dressed in men's clothes, were employed to carry wood, stones, and other necessary materials to the walls. All their efforts, however, were ineffectual. They were reduced to such extremities, that for three months they fed on human flesh; killing the old and feeble, as well as many prisoners, for food. This being known to the Moguls, they made a general assault in January 1234. The attack continued from morning till night; but at last the assailants were repulsed. In this action, however, the Kin lost all their best officers; upon which the emperor resigned the crown to Cheng-lin a prince of the blood. Next morning, while the ceremony of investing the new emperor was performing, the enemy mounted the south walls, which were defended only by 200 men; and the south gate being at the same time abandoned, the whole army broke in. They were opposed, however, by Hu-sye-hu; who, with 1000 soldiers, continued to fight with amazing intrepidity. In the mean time Shew-fu, seeing every thing irreparably lost, lodged the seal of the empire in a house; and then causing sheaves of straw to be set round it, ordered it to be set on fire as soon as he was dead. After giving this order he hanged himself, and his commands were executed

32 Siege of Juning-fu.

33 Unhappy fate of the emperor.

China.

cuted by his domeftics. Hu-fye-hu, who ftill continued fighting with great bravery, no fooner heard of the tragical death of the emperor, than he drowned himfelf in the river Ju; as did alfo 500 of his moft refolute foldiers. The fame day the new emperor, Cheng-lin, was flain in a tumult; and thus an end was put to the dominion of the Kin Tartars in China.

34 Diffolution of the Kin empire.

The empire of China was now to be fhared between the Song, or fouthern Chinefe, and the Moguls. It had been agreed upon, that the province of Honan fhould be delivered up to the Song as foon as the war was finifhed. But they, without waiting for the expiration of the term, or giving Oktay notice of their proceedings, introduced their troops into Kay-fong-fu, Lo-yang, and other confiderable cities. On this the Mogul general refolved to attack them; and repaffing the Whang-ho, cut in pieces part of the garrifon of Lo-yang, while they were out in fearch of provifions. The garrifon of Kay-fong-fu likewife abandoned that place; and the Song emperor degraded the officers who had been guilty of thofe irregularities, fending ambaffadors to Oktay, at the fame time, to defire a continuance of the peace. What Oktay's anfwer was we are not told, but the event fhowed that he was not well pleafed; for, in 1235, he ordered his fecond fon Prince Kotovan, and his general Chahay, to attack the Song in Se-chwen, while others marched towards the borders of Kyang-nan.

35 War between the Song and the Moguls.

In 1236, the Moguls made great progrefs in the province of Huquang, where they took feveral cities, and put vaft numbers to the fword. This year they introduced paper or filk money, which had formerly been ufed by Chang-tfong, fixth emperor of the Kin. Prince Kotovan forced the paffages into the diftrict of Hang-chong-fu in the province of Shenfi, which he entered with an army of 500,000 men. Here a terrible battle was fought between the vaft army of the Moguls and the Chinefe troops, who had been driven from the paffages they defended. The latter confifted only of 10,000 horfe and foot, who were almoft entirely cut off; and the Moguls loft fuch a number of men, that the blood is faid to have run for two leagues together. After this victory the Moguls entered Se-chwen, which they almoft entirely reduced, committing fuch barbarities, that, in one city, 40,000 people chofe rather to put an end to their own lives than fubmit to fuch cruel conquerors.

36 Dreadful engagement.

In 1237, the Moguls received a confiderable check before the city of Gantong in Kyang-nan, the fiege of which they were obliged to raife with lofs. In 1238, they befieged Lu-chuw, another city in the fame province. They furrounded it with a rampart of earth and a double ditch; but the Chinefe general ordered their intrenchments to be filled with immenfe quantities of herbs fteeped in oil, and then fet on fire, while he fhot ftones upon them from a tower feven ftories high. At the fame time a vigorous fally was made; and the Mogul army being thrown into the utmoft diforder, were obliged finally to abandon the fiege, and retire northwards.

In 1239, thefe barbarians were oppofed by a general called Meng kong, with great fuccefs; who, this and the following year, gained great honour by his exploits. While he lived, the Moguls were never able to make any confiderable progrefs; but his death, in 1246, proved of the greateft detriment to the Chinefe affairs: and foon after, the Tartars renewed the war with more vigour and fuccefs than ever. In 1255, they re-entered the province of Se-chwen; but ftill met with vigorous oppofition in this quarter, becaufe the Chinefe took care to have Se-chwen furnifhed with good troops and generals. Though they were always beaten, being greatly inferior in number to their enemies, yet they generally retook the cities the Moguls had reduced, as the latter were commonly obliged to withdraw for want of provifions and forage. In 1259 they undertook the fiege of Ho-chew, a ftrong city to the weft of Peking, defended by Vang-kyen, a very able officer, who commanded a numerous garrifon. The fiege continued from the month of February till Auguft; during which time the Moguls loft an immenfe number of men. On the 10th of Auguft they made a general affault in the night. They mounted the walls before the governor had intelligence; but were foon attacked by him with the utmoft fury. The Mogul emperor, Meng-ko, himfelf came to the fcalade; but his prefence was not fufficient to overcome the valour of Vang-kyen. At the fame time the fcaling-ladders of the Moguls were blown down by a ftorm; upon which a terrible flaughter enfued, and amongft the reft fell the emperor himfelf. Upon this difafter the Mogul generals agreed to raife the fiege, and retired towards Shen-fi.

China.

37 Siege of Ho-chew.

38 Moguls defeated, and their emperor killed.

On the death of Meng ko, Hupilay, or Kublay Khan, who fucceeded him, laid fiege to Vu-chang-fu, a city not far diftant from the capital of the Song empire.

At this the emperor being greatly alarmed, diftributed immenfe fums among his troops; and, having raifed a formidable army, marched to the relief of Vu-chang fu. Unfortunately the command of this army was committed to the care of Kya-tfe-tau, a man without either courage or experience in war. He was befides very vain and vindictive in his temper; often ufing the beft officers ill, and entirely overlooking their merit, which caufed many of them to go over to the Moguls. The fiege of Vu-chang-fu was commenced, and had continued a confiderable time, when Kya-tfe-tau, afraid of its being loft, and at the fame time not daring to take any effectual ftep for its relief, made propofals of peace. A treaty was accordingly concluded, by which Kya-tfe-tau engaged to pay an annual tribute of about 50,000l. in filver and as much in filk; acknowledging likewife the fovereignty of the Moguls over the Song empire. In confequence of this treaty, the Moguls retreated after the boundaries of the two empires had been fixed, and repaffed the Kyang; but 170 of them having ftaid on the other fide of the river, were put to death by Kya-tfe-tau.

This wicked minifter totally concealed from the emperor his having made fuch a fhameful treaty with the Moguls; and the 170 foldiers maffacred by his order, gave occafion to a report that the enemy had been defeated; fo that the Song court believed that they had been compelled to retreat by the fuperior valour and wifdom of Kya-tfe-tau. This proved the ruin of the empire; for, in 1260, the Mogul emperor fent Hauking to the Chinefe court to execute the treaty according to the terms agreed on with Kya-tfe-tau.

39 Treachery of a Chinefe minifter.

The

China.

The minifter, dreading the arrival of this envoy, imprifoned him near Nanking; and took all poffible care that neither Hupilay, nor Li-tfong the Chinefe emperor, fhould ever hear any thing of him.

It was impoffible fuch unparalleled conduct could fail to produce a new war. Hupilay's courtiers inceffantly preffed him to revenge himfelf on the Song for their treacherous behaviour; and he foon publifhed a manifefto againft them, which was followed by a renewal of hoftilities in 1268. The Mogul army amounted to 300,000 men; but notwithftanding their numbers, little progrefs was made till the year 1271. Syan-yang and Fan-ching, cities in the province of Se-chew, had been befieged for a long time ineffectually; but this year an *Igur* lord advifed Hupilay to fend for feveral of thofe engineers out of the weft, who knew how to caft ftones of 150 pounds weight out of their engines, which made holes of feven or eight feet wide in the ftrongeft walls. Two of thefe engineers were accordingly fent for; and after giving a fpecimen of their art before Hupilay, were fent to the army in 1272. In the beginning of 1273 they planted their engines againft the city of Fan-ching, and prefently made a breach in the walls. After a bloody conflict the fuburbs were taken; and foon after the Moguls made themfelves mafters of the walls and gates of the city. Neverthelefs, a Chinefe officer, with only 100 foldiers, refolved to fight from ftreet to ftreet. This he did for a long time with the greateft obftinacy, killing vaft numbers of the Moguls; and both parties are faid to have been fo much overcome with thirft, that they drank human blood to quench it. The Chinefe fet fire to the houfes, that the great beams, falling down, might embarrafs the way of their purfuers; but at laft, being quite wearied out, and filled with defpair, they put an end to their own lives. After the taking of Fan-ching, all the materials which had ferved at the fiege were tranfported to Seyenyang. The two engineers pofted themfelves againft a wooden retrenchment raifed on the ramparts. This they quickly demolifhed; and the befieged were fo intimidated by the noife and havock made by the ftones caft from thefe terrible engines, that they immediately furrendered.

40 Defperate conflict.

In 1274, Pe-yen, an officer of great valour, and endowed with many other good qualities, was promoted to the command of the Mogul army. His firft exploits were the taking of two ftrong cities; after which he paffed the great river Ky-ang, defeated the Song army, and laid fiege to Vu-chang-fu. This city was foon intimidated into a furrender; and Pe-yen, by reftraining the barbarity of his foldiers, whom he would not allow to hurt any body, foon gained the hearts of the Chinefe fo much, that feveral cities furrendered to him on the firft fummons. In the mean time the treacherous Kya-tfe-tau, who was fent to oppofe Pe-yen, was not afhamed to propofe peace on the terms he had formerly concluded with Hupilay; but thefe being rejected, he was obliged at length to come to an engagement. In this he was defeated, and Pe-yen continued his conquefts with great rapidity. Having taken the city of Nanking, and fome others, he marched towards Hang-chew-fu, the capital of the Song empire. Peace was now again propofed, but rejected by the Mogul general; and at laft the emprefs was conftrained to put herfelf, with her fon, then an infant, into the hands of Pe-yen, who immediately fent them to Hupilay.

41 Chinefe emprefs fubmits.

The fubmiffion of the emprefs did not yet put an end to the war. Many of the chief officers fwore to do their utmoft to refcue her from the hands of her enemies. In confequence of this refolution they diftributed their money among the foldiers, and foon got together an army of 40,000 men. This army attacked the city where the young emperor Kong-tfong was lodged, but without fuccefs; after which, and feveral other vain attempts, they raifed one of his brothers to the throne, who then took upon him the name of Twon-tfong. He was but nine years of age when he was raifed to the imperial dignity, and enjoyed it but a very fhort time. In 1277 he was in great danger of perifhing, by reafon of the fhip on board which he then was being caft away. The poor prince fell into the water, and was taken up half dead with the fright. A great part of his troops perifhed at that time, and he foon after made offers of fubmiffion to Hupilay. Thefe, however, were not accepted; for, in 1278, the unhappy Twon-tfong was obliged to retire into a little defert ifland on the coaft of Quang-tong, where he died in the 11th year of his age.

Notwithftanding the progrefs of the Moguls, vaft territories ftill remained to be fubdued before they could become mafters of all the Chinefe empire. On the death of Twon-tfong, therefore, the mandarins raifed to the throne his brother, named Te-ping, at that time but eight years of age. His army confifted of no fewer than 200,000 men; but being utterly void of difcipline, and entirely ignorant of the art of war, they were defeated by 20,000 Mogul troops. Nor was the fleet more fuccefsful; for being put in confufion by that of the Moguls, and the emperor in danger of falling into their hands, one of the officers taking him on his fhoulders, jumped with him into the fea, where they were both drowned. Moft of the mandarins followed this example, as did alfo the emprefs and minifter, all the ladies and maids of honour, and multitudes of others, infomuch that 100,000 people are thought to have perifhed on that day. Thus ended the Chinefe race of emperors; and the Mogul dynafty, known by the name of *Ywen*, commenced.

42 Diffolution of the Song empire.

Though no race of men that ever exifted were more remarkable for cruelty and barbarity than the Moguls; yet it doth not appear that the emperors of the Ywen dynafty were in any refpect worfe than their predeceffors. On the contrary, Hupilay, by the Chinefe called *Shi-tfu*, found the way of reconciling the people to his government, and even of endearing himfelf to them fo much, that the reign of his family is to this day ftyled by the Chinefe *the wife government*. This he accomplifhed by keeping as clofe as poffible to their ancient laws and cuftoms, by his mild and juft government, and by his regard for their learned men. He was indeed afhamed of the ignorance and barbarity of his Mogul fubjects, when compared with the Chinefe. The whole knowledge of the former was fummed up in their fkill in managing their arms and horfes, being perfectly deftitute of every art or fcience, or even of the knowledge of letters. In 1269, he had caufed the Mogul characters to be contrived

43 Reign of Hupilay.

China.

trived. In 1280, he caused some mathematicians search for the source of the river Whang-ho, which at that time was unknown to the Chinese themselves. In four months time they arrived in the country where it rises, and made a map of it, which they presented to his majesty. The same year a treatise on astronomy was published by his order; and, in 1282, he ordered the learned men to repair from all parts of the empire, to examine the state of literature, and take measures for its advancement.

At his first accession to the crown he fixed his residence at Tay-ywen-fu, the capital of Shen-si; but thought proper afterwards to remove it to Peking. Here, being informed that the barks which brought to court the tribute of the southern provinces, or carried on the trade of the empire, were obliged to come by sea, and often suffered shipwreck, he caused that celebrated canal to be made, which is at present one of the wonders of the Chinese empire, being 300 leagues in length. By this canal above 9000 imperial barks transport with ease, and at small expence, the tribute of grain, rice, silk, &c. which is annually paid to the court. In the third year of his reign Shi-tsu formed a design of reducing the islands of Japan, and the kingdoms of Tonquin and Cochin-china. Both these enterprises ended unfortunately, but the first remarkably so; for of 100,000 persons employed in it, only four or five escaped with the melancholy news of the destruction of the rest, who all perished by shipwreck. Shi-tsu reigned 15 years, died in the 80th year of his age, and was succeeded by his grandson. The throne continued in the Ywen family to the year 1367, when Shun-ti, the last of that dynasty, was driven out by a Chinese named Chu. During this period the Tartars had become enervated by long prosperity; and the Chinese had been roused into valour by their subjection. Shun-ti, the reigning prince, was quite sunk in sloth and debauchery; and the empire, besides, was oppressed by a wicked minister named *Ama*. In June 1355, Chu, a Chinese of mean extraction, and head of a small party, set out from How-chew, passed the Kyang, and took Tayping. He then associated himself with some other malcontents, at the head of whom he reduced the town of Tu-chew, in Kyang-nan. Soon after he made himself master of Nanking, having defeated the Moguls who came to its relief. In December 1356, he was able to raise 100,000 men, at the head of whom he took the city of U-chew, in the east borders of Quang-si; and here, assembling his generals, it was resolved neither to commit slaughter nor to plunder. The most formidable enemy he had to deal with was *Chen-yew-lyang*, styled, "emperor of the Han." This man being grieved at the progress made by Chu, equipped a fleet, and raised a formidable army, in order to reduce Nan-chang-fu, a city of Kyang-si, which his antagonist had made himself master of. The governor, however, found means to inform Chu of his danger; upon which that chief caused a fleet to be fitted out at Nanking, in which he embarked 200,000 soldiers. As soon as Chen-yew-lyang was informed of his enemy's approach, he raised the siege of Nan-chang-fu, and gave orders for attacking Chu's naval force. An engagement ensued between a part of the fleets, in which Chu proved victorious; and next day, all the squadrons having

44 Moguls driven out.

45 Exploits of Chu.

joined in order to come to a general engagement, Chu gained a second victory, and burnt 100 of the enemy's vessels. A third and fourth engagement happened, in both which Chu gained the victory; and in the last, Chen-yew-lyang himself was killed, his son taken prisoner, and his generals obliged to surrender themselves, with all their forces and vessels.

46 He is proclaimed king of U.

In January 1364, Chu's generals proposed to proclaim him emperor; but this he declined, and at first contented himself with the title of king of *U*. In February he made himself master of Vu-chang-fu, capital of Hu-quang: where, with his usual humanity, he relieved those in distress, encouraged the literati, and would allow his troops neither to plunder nor destroy. This wise conduct procured him an easy conquest both of Kyan-si and Hu-quang. The Chinese submitted to him in crowds, and professed the greatest veneration and respect for his person and government.

All this time Shun-ti, with an unaccountable negligence, never thought of exerting himself against Chu, but continued to employ his forces against the rebels who had taken up arms in various parts of the empire; so that Chu found himself in a condition to assume the title of emperor. This he chose to do at Nanking on the first day of the year 1368. After this his troops entered the province of Honan, which they presently reduced. In the third month, Chu, who had now taken the title of *Hong-vu* or *Tay-tsu*, reduced the fortress of Tong-quan; after which his troops entered Pecheli from Honan on the one side, and Shang-tong on the other. Here his generals defeated and killed one of Shun-ti's officers; after which they took the city of Tong-chew, and then prepared to attack the capital, from which they were now but 12 miles distant. On their approach the emperor fled with all his family beyond the great wall, and thus put an end to the dynasty of Ywen. In 1370 he died, and was succeeded by his son, whom the successor of Hong-vu drove beyond the Kobi or Great Desert, which separates China from Tartary. They continued their incursions, however, for many years; nor did they cease their attempts till 1583, when vast numbers of them were cut in pieces by the Chinese troops.

47 Becomes emperor of China.

48 Moguls driven beyond the desert.

49 China again conquered by the Tartars.

The 21st dynasty of Chinese emperors, founded in 1368 by Chu, continued till the year 1644, when they were again expelled by the Tartars. The last Chinese emperor was named Whay-tsong, and ascended the throne in 1628. He was a great lover of the sciences, and a favourer of the Christians; though much addicted to the superstitions of the Bonzes. He found himself engaged in a war with the Tartars, and a number of rebels in different provinces. That he might more effectually suppress the latter, he resolved to make peace with the former; and for that end sent one of his generals, named *Ywen*, into Tartary, at the head of an army, with full power to negotiate a peace; but that traitor made one upon such shameful terms, that the emperor refused to ratify it. Ywen, in order to oblige his master to comply with the terms made by himself, poisoned his best and most faithful general, named *Mau-ven-long*: and then desired the Tartars to march directly to Peking, by a road different from that which he took with his army. This they accordingly did, and laid siege to the capital.

B Ywen

China.

Ywen was ordered to come to its relief; but, on his arrival, was put to the torture and ſtrangled; of which the Tartars were no ſooner informed, than they raiſed the ſiege, and returned to their own country. In 1636, the rebels above mentioned compoſed four great armies, commanded by as many generals; which, however, were ſoon reduced to two, commanded by Li and Chang. Theſe agreed to divide the empire between them; Chang taking the weſtern provinces, and Li the eaſtern ones. The latter ſeized on part of Shen-ſi, and then on Honan, whoſe capital, named *Kay-fong-fu*, he laid ſiege to, but was repulſed with loſs. He renewed it ſix months after, but without ſucceſs; the beſieged chooſing rather to feed on human fleſh than ſurrender. The imperial forces coming ſoon after to its aſſiſtance, the general made no doubt of being able to deſtroy the rebels at once, by breaking down the banks of the Yellow river; but unfortunately the rebels eſcaped to the mountains, while the city was quite overflowed, and 300,000 of the inhabitants periſhed.

After this diſaſter, Li marched into the provinces of Shen-ſi and Honan; where he put to death all the mandarins, exacted great ſums from the officers in place, and ſhowed no favour to any but the populace, whom he freed from all taxes: by this means he drew ſo many to his intereſt, that he thought himſelf ſtrong enough to aſſume the title of emperor. He next advanced towards the capital, which, though well garriſoned, was divided into factions. Li had taken care to introduce beforehand a number of his men in diſguiſe: and by theſe the gates were opened to him the third day after his arrival. He entered the city in triumph at the head of 300,000 men, whilſt the emperor kept himſelf ſhut up in his palace, buſied only with his ſuperſtitions. It was not long, however, before he found himſelf betrayed; and, under the greateſt conſternation, made an effort to eſcape out of the palace, attended by about 600 of his guards. He was ſtill more ſurpriſed to ſee himſelf treacherouſly abandoned by them, and deprived of all hopes of eſcaping the inſults of his ſubjects. Upon this, preferring death to the diſgrace of falling alive into their hands, he immediately retired with his empreſs, whom he tenderly loved, and the princeſs her daughter, into a private part of the garden. His grief was ſo great that he was not able to utter a word; but ſhe ſoon underſtood his meaning, and, after a few ſilent embraces, hanged herſelf on a tree in a ſilken ſtring. Her huſband ſtaid only to write theſe words on the border of his veſt: "I have been baſely deſerted by my ſubjects; do what you will with me, but ſpare my people." He then cut off the young princeſs's head with one ſtroke of his ſcymitar, and hanged himſelf on another tree, in the 17th year of his reign, and 36th of his age. His prime miniſter, queens, and eunuchs, followed his example; and thus ended the Chineſe monarchy, to give place to that of the Tartars, which hath continued ever ſince.

50 Unhappy fate of the emperor and his family.

It was ſome time before the body of the unfortunate monarch was found. At laſt it was brought before the rebel Li, and by him uſed with the utmoſt indignity; after which he cauſed two of Whay-tſong's ſons, and all his miniſters, to be beheaded; but his eldeſt ſon happily eſcaped by flight. The whole empire ſubmitted peaceably to the uſurper, except Prince U-ſan-ghey, who commanded the imperial forces in the province of Lyau-tong. This brave prince, finding himſelf unable to cope with the uſurper, invited the Tartars to his aſſiſtance; and Tſong-te their king immediately joined him with an army of 80,000 men. Upon this the uſurper marched directly to Peking; but not thinking himſelf ſafe there, plundered and burnt the palace, and then fled with the immenſe treaſure he had got. What became of him afterwards we are not told; but the young Tartar monarch was immediately declared emperor of China, his father Tſong-te having died almoſt as ſoon as he ſet his foot on that empire.

The new emperor, named *Shun-chi*, or *Xun-chi*, began his reign with rewarding U-ſan-ghey, by conferring upon him the title of king; and aſſigned him the city of Si-gnan-fu, capital of Shen-ſi, for his reſidence. This, however, did not hinder U-ſan-ghey from repenting of his error in calling in the Tartars, or, as he himſelf uſed to phraſe it, "in ſending for lions to drive away dogs." In 1674, he formed a very ſtrong alliance againſt them, and had probably prevailed if his allies had been faithful; but they treacherouſly deſerted him one after another: which ſo affected him, that he died ſoon after. In 1681 Hong-wha, ſon to U-ſan-ghey, who continued his efforts againſt the Tartars, was reduced to ſuch ſtraits that he put an end to his own life.

During this time, ſome reſiſtance had been made to the Tartars in many of the provinces. Two princes of Chineſe extraction had at different times been proclaimed emperors; but both of them were overcome and put to death. In 1682, the whole 15 provinces were ſo effectually ſubdued, that the emperor Kang-hi, ſucceſſor to Shun-chi, determined to viſit his native dominions of Tartary. He was accompanied by an army of 70,000 men, and continued for ſome months taking the diverſion of hunting. For ſeveral years he repeated his viſits annually; and in his journeys took Father Verbieſt along with him; by which means we have a better deſcription of theſe countries than could have been otherwiſe obtained. This prince was a great encourager of learning and of the Chriſtian religion; and in favour of the latter he publiſhed a decree, dated in 1692. But in 1716, he revived ſome obſolete laws againſt the Chriſtians; nor could the Jeſuits with all their art preſerve the footing they had got in China. The cauſes of this alteration in his reſolution are, by the miſſionaries, ſaid to have been the ſlanders of the mandarins; but, from the known character of the Jeſuits, it will be readily believed, that there was ſomething more at bottom. This emperor died in 1722, and was ſucceeded by his ſon Yon-ching; who not only gave no encouragement to the miſſionaries, but perſecuted all Chriſtians of whatever denomination, not excepting even thoſe of the imperial race. At the beginning of his reign he baniſhed all the Jeſuits into the city of Canton, and in 1732 they were baniſhed from thence into Ma-kau, a little iſland inhabited by the Portugueſe, but ſubject to China. He died in 1736: but though the Jeſuits entertained great hopes from his ſucceſſor, we have not heard that they have yet met with any ſucceſs.

51 Empire totally reduced.

52 Chriſtianity firſt encouraged and then perſecuted.

Thus we have given an account of the moſt memorable

China.

rable tranfactions recorded in the Chinefe hiftory. We now proceed to defcribe the prefent ftate of the empire and its inhabitants, according to the beft and lateft accounts.

53
Climate, foil, and produce.

The climate as well as the foil of this extenfive empire is very different in different parts; fevere cold being often felt in the northern provinces, while the inhabitants of the fouthern ones are fcarcely able to bear the heat. In general, however, the air is accounted wholefome, and the inhabitants live to a great age.—The northern and weftern provinces have many mountains, which in the latter are cultivated, but in the north are barren, rocky, and incapable of improvement. On the mountains of Chenfi, Honan, Canton, and Fokien, are many forefts, abounding with tall ftraight trees, of different kinds, fit for building, and particularly adapted for mafts and fhip timber. Thefe are ufed by the emperor in his private buildings; and from thefe forefts enormous trunks are fometimes tranfported to the diftance of more than 300 leagues. Other mountains contain quickfilver, iron, tin, copper, gold, and filver. Formerly thefe laft were not allowed to be opened, left the people fhould thereby be induced to neglect the natural richnefs of the foil: and it is certain, that, in the 15th century, the emperor caufed a mine of precious ftones to be fhut, which had been opened by a private perfon. Of late, however, the Chinefe are lefs fcrupulous, and a great trade in gold is carried on by them. Many extravagant fables are told by the Chinefe of their mountains, particularly of one in Chenfi which throws out flames, and produces violent tempefts, whenever any one beats a drum or plays on a mufical inftrument near it. In the province of Fokien is a mountain the whole of which is an idol, or ftatue of the god Fo. This natural coloffus, for it appears not to have been the work of art, is of fuch an enormous fize, that each of its eyes is feveral miles in circumference, and its nofe extends fome leagues.

54
Lakes and rivers.

China has feveral large lakes; the principal one is that named Poyang-hou, in the province of Kiang-fi. It is formed by the confluence of four large rivers; extends near 100 leagues in length; and, like the fea, its waters are raifed into tempeftuous waves. The empire is watered by an immenfe number of rivers of different fizes, of which two are particularly celebrated, viz. the *Yang-tfe-kiang*, or *fon of the fea*, and *Hoang-ho*, or the *yellow river*. The former rifes in the province of Yunan, and paffing through Houquang and Kiang-nan, falls into the eaftern ocean, after a courfe of 1200 miles, oppofite to the ifland of Tfon-ming, which is formed by the fand accumulated at its mouth. This river is of immenfe fize, being half a league broad at Nanking, which is near 100 miles from its mouth. The navigation is dangerous, fo that great numbers of veffels are loft on it. It runs with a rapid current, forming feveral iflands in its courfe, which are again carried off, and new ones formed in different places, when the river is fwelled by the torrents from the mountains. Thefe iflands, while they remain, are very ufeful; producing great quantities of reeds ten or twelve feet high, which are ufed in all the neighbouring countries for fuel. The Hoang-ho, or Yellow-river, has its name from the yellow colour given it by the clay and fand wafhed down in the time of rain. It rifes in the mountains which border the province of Te-tchuen on the weft, and after a courfe of near 600 leagues, difcharges itfelf into the eaftern fea, not far from the mouth of the Kiang. It is very broad and rapid, but fo fhallow that it is fcarcely navigable. It is very liable to inundations, often overflowing its banks, and deftroying whole villages. For this reafon it has been found neceffary to confine it in feveral places by long and ftrong dikes, which yet do not entirely anfwer the purpofe. The people of Honan, therefore, whofe land is exceedingly low, have furrounded moft of their cities with ftrong ramparts of earth, faced with turf, at the diftance of three furlongs.

55
Canals.

The Chinefe have been at great pains to turn their lakes and rivers to the advantage of commerce, by promoting an inland navigation. One of their principal works for this purpofe is the celebrated canal reaching from Canton to Peking, and forming a communication between the fouthern and northern provinces. This canal extends through no lefs a fpace than 600 leagues; but its navigation is interrupted in one place by a mountain, where paffengers are obliged to travel 10 or 12 leagues over land. A number of other canals are met with in this and other provinces; moft of which have been executed by the induftry of the inhabitants of different cities and towns, in order to promote their communication with the various parts of the empire. M. Grofier remarks, that, in thefe works, the Chinefe have "furmounted obftacles that perhaps would have difcouraged any other people: fuch, for example, is part of a canal which conducts from *Chao-king* to *Ning-po*." Near thefe cities there are two canals, the waters of which do not communicate, and which differ ten or twelve feet in their level. To render this place paffable for boats, the Chinefe have conftructed a double glacis, of large ftones, or rather two inclined planes, which unite as an acute angle at their upper extremity, and extend on each fide to the furface of the water. If the bark is in the lower canal, they pufh it up the plane of the firft glacis by means of feveral capftans until it is raifed to the angle, when by its own weight it glides down the fecond glacis, and precipitates itfelf into the water of the higher canal with the velocity of an arrow. It is aftonifhing that thefe barks, which are generally very long and heavily loaden, never burft afunder when they are balanced on this acute angle; however, we never hear of any accident of this kind happening in the paffage. It is true they take the precaution of ufing for their keels a kind of wood which is exceedingly hard, and proper for refifting the violence of fuch an effort.

56
Remarkable river which partly finks under ground.

The following remarkable phenomenon in a Chinefe river is related by Father le Couteux, a French miffionary. "Some leagues above the village Che-pai, (fays he), the river becomes confiderably fmaller, although none of its waters flow into any other channel; and eight or nine leagues below, it refumes its former breadth, without receiving any additional fupply, excepting what it gets from a few fmall rivulets, which are almoft dry during the greater part of the year. Oppofite to Che-pai it is fo much diminifhed, that, excepting one channel, which is not very broad, I have paffed and repaffed it feveral times by the help of a com-

mon pole. I was always furprifed to find this river fo narrow and fhallow in that place : but I never thought of inquiring into the caufe of it, until the lofs of a bark belonging to a Chriftian family afforded me an opportunity. In that place where the river diminifhes almoft of a fudden, it flows with great impetuofity ; and where it refumes its former breadth it is equally rapid. At the fixth moon, when the water was high and the wind ftrong, the bark I have mentioned arriving above Che-pai, was driven on a fand-bank ; for between thefe two places the river is full of moveable fands, which are continually fhifting their fituation. The mafter of the boat dropped his anchor until the wind fhould abate, and permit him to continue his voyage ; but a violent vortex of moveable fand, which was caft up from the bottom of the river, laid the bark on its fide ; a fecond vortex fucceeded ; then a third ; and afterwards a fourth, which fhattered the bark to pieces. When I arrived at the place where this bark had been loft, the weather was mild and ferene ; I perceived eddies in the current everywhere around, which abforbed, and carried to the bottom of the river, whatever floated on the furface ; and I obferved, at the fame time, that the fand was thrown violently up with a vortical motion. Above thefe eddies the water was rapid, but without any fall ; and in the place below, where the river refumes its ufual courfe, no eddies are to be feen, but the fand is thrown up in the fame violent manner ; and in fome places there are water-falls and a kind of fmall iflands fcattered at fome diftance from one another. Thefe iflands which appear above the furface of the water, are not folid earth, but confift of branches of trees, roots, and herbs collected together. I was told that thefe boughs rofe up from the water, and that no one knew the place from whence they came. I was informed that thefe maffes, which were 40 or 50 feet in extent on that fide on which we paffed, were immoveable and fixed in the bottom of the river ; that it was dangerous to approach them, becaufe the water formed whirlpools everywhere around them ; that, however, when the river was very low, the fifhermen fometimes ventured to collect the bufhes that floated on its furface, and which they ufed for fuel. I am of opinion, that, at the place of the river which is above Che-pai, the water falls into deep pits, from whence it forces up the fand with that vortical motion ; and that it flows under-ground to the other place, eight or nine leagues below, where it carries with it all the boughs, weeds, and roots, which it wafhes down in its courfe, and thus forms thofe iflands which appear above its furface. We know there are fome rivers that lofe themfelves entirely, or in part, in the bowels of the earth, and which afterwards arife in fome other place ; but I believe there never was one known to lofe part of its water below its own channel, and again to recover it at the diftance of fome leagues."

57
Why China is fubject to famines, notwithftanding its fertility.

It has already been faid, that China is, in general, a fertile country ; and indeed all travellers agree in this refpect, and make encomiums on the extent and beauty of its plains. So careful are the hufbandmen of this empire to lofe none of their ground, that neither inclofure, hedge, nor ditch, nay, fcarce a fingle tree, are ever to be met with. In feveral places the land yields two crops a-year ; and even in the interval between the harvefts the people fow feveral kinds of pulfe and fmall grain. The plains of the northern provinces yield wheat ; thofe of the fouthern, rice, becaufe the country is low and covered with water. Notwithftanding all this fertility, however, the inhabitants are much more frequently afflicted with famine than thofe of the European nations, though the countries of Europe produce much lefs than China. For this two caufes are affigned. 1. The deftruction of the rifing crops by drought, hail, inundations, locufts, &c. in which cafe China cannot like the European countries be fupplied by importation. This is evident by confidering how it is fituated with regard to other nations. On the north are the Mogul Tartars, a lazy and indolent race, who fubfift principally on the flefh of their flocks ; fowing only a little millet for their own ufe. The province of Leatong, which lies to the north-eaft, is indeed extremely fertile, but too far diftant from the capital and centre of the empire to fupply it with provifions ; and befides, all carriage is impracticable but in the winter, when great quantities of game and fifh, preferved in ice, are fent thither. No corn is brought from Corea to China ; and though the Japan iflands are only three or four days failing from the Chinefe provinces of Kiang-nan and Che-kyang, yet no attempt was ever made to obtain provifions from thence ; whether it be that the Japanefe have nothing to fpare, or on account of the infults offered by thefe iflanders to foreign merchants. Formofa lies oppofite to the province of Fo-kien ; but fo far is that ifland from being able to fupply any thing, that in a time of fcarcity it requires a fupply from China itfelf. The province of Canton is alfo bounded by the fea, and has nothing on the fouth but iflands and remote countries. One year, when rice was exceedingly fcarce there, the emperor fent for F. Parranin, a Jefuit miffionary, and afked him if the city of Macao could not furnifh Canton with rice until the fupply he had ordered from other provinces fhould arrive : but was informed that Macao had neither rice, corn, fruit, herbs, nor flocks, and that it generally got from China what was neceffary for its fubfiftence.—The only method, therefore, the Chinefe can take to guard againft famines arifing from thefe caufes, is to erect granaries and public magazines in every province and moft of the principal cities of the empire. This has at all times been a principal object of care to the public minifters ; but though this mode of relief ftill takes place in theory, fo many ceremonies are to be gone through before any fupply can be drawn from thofe public repofitories, that it feldom arrives feafonably at the places where it is wanted : and thus numbers of unhappy wretches perifh for want. 2. Another caufe of the fcarcity of grain in this empire, is the prodigious confumption of it in the compofition of wines, and a fpirituous liquor called *rack*. But though government is well apprized that this is one of the principal fources of famine throughout the empire, it never employed means fufficient to prevent it. Proclamations indeed have frequently been iffued, prohibiting the diftillation of rack ; and the appointed officers will vifit the ftill-houfes and deftroy the furnaces if nothing is given them ; but on flipping fome money into their hands, they fhut their eyes, and go fomewhere

China.

where elſe to receive another bribe. When the mandarin himſelf goes about, however, theſe diſtillers do not eſcape quite ſo eaſily, the workmen being whipped and impriſoned, after which they are obliged to carry a kind of collar called the *Cangue;* the maſters are likewiſe obliged to change their habitations and conceal themſelves for a ſhort time, after which they generally reſume their operations. It is impoſſible, however, that any method of this kind can prove effectual in ſuppreſſing theſe manufactories while the liquors themſelves are allowed to be ſold publicly; and againſt this there is no law throughout the empire. Our author, however, juſtly obſerves, that in caſe of a prohibition of this kind, the grandees would be obliged to deny themſelves the uſe of theſe luxuries, which would be too great a ſacrifice for the good of the empire.

58 Immenſe population.

The population of China, is ſo great, in compariſon with that of the European countries, that the accounts of it have generally been treated as fabulous by the weſtern nations; but by an accurate inveſtigation of ſome Chineſe records concerning the number of perſons liable to taxation throughout the empire, M. Groſier has ſhowed that it cannot be leſs than 200 millions. For this extraordinary population he aſſigns the following cauſes. 1. The ſtrict obſervance of filial duty throughout the empire, and the prerogatives of fraternity, which make a ſon the moſt valuable property of a father. 2. The infamy attached to the memory of thoſe who die without children. 3. The univerſal cuſtom by which the marriage of children becomes the principal concern of the parents. 4. The honours beſtowed by the ſtate on thoſe widows who do not marry a ſecond time. 5. Frequent adoptions, which prevent families from becoming extinct. 6. The return of wealth to its original ſtock by the diſinheriting of daughters. 7. The retirement of wives, which renders them more complaiſant to their huſbands, ſaves them from a number of accidents when big with child, and conſtrains them to employ themſelves in the care of their children. 8. The marriage of ſoldiers. 9. The fixed ſtate of taxes; which being always laid upon lands, never fall but indirectly on the trader and mechanic. 10. The ſmall number of ſailors and travellers. 11. To theſe may be added the great number of people who reſide in China only by intervals; the profound peace which the empire enjoys; the frugal and laborious manner in which the great live; the little attention that is paid to the vain and ridiculous prejudice of marrying below one's rank; the ancient policy of giving diſtinction to men and not to families, by attaching nobility only to employments and talents, without ſuffering it to become hereditary. And, 12. laſtly, A decency of public manners, and a total ignorance of ſcandalous intrigues and gallantry.

Extravagant, however, and almoſt incredible as this account of the population of China may appear to ſome, we have very high and reſpectable authority for believing that it is much below the truth. Whether the cauſes of this phenomenon, as above enumerated by M. Groſier, be the only ones aſſignable, it is certain that the immenſe population of this country amounted to 333,000,000 at the time when Sir George Staunton* viſited it in the capacity of ſecretary to the Britiſh plenipotentiary, as appears from the following eſtimate of the population of each province, made by Chow-ta-zhin, and taken from his official documents.

59 Population of the different provinces.

Provinces.		Population.
Pe-che-lee,		38,000,000
Kiang-nan, two provinces,		32,000,000
Kiang-ſee,		19,000,000
Tche-kiang,		21,000,000
Fo-chen,		15,000,000
Hou-pe,	Houquang,	14,000,000
Hou-nan,		13,000,000
Ho-nan,		25,000,000
Shan-tung,		24,000,000
Shan-ſee,		27,000,000
Shen-ſee,		18,000,000
Kan-ſou,		12,000,000
Se-chuen,		27,000,000
Canton,		21,000,000
Quang-ſee,		10,000,000
Yu-nan,		8,000,000
Koei-cheou,		9,000,000
		333,000,000

This prodigious ſum total may exceed the belief of thoſe who are only accuſtomed to calculate from analogy, not recollecting that China cannot have its population reduced by thoſe fertile cauſes, *war* and *debauchery*, the former deſtroying mankind by thouſands, and the latter rendering them unproductive.

60 Unlimited authority of the emperor.

The government of China, according to the Abbé Groſier, is purely patriarchal. The emperor is more unlimited in his authority than any other potentate on earth; no ſentence of death, pronounced by any of the tribunals, can be executed without his conſent, and every verdict in civil affairs is ſubject to be reviſed by him; nor can any determination be of force until it has been confirmed by the emperor: and, on the contrary, whatever ſentence he paſſes is executed without delay; his edicts are reſpected throughout the empire as if they came from a divinity; he alone has the diſpoſal of all offices, nor is there any ſuch thing as the purchaſe of places in China; merit, real or ſuppoſed, raiſes to an office, and rank is attached to it only. Even the ſucceſſion to the throne is not altogether hereditary. The emperor of China has a power of chooſing his own ſucceſſor without conſulting any of his nobility; and can ſelect one not only from among his own children, but even from the body of his people; and there have been ſeveral inſtances of his making uſe of this right: and he has even a power of altering the ſucceſſion after it has once been fixed, in caſe the perſon pitched upon does not behave towards him with proper reſpect. The emperor can alſo prevent the princes of the blood from exerciſing the title, with which, according to the conſtitution of the empire, they are inveſted. They may, indeed, notwithſtanding this, poſſeſs their hereditary dignity; in which caſe they are allowed a revenue proportioned to their high birth, as well as a palace, officers, and a

* In 1793.

a court; but they have neither influence nor power, and their authority is lower than that of the meanest mandarin.

61 Mandarins of different classes.

The mandarins are of two classes, viz. those of letters, and the inferior sort styled mandarins of arms. The latter by no means enjoy the same consideration with the former sort; indeed in China the literati are highly honoured, and to their influence M. Grosier supposes that we may in a great measure ascribe the mildness and equity of the government; though he thinks that the balance may incline rather too much in their favour. Several degrees, answering to those of bachelor, licentiate, and doctor, must be passed through before one can attain to the dignity of a mandarin of letters; though sometimes, by the favour of the emperor, it is conferred on those who have attained only the two first degrees: but even the persons who have gone through all the three, enjoy at first only the government of a city of the second or third class. When several vacancies happen in the government of cities, the emperor invites to court a corresponding number of the literati, whose names are written down in a list. The names of the vacant governments are then put into a box, raised so high that the candidates are able only to reach it with their hands; after which they draw in their turns, and each is appointed governor of the city whose name he has drawn.

There are eight orders of these mandarins in China. 1. The *calao*, from whom are chosen the ministers of state, the presidents of the supreme courts, and all the superior officers among the militia. The chief of this order presides also in the emperor's council, and enjoys a great share of his confidence. 2. The *te-hiose*, or man of acknowledged ability, is a title bestowed upon every mandarin of the second rank; and from these are selected the viceroys and presidents of the supreme council in the different provinces. 3. The *tchong-tchueo*, or school of mandarins, act as secretaries to the emperor. 4. *Y-tchuen-tao*. These keep in repair the harbours, royal lodging houses, and barks which belong to the emperor, unless particularly engaged in some other office by his order. 5. The *ting-pi-tao* have the inspection of the troops. 6. The *tun-tien-hao* have the care of the highways 7. The *ho-tao* superintend the rivers. 8. The *hai-tao* inspect the sea coasts.

Thus the whole administration of the Chinese empire is intrusted to the mandarins of letters; and the homage paid by the common people to every mandarin in office almost equals that paid to the emperor himself. This indeed flows from the nature of their government. In China it is a received opinion that the emperor is the father of the whole empire; that the governor of a province is the father of that province; and that the mandarin who is governor of a city is also the father of that city. This idea is productive of the highest respect and submission, which is not at all lessened by their great number; for though the mandarins of letters amount to more than 14,000, the same respect is paid to every one of them.

The mandarins of arms are never indulged with any share in the government of the state; however, to attain to this dignity, it is also necessary to pass through the degrees of bachelor, licentiate, and doctor of arms. The accomplishments necessary for a mandarin of arms are, strength of body, with agility and readiness in performing the various military exercises, and comprehending the orders requisite for the profession of arms; an examination on these subjects must be undergone before the candidate can attain the wished-for dignity.

62 Tribunal of the mandarins of arms.

The mandarins of arms have tribunals, the members of which are selected from among their chiefs; and among these they reckon princes, counts, and dukes; for all these dignities, or something equivalent to them, are met with in China. The principal of these tribunals is held at Peking, and consists of five classes: 1. The mandarins of the rear-guard, called *heou-fou*. 2. Of the left wing, or *tsa-fou*. 3. Of the right wing, or *yeou-feou*. 4. Of the advanced main-guard, or *te-hong-fou*. 5. Of the advanced guard, or *tsien-fou*. These five tribunals are subordinate to one named *iong-tching-fou*; the president of which is one of the great lords of the empire, whose authority extends over all the military men of the empire. By his high dignity he could render himself formidable even to the emperor; but to prevent this inconvenience, he has for his assessor a mandarin of letters, who enjoys the title and exercises the function of superintendant of arms. He must also take the advice of two inspectors who are named by the emperor; and when these four have agreed upon any measure, their resolution must still be submitted to the revisal of a higher court named *ping-pou*, which is entirely of a civil nature. The chief of these mandarins is a general of course, whose powers are equivalent to those of our commanders in chief; and below him are other mandarins who act as subordinate officers.

These two classes of mandarins compose what is called the nobility of China: but as we have already hinted, their office is not hereditary; the emperor alone continues or confers it. They have the privilege of remonstrating to the emperor, either as individuals or in a body, upon any part of his conduct which appears contrary to the interest of the empire. These remonstrances are seldom ill received, though the sovereign complies with them only when he himself thinks proper. The number of literary mandarins in China is computed at upwards of 14,000; and those of arms at 18,000; the former, however, are considered as the principal body in the empire; and this preference is thought to damp the military ardour of the nation in general, and to be one cause of that weakness in war for which the Chinese are remarkable.

63 Military force.

The armies of this empire are proportioned to its vast extent and population; being computed in time of peace at more than 700,000. Their pay amounts to about two-pence halfpenny and a measure of rice per day, though some of them have double pay, and the pay of a horseman is double that of a foot soldier; the emperor furnishes a horse, and the horseman receives two measures of small beans for his daily subsistence; the arrears of the army being punctually paid up every three months.

The arms of a horseman are, a helmet, cuirass, lance, and sabre; those of a foot soldier are a pike and sabre; some have fusees, and others bows and arrows. All these are carefully inspected at every review; and if any of them are found in the least rusted, or otherwise

in

China.

in bad condition, the poffeffor is inftantly punifhed; if a Chinefe, with 30 or 40 blows of a ftick; or if a Tartar, with as many lafhes.

64
Ufe of fire-arms loft and revived.

Though the ufe of gun-powder is certainly very ancient in China, it appears to have been afterwards totally loft, at leaft fire-arms feem to have been almoft entirely unknown fome centuries ago. Three or four cannon were to be feen at that time about the gates of Nanking; but not a fingle perfon in China knew how to make ufe of them; fo that, in 1621, when the city of Macao made a prefent of three pieces of artillery to the emperor, it was found neceffary alfo to fend three men to load them. The utility of thefe weapons was quickly perceived by the execution which the three cannon did againft the Tartars, at that time advanced as far as the great wall. When the invaders threatened to return, the mandarins of arms gave it as their opinion, that cannons were the beft arms they could make ufe of againft them. They were then taught the art of cafting cannon by F. Adam Schaal and Verbieft, two Jefuit miffionaries, and their artillery was increafed to the number of 320 pieces; at the fame time that they were inftructed in the method of fortifying towns, and conftructing fortreffes and other buildings according to the rules of modern architecture.

The beft foldiers in China are procured from the three northern provinces, the others being feldom called forth, but allowed to remain at peace with their families; indeed there is not often occafion for exerting their military talents, unlefs it be in the quelling of an infurrection, when a mandarin or governor ufually accompanies them. They march in a very tumultuous manner, but want neither fkill nor agility in performing their different evolutions. They, in general, handle a fabre well, and fhoot very dexteroufly with bows and arrows. There are in China more than 2000 places of arms; and through the different provinces there are difperfed about 3000 towers or caftles, all of them defended by garrifons. Soldiers continually mount guard there; and on the firft appearance of tumult, the neareft fentinel makes a fignal from the top of the tower, by hoifting a flag in the day-time, or lighting a torch in the night; when the neighbouring garrifons immediately repair to the place where their prefence is neceffary.

65
Account of the great wall.

The principal defence of the empire againft a foreign enemy is the great wall which feparates China from Tartary, extending more than 1500 miles in length, and of fuch a thicknefs that fix horfemen may eafily ride abreaft upon it. It is flanked with towers two bow-fhots diftant from one another; and it is faid that a third of the able-bodied men in the empire were employed in conftructing it. The workmen were ordered, under pain of death, to place the materials fo clofely, that not the leaft entrance might be afforded for any inftrument of iron; and thus the work was conftructed with fuch folidity, that it is ftill almoft entire, though 2000 years have elapfed fince it was conftructed. This extraordinary work is carried on not only through the low lands and valleys, but over hills and mountains; the height of one of which was computed by F. Verbieft at 1236 feet above the level of the fpot where he ftood. According to F. Martini it begins at the gulf of Lea-tong, and reaches to the mountains near the city of Kin on the Yellow river; between which places it meets with no interruption except to the north of the city of Suen in the province of Pecheli, where it is interrupted by a ridge of hideous and inacceffible mountains, to which it is clofely united. It is likewife interrupted by the river Hoang-ho; but for others of an inferior fize, arches have been conftructed, through which the water paffes freely. Mr Bell informs us, that it is carried acrofs rivers, and over the tops of the higheft hills, without the leaft interruption, keeping nearly along that circular range of barren rocks which inclofes the country; and, after running about 1200 miles, ends in impaffable mountains and fandy deferts. The foundation confifts of large blocks of ftone laid in mortar; but all the reft is of brick. The whole is fo ftrong and well built, that it fcarcely needs any repairs; and, in the dry climate in which it ftands, may remain in the fame condition for many ages. When carried over fteep rocks, where no horfe can pafs, it is about 15 or 20 feet high, but when running through a valley, or croffing a river, it is about 30 feet high, with fquare towers and embrafures at equal diftances. The top is flat and paved with cut ftone; and where it rifes over a rock or eminence, there is an afcent made by an eafy ftone ftair. "This wall (our author adds) was begun and completely finifhed in the fhort fpace of five years; and it is reported, that the labourers ftood fo clofe for many miles, that they could hand the materials from one to another. This feems the more probable, as the rugged rocks among which it is built muft have prevented all ufe of carriages; and neither clay for making bricks, nor any kind of cement are to be found among them."

To this account of the moft aftonifhing production of human labour and induftry to be met with on the face of the earth, we may add, that if to its prodigious length of 1500 miles, we affume as true, the probable conjecture that its dimenfions throughout are nearly the fame as where it was croffed by the Britifh embaffy, it contains materials more than fufficient to erect all the dwelling houfes in England and Scotland, even admitting their number to be 1,800,000, and each to contain 2000 cubic feet of mafonry. In this calculation the huge projecting maffes of ftone called towers, are not included, which of themfelves would erect a city as large as London. To affift the conceptions of our readers ftill farther refpecting this fingular and ftupendous fabric, we fhall only obferve, that were its materials converted into a wall 12 feet high and four feet thick, it would poffefs fufficient length to furround the globe, at its equatorial circumference.

66
Courts by which the civil government is managed.

The whole civil government of China is managed by the following courts. 1. The emperor's grand council, compofed of all the minifters of ftate, prefidents and affeffors of the fix fovereign courts, and of three others, to be afterwards mentioned. This is never affembled but on affairs of the greateft importance; the emperor's private council being fubftituted to it in all cafes of fmaller moment. 2. The chief of the other courts furnifhes mandarins for the different provinces, watches over their conduct, keeps a journal of their tranfactions, and informs the emperor of them, who rewards or punifhes according to the report he gets.

This

China.

This ſecond tribunal, which may be called a kind of civil inquiſition, is ſubdivided into four others; the firſt entruſted with the care of ſelecting thoſe who, on account of their learning or other good properties, are capable of filling the offices of government; the ſecond appointed to take care of the conduct of the mandarins; the third affixing the ſeals to the different public acts, giving the ſeals to mandarins, and examining thoſe of the different diſpatches; while the fourth inquires into the merit of the grandees of the empire, not excepting the princes of the imperial blood themſelves. The principal ſovereign court to which theſe four laſt are ſubordinate is called *Lü-pou.*

2. *Hou-pou*, or the grand treaſurer, ſuperintends all the finances of the ſtate; is the guardian and protector of the treaſures and dominions of the emperor, keeping an account of his revenues, &c. ſuperintending the management and coining of money, the public magazines, cuſtomhouſes; and, laſtly, keeping an exact regiſter of all the families in the empire. To aſſiſt this court, 14 others are appointed throughout the different provinces of the empire.

3. *Li-pou*, or the court of ceremonies. "It is an undoubted fact (ſays M. Groſier), that ceremonies form, in part, the baſe of the Chineſe government. This tribunal therefore takes care to ſupport them, and enforce their obſervance; it inſpects alſo the arts and ſciences. It is conſulted by the emperor when he deſigns to confer particular honours; takes care of the annual ſacrifices offered up by him, and even regulates the entertainments which he gives either to ſtrangers or to his own ſubjects. It alſo receives and entertains foreign ambaſſadors, and preſerves tranquillity among the different religious ſects in the empire. It is aſſiſted by four inferior tribunals.

4. *Ping-pou*, or the tribunal of arms, comprehends in its juriſdiction the whole militia of the empire; inſpecting alſo the fortreſſes, magazines, arſenals, and ſtore-houſes of every kind, as well as the manufactories of arms both offenſive and defenſive; examining and appointing officers of every rank. It is compoſed entirely of mandarins of letters; and the four tribunals depending upon it conſiſt alſo of literati."

5. The *hong-pou*, is a criminal bench for the whole empire, and is aſſiſted by 14 ſubordinate tribunals.

6. The *cong pou*, or tribunal of public works, ſurveys and keeps in repair the emperor's palaces, as well as thoſe of the princes and viceroys, and the buildings where the tribunals are held, with the temples, tombs of the ſovereigns, and all public monuments. It has beſides the ſuperintendance of the ſtreets, public highways, bridges, lakes, rivers, and every thing relating either to internal or foreign navigation. Four inferior tribunals aſſiſt in the diſcharge of theſe duties; the firſt drawing the plans of public works; the ſecond directing the work-ſhops in the different cities of the empire; the third ſurveying the cauſeways, roads, bridges, canals, &c.; and the fourth taking care of the emperor's palaces, gardens, and orchards, and receiving their produce.

67 Partiality of government towards the Chineſe.

All the tribunals are compoſed, one half of Chineſe, and the other of Tartars; and one of the preſidents of each ſuperior tribunal is always a Tartar born. None of the courts above deſcribed, however, has abſolute authority even in its own juriſdiction; nor can its deciſions be carried into execution without the concurrence of another tribunal, and ſometimes of ſeveral others. The fourth tribunal, for inſtance, has indeed under its juriſdiction the whole troops of the empire; but the payment of them is entruſted with the ſecond; while the ſixth has the care of the arms, tents, chariots, barks, and ſtores neceſſary for military operations; ſo that nothing relative to theſe can be put in execution without the concurrence of all the three tribunals.

68 Cenſors.

To prevent any unlawful combination among the tribunals, each has its *cenſor* appointed. This is an officer whoſe duty is merely to watch over the proceedings of the court, without deciding upon any thing himſelf. He aſſiſts therefore at all aſſemblies, reviſes all their acts, and without acquainting the court in the leaſt with either his ſentiments or intentions, immediately informs the emperor of what he judges to be amiſs. He likewiſe gives information of the behaviour of the mandarins, either in the public adminiſtration of affairs, or in their private conduct; nay, ſometimes he will not ſcruple to reprimand the emperor for what he ſuppoſes to be erroneous in his conduct.

Theſe cenſors are never removed from their places but in order to be promoted; and thus, holding their offices for life, they have the greater courage to ſpeak out when they obſerve any impropriety or abuſe. Their accuſation is ſufficient to ſet on foot an inquiry, which generally leads to a proof; in which caſe the accuſed is diſcharged from his office, and never held in any eſtimation afterwards. The complaints of the cenſors, however, are referred to the very tribunal againſt whoſe members they complain; though, being afraid of an accuſation themſelves, they very ſeldom paſs ſentence againſt the accuſers.

Beſides all this, the cenſors alſo form a tribunal of their own, named *tou-tche-yven.* Its members have a right of remonſtrating with the emperor, whenever his own intereſt or that of the public renders it neceſſary. They inſpect all lawyers and military men in public employments. "In ſhort (ſays M. Groſier), they are, morally ſpeaking, placed between the prince and the mandarins; between the mandarins and the people; between the people and families; between families and individuals; and they generally unite to the importance of their office incorruptible probity and invincible courage. The ſovereign may, if he proceeds to rigour, take away their lives; but many of them have patiently ſuffered death, rather than betray the cauſe of truth or wink at abuſes. It is not ſufficient therefore to have got rid of one, they muſt all be treated in the ſame manner; the laſt that might be ſpared would tread in the ſame ſteps with no leſs reſolution than thoſe who went before him. In the annals of no nation do we find an example of ſuch a tribunal, yet it appears to be neceſſary in all without exception. We muſt not, however, imagine, that the privileges of a cenſor give him a right to forget his duty to his ſovereign, or to communicate to the public thoſe remarks which he takes the liberty of making to him: were he only to give the leaſt hint of them to his colleagues, he would be puniſhed with death; and he would ſhare the ſame fate did he, in any of his repre-ſentations,

China.

sentations, suffer a single word, inconsistent with moderation or respect, to escape him."

69
Two courts peculiar to China.

There are still two other courts in China, both of them peculiar to the empire, which deserve to be mentioned. The first is that of princes; and which, in conformity with its title, is composed of princes only. In the registers of this tribunal are inscribed the names of all the children of the imperial family as soon as they are born: and to these are also consigned the dignities and titles which the emperor confers upon them. This is the only tribunal where the princes can be tried; and here they are absolved or punished according to the pleasure of the judges.

The other tribunal is that of history, called by the Chinese *han-lin-yvan*. It is composed of the greatest geniuses of the empire, and of men of the most profound erudition. These are entrusted with the education of the heir apparent to the throne, and the compilation and arrangement of the general history of the empire; which last part of their office renders them formidable even to the emperor himself. From this body the mandarins of the first class, and the presidents of the supreme class, are generally chosen.

70
Filial piety the basis of all their laws.

The basis of all the civil laws of the Chinese is filial piety. Every mandarin, who is a governor either of a province or city, must instruct the people assembled round him twice a-month, and recommend to them the observance of certain salutary rules, which are summed up in a few short sentences, and such as no person can ever be supposed capable of forgetting.

71
Of their marriages.

The Chinese are allowed only to have one wife, whose rank and age must be nearly equal to that of their husbands; but they are allowed to have several concubines, whom they may admit into their houses without any formality, after paying the parents a sum of money, and entering into a written engagement to use their daughters well. These concubines, however, are all in subjection to the lawful wife; their children are considered as hers; they address her as mother, and can give this title to her only. A person that has once been married, whether man or woman, may lawfully marry again, but it is then no longer necessary to study equality of age or condition. A man may choose his second wife from among his concubines; and, in all cases, this new marriage requires very few formalities. A widow is absolute mistress of herself, and can neither be compelled by her parents to marry again, nor continue in a state of widowhood, contrary to her own inclination. Those of moderate rank, however, who have no children, do not enjoy the same privilege; as the parents of the former husband can dispose of her in marriage, not only without her consent, but without her knowledge. The law authorizes the disposal of them in this manner, in order to indemnify the relations of the deceased husband for the money they may have cost him. If the wife is left big with child, this cannot take place, until she is delivered; nor can it be done at all if she brings forth a son. There are likewise two exceptions; 1. when the parents of the widow assign her a proper maintenance; and, 2. if the widow embraces a religious life, and becomes a bonzesse.

72
Divorces, unlawful marriages, &c.

Divorces are allowed in China in cases of adultery, mutual dislike, incompatibility of tempers, jealousy, &c. No husband, however, can put away or sell his wife until a divorce is legally obtained; and if this regulation be not strictly observed, the buyer and seller become equally culpable. If a wife, lawfully married, privately withdraws herself from her husband, he may immediately commence an action at law; by the sentence of which she becomes his slave, and he is at liberty to sell her to whom he pleases. On the other hand, if a husband leaves his wife for three years, she is at liberty, after laying her case before the mandarins, to take another husband; but if she were to anticipate their consent, she would be liable to a severe punishment.

Marriage is deemed illegal in China in the following cases. 1. If the young woman has been betrothed to a young man, and presents have been given and received by the parents of the intended husband and wife. 2. If in the room of a beautiful young woman another be substituted of a disagreeable figure; or if the daughter of a free man marry his slave; or if any one give his slave to a free woman, pretending to her parents that he is his son or relation. In all these cases the marriage is null and void; and all those who have had any share in making up the match are severely punished.

3. Any mandarin of letters is forbidden to form an alliance with any family residing in the province or city of which he is governor.

4. No Chinese youth can enter into a state of marriage during the time of mourning for his father or mother; and if promises have been made before, they cease immediately on that event taking place. After the usual time of mourning is expired, however, the parents of the intended bride are obliged to write to those of the young man, putting him in mind of his engagement.

5. Marriage is also suspended when a family experiences any severe misfortune, and even if a near relation were thrown into prison; though this may be set aside, provided the unfortunate person gives his consent.

6. Two brothers cannot marry two sisters; nor is a widower at liberty to marry his son to the daughter of a widow whom he chooses for his own wife. A man is also forbidden to marry any of his own relations, however distant the degree of consanguinity between them.

In China, every father of a family is responsible for the conduct of his children, and even of his domestics; all those faults being imputed to him which it was his duty to have prevented. Every father has the power of selling his son, "provided (says the law) the son has a right of selling himself." This custom, however, is barely tolerated among the middling and inferior ranks; and all are forbidden to sell them to comedians, or people of infamous character or very mean stations.

In China a son remains a minor during the whole lifetime, and is even liable for the debts contracted by his father, those from gaming only excepted. Adoption is authorized by law, and the adopted child immediately enters into all the rights of a lawful son; only the law gives a right to the father of making a few dispositions in favour of his real children. The children, however, whether adopted or not, cannot succeed

China.

ceed to the dignity or titles of their father, though they may to his eftate. The emperor alone can confer honours; and even then they muft be refigned when the perfon attains the age of 70; though this refignation is confidered as an advice rather than a law. The will of a father cannot be fet afide in China on account of any informality; nor can any mother in this empire make a will.

Though the Chinefe laws authorize flavery, yet the power of the mafter extends only to thofe matters which concern his own fervice; and he would be punifhed with death for taking advantage of his power to debauch the wife of his flave.

By the laws of China hufbandmen are exempt from the payment of taxes after they have begun to till the earth to the beginning of harveft.

73
Criminal code.

It appears, from recent information refpecting many interefting particulars relating to China, that the utmoft attention feems to have been paid to the different degrees of enormity attached to thofe actions of men which are denominated criminal. The code of laws is pronounced the reverfe of fanguinary, and it is affirmed by competent judges, that if the practice in all refpects coincided with the theory, few nations could boaft of a milder or more effectual adminiftration of juftice. But while they do not confider the crime of pilfering a few fmall pieces of money as of equal enormity with the fhedding of human blood, yet they pay too little attention to the three different circumftances under which that action may exift; either as accidental, unintentional as to the extent of taking away life, or malicioufly premeditated. Even foreigners who have the misfortune to kill a Chinefe, however cafually it may be done, have been punifhed in the very fame manner as a traitor or deliberate affaffin. As foreigners intending to refide in China may be at a lofs to determine how, when, and by what various means their lives may be endangered, the following abftract of the criminal code of that country may perhaps be beneficial to fome of our readers.

1. A man who kills another on the fuppofition of theft, fhall be ftrangled, according to the law of homicide committed in an affray.

2. A man who fires at another with a mufket, and kills him, fhall be beheaded, as in cafes of wilful murder. If the fufferer be wounded, but not mortally, the offender fhall be fent into exile.

3. A man who puts to death a criminal who had been apprehended, and made no refiftance, fhall be ftrangled, according to the law againft homicide committed in an affray.

4. A man who falfely accufes an innocent perfon of theft (in cafes of greateft criminality) is guilty of a capital offence; in all other cafes the offenders, whether principals or acceffaries, fhall be fent into exile.

5. A man who wounds another unintentionally, fhall be tried according to the law refpecting blows given in an affray, and the punifhment rendered more or lefs fevere, according to the degree of injury fuftained.

6. A man who, intoxicated with liquor, commits outrages againft the laws, fhall be exiled to a defert country, there to remain in a ftate of fervitude.

For this abftract we are indebted to the humane interference of the fupercargoes of the Eaft India Company, on account of the difagreeable difputes which frequently took place with the Chinefe government, owing to accidents of the moft trivial nature, which the people fometimes met with from the Britifh in the port of Canton.

The blood of a traitor is fuppofed to be contaminated in this country to the 10th generation, although the law in general is conceived to be fatisfied with implicating the neareft male relatives in the guilt of the actual perpetrator of the crime, but with commutation of punifhment from death to exile. It appears to us, that nothing can be conceived more tyrannical than a law which pretends to inflict punifhment on an innocent perfon, fince no man can be a traitor, merely from the circumftance of his being the relation of one, and the abfurdity of fuppofing that a non-exiftence is capable of committing a crime, muft be obvious to every man. The fifth law in the forementioned extract is peculiarly cruel and unjuft, fince it fubjects a man to different degrees of punifhment, according to the different effects which thofe actions may produce. It is with a degree of national pride that we turn from this cruel, abfurd fpecimen of Chinefe legiflation, this ftrange judicial thermometer, if we may be allowed the expreffion, to the nice difcriminations which are made by the laws of our own country refpecting the fhedding of blood, the gradations of guilt attending which we have already mentioned, and which are diftinguifhed by the appropriate names of *manflaughter*, *culpable homicide*, and *wilful murder*.

The denunciations of Mofes, it may be faid, have fome refemblance to this gothic code of the Chinefe, efpecially when he declares that the deity would vifit the iniquities of the fathers upon the children to the third and fourth generation. It is not our province in this account of China, to write an apology for Mofes in this particular inftance, although it muft be granted that he had a moft obftinate and refractory race of beings to govern, and to preferve a becoming degree of order and fubordination among them. He might therefore have nothing more in view than political expedience, an opinion which we are the more encouraged to entertain, when we find the prophet Ezekiel reprobating the idea of making the innocent fuffer for the guilty, in the following beautiful paffage. "What mean ye that ye ufe this proverb concerning the land of Ifrael, faying, the fathers have eaten four grapes, and the children's teeth are fet on edge? As I live, faith the Lord, ye fhall not have occafion any more to ufe this proverb in Ifrael. Behold all fouls are mine; as the foul of the father, fo alfo the foul of the fon, is mine. The foul that finneth, *it* fhall die. The fon fhall not bear the iniquity of the father, neither fhall the father bear the iniquity of the fon: the righteoufnefs of the righteous fhall be upon *him*, and the wickednefs of the wicked fhall be upon *him*."

In criminal matters every perfon accufed muft be examined before five or fix tribunals; and whofe inquiries are directed not only againft him, but againft his accufer, and the witneffes that appear in the caufe. He is, however, obliged to remain in prifon during the procefs: "but (fays M. Grofier) the Chinefe prifons are not horrible dungeons like thofe of fo many other nations; they are fpacious, and have even a

degree

China.

degree of convenience. One of the mandarins is obliged to inſpect them frequently; and this he does with the greater punctuality, as he muſt anſwer for thoſe who are ſick. He is obliged to ſee them properly treated, to ſend for phyſicians, and to ſupply them with medicines at the emperor's expence. If any of them dies, he muſt inform the emperor, who perhaps will order ſome of the higher mandarins to examine whether the former has diſcharged his duty faithfully or not.

74 Method of inflicting the baſtinado.

The ſlighteſt puniſhment in China is the baſtinado; and the number of blows is to be determined by the degree of the offender's guilt. Twenty is the loweſt number: and in this caſe the puniſhment is conſidered as having nothing infamous in it, but being only a ſimple paternal correction. In this way the emperor ſometimes orders it to be inflicted on his courtiers; which does not prevent them from being afterwards received into favour, and as much reſpected as before. Every mandarin may inflict the baſtinado when any one forgets to ſalute him, or when he ſits in judgment in public. The inſtrument of correction is called *pan-tſee*, and is a piece of bamboo a little flatted, broad at the bottom, and poliſhed at the upper extremity, in order to manage it more eaſily with the hand. When the puniſhment is to be inflicted, the magiſtrate ſits gravely behind a table, having on it a bag filled with ſmall ſticks, while a number of petty officers ſtand around him, each furniſhed with theſe *pan-tſees*, and waiting only for his ſignal to make uſe of them. The mandarin then takes out one of the little ſticks contained in the bag, and throws it into the hall of audience. On this the culprit is ſeized and ſtretched out with his belly towards the ground; his breeches are pulled down to his heels, and an athletic domeſtic applies five ſmart blows with his *pan-tſee*. If the judge draws another ſmall ſtick from the bag, another officer ſucceeds, and beſtows five more blows; and ſo on until the judge makes no more ſignals. When the puniſhment is over, the criminal muſt throw himſelf on his knees, incline his body three times to the earth, and thank the judge for the care he takes of his education.

75 The *cangue*, or wooden collar.

For faults of a higher nature, the carrying of a wooden collar, called by the Portugueſe the *cangue*, is inflicted. This machine is compoſed of two pieces of wood hollowed out in the middle, which, when put together, leave ſufficient room for the neck. Theſe are laid upon the ſhoulders of the criminal, and joined together in ſuch a manner, that he can neither ſee his feet nor put his hands to his mouth; ſo that he is incapable of eating without the aſſiſtance of another. This diſagreeable burden he is obliged to carry day and night; its weight is from 50 to 200 pounds, according to the enormity of the crime, to which the time of carrying it is alſo proportioned. For robbery, breaking the peace, or diſturbing a family, or being a notorious gambler, it is generally carried three months. During all this time the criminal is not allowed to take ſhelter in his own houſe, but is ſtationed for a certain ſpace of time, either in ſome public ſquare, the gate of a city or temple, or perhaps even of the tribunal where he was condemned. On the expiration of his term of puniſhment, he is again brought before the judge, who exhorts him in a friendly manner to amend; and after giving him 20 ſound blows diſcharges him.

76 Baniſhment, &c.

Baniſhment is inflicted for crimes of a nature inferior to homicide, and the duration is often for life, if the criminals be ſent into Tartary. Some culprits are condemned to drag the royal bark for three years, or to be branded in the cheeks with a hot iron, indicating the nature of their tranſgreſſions. Robbery between relations is more ſeverely puniſhed than any other; and that is accounted the moſt atrocious where younger brothers or nephews appropriate to themſelves beforehand any part of the ſucceſſion in which they have a right to ſhare with their elder brothers or nephews.

77 Puniſhment of informers againſt parents, &c.

Information againſt a father or mother, grandfather or grandmother, uncle or eldeſt brother, even though the accuſation be juſt, is puniſhed with 100 blows of the pan-tſee and three years baniſhment. If the accuſation be falſe, it is puniſhed with death. Deficiency in proper filial reſpect to a father, mother, grandfather, or grandmother, is puniſhed with 100 blows of the pan-tſee; abuſive language to theſe relations is death by ſtrangling; to ſtrike them is puniſhed by beheading; and if any one preſumes to hurt or maim them, his fleſh is torn from his bones with red-hot pincers, and he is cut into a thouſand pieces. Abuſing an elder brother is puniſhed with 100 blows of the pan-tſee; ſtriking him, with the puniſhment of exile.

78 Capital puniſhments, how inflicted.

Homicide, even though accidental, is puniſhed with death in China. A rope about ſix or ſeven feet in length, with a running nooſe, is thrown over the criminal's head; and a couple of domeſtics belonging to the tribunal pull it ſtrongly in different directions. They then ſuddenly quit it, and in a few moments give a ſecond pull; a third is ſeldom neceſſary to finiſh the buſineſs. Beheading is accounted in China the moſt diſhonourable of all puniſhments, and is reſerved only for deſperate aſſaſſins, or thoſe who commit ſome crime equally atrocious with murder. To be cut in a thouſand pieces is a puniſhment inflicted only upon ſtate criminals or rebellious ſubjects. It is performed by tying the criminal to a poſt, ſcalping the ſkin from the head and pulling it over the eyes. The executioner then tears the fleſh from different parts of the unhappy wretch's body; and never quits this horrible employment till mere fatigue obliges him to give over: the remains of the body are then left to the barbarous ſpectators, who finiſh what he has begun. Though this puniſhment, however, has been inflicted by ſome emperors with all the dreadful circumſtances juſt mentioned, the law orders only the criminal's belly to be opened, his body to be cut into ſeveral pieces, and then thrown into a ditch or river.

The torture, both ordinary and extraordinary, is uſed in China. The former is applied to the hands or feet: for the hands, ſmall pieces of wood are applied diagonally between the fingers of the criminal; his fingers are then tied cloſe with cords, and he is left for ſome time in that painful ſituation. The torture for the feet is ſtill worſe. An inſtrument, conſiſting of three croſs pieces of wood, is provided, that in the middle being fixed, the others moveable. The feet of the criminal are then put into this machine, which ſqueezes them ſo cloſe that the ankle bones become flat. The extraordinary torture conſiſts in

China.

making small gashes in the body, and then tearing off the skin like thongs. It is never applied but for some great crime, such as treason, or where the criminal's guilt has been clearly proved, and it is necessary to make him discover his accomplices.

79
M. Grosier's general view of the Chinese laws.

Notwithstanding these dreadful punishments, M. Grosier is at great pains to prove that the laws of the Chinese, with regard to criminal matters, are extremely mild. "One law (says he) will no doubt appear exceedingly severe and rigorous; it inflicts the punishment of death on those who use pearls. Those who read the history of China will be apt to fall into certain mistakes respecting the penal laws of that nation. Some of its sovereigns have indulged themselves in gratifying sanguinary caprices which were not authorized by the laws, and which have often been confounded with them; but these princes are even yet ranked among the number of tyrants, and their names are still abhorred and detested throughout the whole empire. The Chinese, in their criminal procedure, have a great advantage over all other nations: it is almost impossible that an innocent man should ever become a victim to a false accusation: in such cases the accuser and witnesses are exposed to too much danger. The slowness of the process, and the numberless revisions it undergoes, are another safeguard for the accused. In short, no sentence of death is ever carried into execution until it has been approved and confirmed by the emperor. A fair copy of the whole process is laid before him; a number of other copies are also made out, both in the Chinese and Tartar languages, which the emperor submits to the examination of a like number of doctors, either Tartars or Chinese. When the crime is of great enormity, and clearly proved, the emperor writes with his own hand at the bottom of the sentence, "When you receive this order, let it be executed without delay." In cases where the crime, though punishable by death according to law, is ranked only in the ordinary class, the emperor writes at the bottom of the sentence, "Let the criminal be detained in prison, and executed in autumn;" that being the season in which they are generally executed, and all on the same day.

80
Cases in which crimes may be pardoned.

The emperor of China never signs an order for the execution of a criminal till he has prepared himself by fasting. Like other monarchs he has the power of giving pardons; but in this respect is much more limited than any other. The only cases in which the Chinese monarch can remit the punishment inflicted by law are, 1. To the son of a widow who has not married again; 2. To the heir of an ancient family; 3. The descendants of great men or citizens who have deserved well of their country; and, 4. lastly, The sons or grandsons of a mandarin, who has become illustrious, and distinguished himself by faithfully discharging the duties of his office. Neither a child, nor a man of very advanced age, can be cited before a tribunal. The son of a very aged father and mother is pardoned, if private property or the public peace be not hurt by giving him a pardon; and if the sons of such a father and mother be all guilty, or accomplices in the same crime, the youngest is pardoned in order to comfort his parents.

In China the accused are always treated with tenderness and lenity, being accounted innocent until their guilt be clearly proved; and even then, liberty excepted, they are scarce allowed to want for any thing. A jailor is punished who behaves rigorously towards his prisoners; and the judges must likewise answer at their peril for any additions to the severity of the law; deposition being the slightest punishment inflicted upon them.

Substitution is sometimes allowed by the laws of China; so that the near relation of a guilty person may put himself in the criminal's place, provided however, that the chastisement be slight, and the accused his ancient friend. The sons, grandsons, wife, and brothers of a banished Chinese, are allowed to follow him into exile; and the relations of all persons are permitted to visit them in prisons, and to give them every assistance in their power; to do which good offices they are even encouraged, instead of being prevented.

81
Of the cities and their government.

Every city in China is divided into different quarters, each of which is subjected to the inspection of a certain officer, who is answerable for whatever passes in the places under his jurisdiction. Fathers of families, as we have already observed, are answerable for the conduct of their children and domestics. Neighbours are even obliged to answer for one another, and are bound to give every help and assistance in cases of robbery, fire, or any accident, especially in the night-time. All the cities are furnished with gates, which are barricaded on the commencement of night. Centinels are also posted at certain distances throughout the streets, who stop all who walk in the night, and a number of horsemen go round the ramparts for the same purpose; so that it is almost impossible to elude their vigilance by favour of the darkness. A strict watch is also kept during the day-time; and all those who give any suspicion by their looks, accent, or behaviour, are immediately carried before a mandarin, and sometimes even detained until the pleasure of the governor be known.

Private quarrels do not often happen in China, and it is rare that they are attended with a fatal issue. The champions sometimes decide the quarrel with their fists, but most frequently refer the case to a mandarin, who very often orders them both a sound drubbing. None but military people are permitted to wear arms in public; and this privilege is extended even to them only during the time of war, or when they accompany a mandarin, mount guard, or attend a review. Prostitutes are not allowed to remain within the walls of a city, or to keep a house of their own even in the suburbs. They may, however, lodge in the house of another; but that other is accountable for every disturbance which may happen on their account.

82
Borrowing of money.

In all the Chinese cities, and even in some of their ordinary towns, there is an office where money may be borrowed upon pledges at the common rate of the country; which, however, is no less than 30 per cent. Every pledge is marked with a number when left at the office, and must be produced when demanded; but it becomes the property of the office if left there a single day longer than the term agreed upon for the payment of the money. The whole transaction remains an inviolable secret; not even the name of

China.

of the perſon who leaves the pledge being inquired after.

This mode of procuring a ſupply of money for the exigencies of the moment, has been long known in Britain, and the people who thus lend money on pledges under the ſanction of government, have a moſt exorbitant intereſt, as well as in China, but we are ſorry to add, that it is by no means conducted with ſuch profound ſecrecy. The perſon's name and ſurname who offers a pledge muſt be inſerted in the pawn-broker's books, who is thus enabled to make the tranſaction as public as he pleaſes. Inſtitutions of this nature are no doubt of conſiderable utility to the modeſt poor during a period of embarraſſment; but the monſtrous evils to which they have given riſe are more than ſufficient to counterbalance their advantages. We ſhould deem an open avowal of poverty and want to be infinitely preferable to an application to ſuch a ſink of corruption and extortion, aſſured that genuine diſtreſs will never want a friend among the ſons of benevolence or philanthropy.

83 Of the Chineſe roads.

Great attention is paid by the adminiſtration of China to the conveniency of travellers. The roads are generally very broad, all of them paved in the ſouthern provinces, and ſome in the northern; but neither horſes nor carriages are allowed to paſs along theſe. In many places valleys have been filled up, and rocks and mountains cut through, for the purpoſe of making commodious highways, and to preſerve them as nearly as poſſible on a level. They are generally bordered with very lofty trees, and in ſome places with walls eight or ten feet high, to prevent travellers from going into the fields; but openings are left in proper places, which give a paſſage into croſs roads that lead to different villages. Covered ſeats are erected on all the great roads, where travellers may ſhelter themſelves from the inclemency of the weather; temples and pagods are alſo frequent, into which travellers are admitted without ſcruple in the day-time, but often meet with a refuſal in the night. In theſe the mandarins only have a right to reſt themſelves as long as they think proper. There is, however, no want of inns on the great roads, or even the croſs ones in China; but they are ill ſupplied with proviſions; and thoſe who frequent them are even obliged to carry beds along with them to ſleep on, or elſe take up with a plain mat.

Towers are erected on all the roads of this great empire, with watch-boxes on the top, with flag-ſtaffs, for the convenience of ſignals in caſe of any alarm. Theſe towers are ſquare, and generally conſtructed of brick, but ſeldom exceed twelve feet in height. They are built, however, in ſight of one another, and are guarded by ſoldiers, who run with great ſpeed from one to another, carrying letters which concern the emperor. Intelligence of any remarkable event is alſo conveyed by ſignals; and thus the court is informed with ſurpriſing quickneſs of any important matter. Thoſe which are built on any of the roads conducting to court, are furniſhed with battlements, and have alſo very large bells of caſt iron. According to law theſe towers ſhould be only five *lys*, about half a French league, diſtant from one another.

84 Method of conveyance.

There is no public poſt-office in China, though ſeveral private ones have been eſtabliſhed; but the couriers and officers charged with diſpatches for the empire have only a right to make uſe of them. This inconvenience, however, excepted, travellers find conveyance very eaſy from one part of China to another. Great numbers of porters are employed in every city, all of whom are aſſociated under the conduct of a chief, who regulates all their engagements, fixes the price of their labour, receives their hire, and is reſponſible for every thing they carry. When porters are wanted, he furniſhes as many as may be neceſſary, and gives the ſame number of tickets to the traveller; who returns one to each porter when they have conveyed their loads to an appointed place. Theſe tickets are carried back to the chief, who immediately pays them from the money he received in advance. On all the great roads in China there are ſeveral offices of this kind, which have a ſettled correſpondence with others; the travellers therefore have only to carry to one of theſe offices a liſt of ſuch things as they wiſh to have tranſported: this is immediately written down in a book; and though there ſhould be occaſion for two, three, or four hundred porters, they are inſtantly furniſhed. Every thing is weighed before the eyes of their chief, and the hire is fivepence per hundred weight for one day's carriage. An exact regiſter of every thing is kept in the office; the traveller pays the money in advance, after which he has no occaſion to give himſelf any farther trouble; on his arrival at the city he deſigns, his baggage is found at the correſponding office, and every thing is delivered to him with the moſt ſcrupulous exactneſs.

85 Cuſtomhouſes.

The cuſtomhouſes are here regulated by the general police of the country; and according to M. Groſier's account, theſe cuſtomhouſe officers are the moſt civil in the world. They have no concern with any claſs of people but the merchants, whom they take care not to diſtreſs by any rigorous exactions; neither, though they have authority to do ſo, do they ſtop travellers till their baggage is examined, nor do they ever require the ſmalleſt fee from them. Duties are paid either by the piece or by the load; and in the former caſe credit is given to the merchant's book without aſking any queſtions. A mandarin is appointed by the viceroy of each province to inſpect the cuſtomhouſes of the whole diſtrict; and the mandarins have alſo the care of the poſt-offices.

86 Money of the empire.

In former times the only money uſed in China was made of ſmall ſhells, but now both ſilver and copper coin are met with. The latter conſiſts of round pieces about nine-tenths of an inch (A) in diameter, with a ſmall ſquare hole in the middle, inſcribed with two Chineſe words on one ſide, and two Tartar ones on the other. The ſilver pieces are valued only by their weight. For the convenience of commerce the metal is therefore caſt into plates of different ſizes: and

(A) The Chineſe foot is longer by one hundredth part than the French, and the inch is divided into ten parts.

China.

and for want of small coin, a Chinese always carries about him his scales, weights, and a pair of sciссars to cut the metal. This operation is performed by putting the silver between the sciссars, and then knocking them against a stone till the pieces drop off. In giving of change, however, people have no right to value silver by the numerical value of copper, this being entirely regulated by the intrinsic value of the metals. Thus, an ounce of silver will sometimes be worth 1000 copper pieces, and sometimes only 800; and thus the copper money of China may frequently be sold for more than it would pass for in commerce. The emperor would lose much by this recoinage, were he not the sole proprietor of all the copper mines in China. It is, however, expressly forbidden to employ copper coin in any manufacture where it might be employed as plain copper, and it is also forbidden to be sold for the purpose of melting: but, if the price of the metal has not fallen, the infraction of this law is not very severely punished. On the other hand, if the value of unwrought copper exceeds that of the coin, a quantity of the latter is issued out to restore the equilibrium.

To keep up a constant circulation of all the coin in the empire, the Chinese government are attentive to preserve an equilibrium between the proportional value of the gold and silver; that is, to regulate the intrinsic value of each in such a manner that the possessor of silver may not be afraid to exchange it for copper, nor the possessor of copper for silver. The method used for this purpose is, when silver becomes scarce, to make all the payments for some time in silver; but if copper, to make them all for some time in that metal only.

87
Of the Chinese commerce.

The commerce of China is under the inspection of the tribunal of finances; but on this subject the Chinese entertain an opinion quite different from that of the Europeans. Commerce, according to them, is only useful as far as it eases the people of their superfluities, and procures them necessaries. For this reason they consider even that which is carried on at Canton as prejudicial to the interest of the empire. "They take from us (say the Chinese) our silks, teas, and porcelain: the price of these articles is raised throughout the provinces: such a trade therefore cannot be beneficial. The money brought us by Europeans, and the high-priced baubles that accompany it, are mere superfluities to such a state as ours. We have no occasion for more bullion than what may be necessary to answer the exigencies of government, and to supply the relative wants of individuals. It was said by Kouan-tse, two thousand years ago, That the money introduced does not enrich a kingdom in any other way than as it is introduced by commerce. No commerce can be advantageous long, but that which consists in a mutual exchange of things necessary or useful. That trade, whether carried on by barter or money, which has for its object the importing of articles that tend to the gratification of pride, luxury, or curiosity, always supposes the existence of luxury: but luxury, which is an abundance of superfluities among certain classes of people, supposes the want of necessaries among a great many others. The more horses the rich put to their carriages, the greater will be the number of those who are obliged to walk on foot; the larger and more magnificent their houses are, so much the more confined and wretched must those of the poor be; and the more their tables are covered with a variety of dishes, the more must the number of those increase who are reduced to the necessity of feeding upon plain rice. Men, united by society in a large and populous kingdom, can employ their industry, talents, and economy, to no better purpose than to provide necessaries for all, and procure convenience for some."

88
History of the trade with Russia.

The only commerce considered by the Chinese as advantageous to their empire, is that with Russia and Tartary; by which they are supplied with those furs so necessary in the northern provinces. The disputes concerning the limits of the respective empires of Russia and China seem to have paved the way to this commerce. These disputes were settled by treaty on the 27th of August 1689, under the reign of Ivan and Peter Alexiowitz. The chief of the embassy on the part of Russia was Golovin governor of Siberia; and two Jesuits were deputed on the part of the emperor of China; and the conferences were held in Latin, with a German in the Russian ambassador's train, who was acquainted with that language. By this treaty the Russians obtained a regular and permanent trade with China, which they had long desired; but in return they yielded up a large territory, besides the navigation of the river Amour. The first intercourse had taken place in the beginning of the 17th century; at which time a small quantity of Chinese merchandise was procured by some Russian merchants from the Kalmuck Tartars. The rapid and profitable sale of these commodities encouraged certain Siberian wayvodes to attempt a direct and open communication with China. For this purpose several deputations were sent to the emperor; and though they failed of obtaining the grant of a regular commerce, their attempts were attended with some consequences of importance. Thus the Russian merchants were tempted to send traders occasionally to Peking; by which means a faint connexion was [illegible] with that metropolis. This commerce, however, was at last interrupted by the commencement of hostilities on the river Amour; but after the conclusion of the treaty in 1689, was resumed with uncommon alacrity on the part of the Russians: and the advantages thence arising were found to be so considerable, that a design of enlarging it was formed by Peter the Great. Isbrand Ides, a native of the duchy of Holstein, then in the Russian service, was therefore despatched to Peking in 1692; by whose means the liberty of trade, before confined to individuals, was now extended to caravans. In the mean time, private merchants continued to trade as before, not only with the Chinese, but also at the head quarters of the Mogul Tartars. The camp of these roving Tartars, which was generally stationed near the confluence of the Orhon and Toula rivers, between the southern frontiers of Siberia and the Mogul desert, thus became the seat of an annual fair. Complaints, however, were soon made of the disorderly behaviour of the Russians; on which the Chinese monarch threatened to expel them from his dominions entirely, and to allow them neither to trade with the Chinese nor Moguls. This produced another embassy to Peking in 1719, when matters were again adjusted to the

the ſatisfaction of both parties. The reconciliation was of no long duration; for the Ruſſians having ſoon renewed their diſorderly behaviour, an order for their expulſion was iſſued in 1722, and all intercourſe between the two nations forbidden. The differences were once more made up in 1727, and a caravan allowed to go to Peking once in three years, provided it conſiſted of no more than a hundred perſons; and that during their ſtay their expences ſhould not, as formerly, be defrayed by the emperor of China. The Ruſſians at the ſame time obtained permiſſion to build a church within the precincts of the caravanſary; and four prieſts were allowed to reſide at Peking for the celebration of divine ſervice; the ſame indulgence being granted to ſome Ruſſian ſcholars, for the purpoſe of learning the Chineſe language, and qualifying themſelves for being interpreters between the two nations. This intercourſe continued till the year 1755; ſince which time no more caravans have been ſent to China. It was firſt interrupted by a miſunderſtanding betwixt the two courts; and though that difference was afterwards made up, no caravans have been ſent ever ſince. The empreſs of Ruſſia, ſenſible that the monopoly of the fur trade (which was entirely confined to the caravans belonging to the crown, and prohibited to individuals) was prejudicial to commerce, gave it up in favour of her ſubjects in 1762; and the centre of commerce betwixt the two nations is now at Kiatka. Here the trade is entirely carried on by barter. The Ruſſians are prohibited from exporting their own coin; finding it more advantageous to take goods in exchange than to receive bullion at the Chineſe ſtandard. The principal exports from Ruſſia are furs of different kinds; the moſt valuable of which are thoſe of ſea otters, beavers, wolves, foxes, martins, ſables, and ermines; the greater part of which are brought from Siberia and the newly diſcovered iſlands; but as they cannot ſupply the demand, there is a neceſſity for importing foreign furs to Peterſburg, which are afterwards ſent to Kiatka. Various kinds of cloth are likewiſe ſent to China, as well as hardware, and live cattle, ſuch as horſes, camels, &c. The exports from China are raw and manufactured ſilk, cotton, porcelain, rhubarb, muſk, &c. The government of Ruſſia likewiſe reſerves to itſelf the excluſive privilege of purchaſing rhubarb. It is brought to Kiatka by ſome Bukharian merchants, who have entered into a contract to ſupply the crown with it in exchange for furs: the exportation of the beſt rhubarb is forbidden under ſevere penalties, but yet is procured in ſufficient quantities, ſometimes by clandeſtinely mixing it with inferior roots, and ſometimes by ſmuggling it directly. Great part of Europe is ſupplied with rhubarb from Ruſſia.

89 Emperor's revenue.

The revenue of the emperor of China amounts to more than 41 millions ſterling; and might eaſily be increaſed, did the ſovereign incline to burden his ſubjects with new impoſitions. When Lord Macartney viſited this vaſt empire in the capacity of his Britannic majeſty's ambaſſador, the revenue of the Chineſe emperor was not leſs than 66 millions ſterling; but it cannot be ſuppoſed that a very large ſhare of this enormous ſum is actually expended by the emperor, after deducting the almoſt incalculable number of ſalaries which it is deſtined to pay, together with a ſtanding army of 1,800,000 men. Yet upon the ſuppoſition that each individual is taxed equally, this enormous ſum will amount to no more than 4s. a head annually, while the ſame analogy applied to Britain will make an individual ſhare amount to 3l. There is reaſon, however, to conclude, that the Chineſe, in the above eſtimate of their ſtanding army, have been rather hyperbolical, for Lord Macartney, from the information communicated by Vang-ta-zin, makes the whole of the expences of government to leave a ſurplus for the uſe of the emperor of 14,043,743l. ſterling, which we preſume would be impoſſible, were their ſtanding army as enormous as ſome of the Chineſe pretend.

Sum total of the revenue,		L. 66,000,000
Civil eſtabliſhment,	L. 1,973,333	
Military ditto,	49,982,933	
		51,956,266
Surplus for the emperor,		L. 14,043,734*

* Barrow's Travels, p. 407.

The annual expences of government are indeed immenſe, but they are regulated in ſuch a manner as never to be augmented but in caſes of the utmoſt neceſſity. It even happens very often that adminiſtration makes greater ſavings every year. When this happens to be the caſe, the ſurplus ſerves to increaſe the general treaſure of the empire, and prevents the neceſſity of new impoſitions in time of war, or other public calamities. The greater part of the taxes are paid in kind; thoſe, for inſtance, who breed ſilk worms, pay their taxes in ſilk, the huſbandmen in grain, the gardeners in fruits, &c. This method, at the ſame time that it is exceedingly convenient for the ſubject, is no way detrimental to the public intereſt. There are numbers of people everywhere in the ſervice of government, who are thus furniſhed with food and clothing; ſo that the commodities collected as taxes are almoſt conſumed in the provinces where they are levied; what remains is ſold for the behoof of the emperor, and the money depoſited in the imperial treaſury. The taxes paid in money ariſe principally from the cuſtoms and ſale of ſalt (which belongs entirely to the emperor), from the duties paid by veſſels entering any port, and from other impoſts on various branches of manufactures. Excepting theſe, the trader ſcarcely contributes any thing to the exigencies of the ſtate, and the mechanic nothing at all; the whole burden of taxation thus falling upon the huſbandman. This burden is regulated in proportion to the extent and fertility of his lands; and the greateſt care has been taken to manage matters ſo, that he may neither be overcharged in the impoſition nor haraſſed in the levying of the duties. "The regiſtering of lands (ſays M. Groſier), ſo often and to no purpoſe projected in France, has been long practiſed in this empire, notwithſtanding its prodigious extent."

90 Of the taxes in China.

The levying of taxes in China is as ſimple as the nature of the thing will admit of. The duties levied from towns and villages are carried to cities of the third claſs; then they are conducted to thoſe of the ſecond; then to thoſe of the firſt; and at laſt to the capital. The levying and impoſition of taxes is ſubmitted to the tribunal of finances; and matters are ſo managed, that beſides the conſumption in each diſtrict for

China.

for discharging the ordinary expences of government, something is left by way of reserve for answering accidental demands, and to be ready in cases of necessity. This sum becomes gradually less from the capital to cities of the first, second, and third class. A proper statement of what is paid in the provinces, of what is reserved in the different cities, or contained in the different treasuries of the empire, is subjected to the examination of the grand tribunal of finances. This revises the whole, and keeps an exact account of what is consumed, and of whatever surplus may be left.

91 Of lending money, and deficiencies in paying interest.

Lending money upon interest has been in use in China for about 2000 years. It has often been abolished, and as often established. The interest, as has been already hinted, is no less than 30 per cent. and the year is only lunar. A tenth part of this interest is paid monthly: and concerning neglects of payment, the following laws have been enacted. "However much the debt may have accumulated by months or years, the principal and interest shall remain always the same. Whoever infringes this law shall receive 40 blows of a *pan-tsee*; or an hundred, if he uses any artifice to add the principal and interest together." This law is explained by the following. "Whoever shall be convicted before a mandarin of not having paid a month's interest, shall receive ten blows; twenty for two months, and thirty for three; and in this manner as far as sixty; that is to say, to the sixth month. The debtor is then obliged to pay principal and interest; but those who obtain payment by using violence and force are condemned to receive 24 blows.

Many Chinese writers have endeavoured unsuccessfully to show why government should allow such exorbitant interest to be taken for money; but the most satisfactory and rational account seems to be, that the great interest of money prevents the rich from purchasing much land; as landed estates would only embarrass and impoverish them, their produce being so much inferior to that of money. The patrimony of a family in China is seldom divided; and it never happens there, as in almost every other country, that wealth and riches are engrossed by one part of the nation, while the other possesses nothing.

92 Agriculture greatly encouraged.

Agriculture is by the Chinese considered as the first and most honourable of all professions; so that in this empire the husbandman enjoys many and great privileges, while the merchant and mechanic are much less esteemed. He is considered as next in dignity to officers of state, from whom indeed they very frequently originate. The soldier in China cultivates the ground, and even the priests are employed in agriculture, when their convents happen to be endowed with land. From the principle that the emperor is absolute proprietor of the soil, one would imagine that the tenant must hold his share of it by a very precarious tenure, yet it is certain that when any man is dispossessed, his own culpable conduct is the cause. The Chinese are so habituated to consider a piece of land as their own, while they continue to be punctual in the payment of their rent, that a Portuguese resident in Macao who attempted to raise the rent of his tenants, ran the hazard of losing his life. There are no prodigiously overgrown farms in China, no monopolizers of farms, no wholesale dealers in grain, but every man has it in his power to carry his produce to a free and open market. Part of the crop is allowed to be used in distillation; but if the harvest happens to be bad, this operation is prohibited. In China, the tillage of the earth is not only encouraged by law, but also by the example of the emperor, who annually tills the earth with his own hands. The beginning of spring in China is always reckoned to be in the month of February; but it belongs to the tribunal of mathematics to determine the precise day. The tribunal of ceremonies announces it to the emperor by a memorial; in which every thing requisite to be done by him is mentioned with the most scrupulous exactness. The sovereign then names 12 of the most illustrious persons in his court to accompany him, and to hold the plough after he has performed his part of the ceremony. Among these there are always three princes of the blood, and nine presidents of supreme courts; and if any of them are too old and infirm to undergo the fatigue, the substitutes must be authorized by the emperor. The festival is preceded by a sacrifice, which the emperor offers up to *Chang-ti* (the supreme God); after which he and his attendants prepare themselves by three days fasting and continence. Others are appointed by the emperor, on the evening before the ceremony, to go and prostrate themselves at the sepulchre of his ancestors, and to acquaint them, that, on the day following, he intends to celebrate a grand sacrifice. This is offered upon a small mount a few furlongs distant from the city, which, by the indispensable rules of the ceremony, must be 50 feet in height. The Chang-ti is invoked by the emperor, who sacrifices under the title of sovereign pontiff, and prays for an abundant harvest in favour of his people. He then descends, accompanied by the three princes and nine presidents who are to put their hands to the plough along with him; the field set apart for this purpose being at a small distance from the mount. Forty labourers are selected to yoke the oxen, and to prepare the seed which the emperor is to sow; and which are of five different kinds, viz. wheat, rice, two kinds of millet, and beans. They are brought to the spot in magnificent boxes, carried by persons of the most distinguished rank. The emperor then lays hold of the plough, and turns up several furrows; the princes of the blood do the same, and then the presidents; after which the emperor throws into the furrows the five kinds of seeds already mentioned: lastly, four pieces of cotton cloth, proper for making dresses, are distributed to each of the labourers, who assist in yoking the oxen and preparing the seeds; and the same presents are made to forty other persons who have only been spectators of the ceremony.

93 Ceremony of the emperor tilling the earth with his own hands.

94 Of the peasants.

"We must not (says M. Grosier) judge of the Chinese peasants from those of Europe, especially in what relates to the lights acquired by education. Free schools are very numerous in every province of China, and even some of the villages are not destitute of this advantage. The sons of the poor are there received as readily as those of the rich; their duties and their studies are the same; the attention of the masters is equally divided between them; and from this obscure source talents often spring, which afterwards make a conspicuous figure on the grand stage of life. Nothing is more common in China than to see the son of

of a peasant governor of that province in which his father had long toiled in cultivating only a few acres. The father himself, if taken from his plough, and elevated to a superior sphere, might, by reviving the instruction he received in his youth, and especially if he be endowed with genius, find himself fully competent for his new employment.

95 Grosier's defence of the Chinese from the charge of murdering and exposing their children.

The Chinese have been greatly reproached with the inhuman practice of murdering their children; but though our author cannot deny that they are guilty of this practice, he excuses them by saying, that "the crime when committed in China is commonly owing to the fanaticism of idolatry; a fanaticism which prevails only among the lowest of the people. It is either in obedience to the oracle of a bonze, to deliver themselves from the power of magic spells, or to discharge a vow, that these infatuated wretches precipitate their children into the river: they imagine that, by so doing, they make an expiatory sacrifice to the spirit of the river. All nations of antiquity almost have disgraced themselves by the like horrid practices; but the Chinese are far from countenancing this barbarity on that account. Besides, these criminal sacrifices are never practised but in certain cantons of China, where the people, blinded by idolatry, are the dupes of prejudice, fanaticism, and superstition.—It often happens also, that the bodies of those children which are seen floating on the water have not been thrown into it till after their death; and this is likewise the case with those which are found in the streets, or lying near the public roads. The poverty of the parents suggests this dismal resource, because their children are then buried at the expence of the public. Exposing of children in public places is a custom tolerated in China; and government employs as much vigilance to have them carried away in the morning, as it bestows care on their education. This is certainly giving people intimation to expose their children in the nighttime, and no doubt encourages the practice; but the dictates of humanity are here united to those of sound policy. No law in China authorizes mutilation: there are indeed eunuchs in the empire, but their number is much less than what it is generally supposed to be by Europeans. The greater part of the eunuchs belonging to the emperor and empresses have no higher employment than that of sweeping the courts of justice."

96 Gazette of Peking.

Like the capital cities of European kingdoms, Peking, the metropolis of the Chinese empire, is furnished with a gazette, which circulates into the remotest provinces, and which is even considered by administration as an essential part of the political constitution. It is printed daily at Peking, and contains an account of all these objects to which the attention of administration is directed. In this gazette may be seen the names of all those mandarins who are stripped of their employments, and the causes of their disgrace; it mentions also the names of all those delinquents who are punished with death; of the officers appointed to fill the places of the disgraced mandarins; the calamities which have afflicted any of the provinces; the relief given by government; and the expences incurred by administration for the subsistence of the troops, supplying the wants of the people, repairing or erecting public works; and, lastly, the remonstrances made to the sovereign by the superior tribunals, either with regard to his public decisions or private conduct, and sometimes even with regard to both. Nothing, however, is contained in this gazette that has not immediately come from the emperor, or been submitted to his inspection; and immediate death would be the consequence of inserting a falsehood in this ministerial paper.

97 Seals of the emperor, mandarins, &c.

No law or sentence, as has already been said, is of any force, until the emperor's seal has been affixed to it. This is about eight inches square, and is made of fine jasper, a kind of precious stone much esteemed in China; of which only the emperor is allowed to have a seal. Those given to princes as marks of honour are composed of gold; the seals of the viceroys and great mandarins, of silver; while those of inferior mandarins and magistrates are made only of lead or copper. The size of these seals is greater or smaller according to the rank their possessors hold in the tribunals or as mandarins; and when any of them happens to be worn out, intimation must be sent to the next superior tribunal; on which a new one is sent, and the old one must then be delivered up. The commission of every inspector sent into the provinces must also be confirmed by the emperor's seal. The duty of these officers is to examine into the conduct of governors, magistrates, and private individuals; and instances are recorded of emperors themselves assuming the office of inspectors in some of the provinces. These officers are not only superior to all the magistrates, but even to the viceroys of the provinces themselves. When a superior magistrate behaves ill to an inferior one, the former instantly becomes the prisoner of the inspector, and is suspended from his office until he has cleared himself from every imputation laid to his charge. The viceroy, however, is allowed to enjoy his office until the report of the inspector has been transmitted to the emperor.

98 Power of the viceroys of provinces.

These viceroys are distinguished by the title of *Tsong-tou*, and are always mandarins of the first class, possessing an almost unlimited power within their districts. They march abroad with all the pomp of royal magnificence, never quitting their palaces, on the most trifling occasion, without a guard of 100 men. A viceroy is the receiver-general of all the taxes collected in the province, transmitting them to the capital, after having reserved what he judges necessary for the demands of his district. All law-suits must be brought before his tribunal; and he has the power of passing sentence of death, but it cannot be put in execution without being first carried to the emperor. Every three years he sends to court a report of the conduct of the mandarins subordinate to him; and according to the contents, they are either continued or disgraced. Those of whom he makes an unfavourable report are punished in proportion to their delinquency; while, on the other hand, those who have the good fortune to be well reported are rewarded in a similar proportion.

99 Degradation of mandarins.

The principal mandarins are sometimes broken and dismissed from all their employments, while others are only removed some degrees lower. Those who have been degraded ten steps run a great risk of never being employed again. These degraded mandarins are kept in perpetual remembrance of their misfortune, by being obliged to mention it in every public order they issue forth in their inferior station; thus: "I such a mandarin, degraded one, two, three, &c. steps, command

China.

mand and order," &c. Over these inferior mandarins the inspector of the province has a very unlimited authority, and can, by his own power, deprive them of their employments for a great offence; nor does he consult the court excepting where the immediate punishment of the criminal is not necessary. Every one of the mandarins, of whatever rank or denomination, is obliged, once in three years, to give in writing an exact account of the faults he has committed in the execution of his office. If he is a mandarin belonging to any of the four first classes, this confession is examined at court; but if it is made by any of the inferior ones, it must be laid before the provincial tribunal of the governor. Government, however, is not satisfied even with this confession; inquiry is made into the truth of it, and the conduct of the mandarin is scrutinized with the utmost severity, the informations being subjected to the tribunal of mandarins; where they are carefully examined, the merits and demerits of those subjected to this political inquisition carefully balanced, and their names afterwards divided into three classes. The first consists of those for whom rewards and preferment are intended: the second, for whom gentle reproof and admonition are thought necessary; and the third, of those who are to be suspended for some time, or removed altogether, from their offices. Of these last some are allowed to continue; but they receive no salary, and are not only deprived of all their emoluments, but even of their honours. If they have been guilty of any action tending to oppress the people, or to occasion a famine or scarcity among the lower ranks, their punishment is not confined to dismission from their offices, but they are also criminally impeached. The family burying-place of every Chinese is accounted sacred; none dares cut down the trees with which it is overshadowed until they become decayed with age; and even then, not until their condition has been attested by a mandarin: but for certain crimes against government or the people, the burying-place of a mandarin is rased to the foundation. No kind of punishment, however, inflicted on a father, is supposed in the least to affect the character of his son; and therefore, when the latter is asked by the emperor concerning his family, he will perhaps coolly answer, "My father was disgraced for such a crime, my grandfather was beheaded for such another," without the acknowledgement being in the least detrimental. On the contrary, by great and important services, it is possible for him to wipe out these stains from the memory of his ancestors.

Though the empire of China is governed by Tartar princes, the latter seem to bestow much more care and attention on the Chinese than their own natural subjects. Should any dispute arise between a Chinese and Tartar, the former must have greatly deviated from the rules of justice, if he is not acquitted even by those tribunals which are composed of half Chinese and half Tartars. The slightest fault committed by a Tartar mandarin is always severely punished; but the punishment of the Chinese is often mitigated if the delinquent be a Chinese; and the same severity is exercised towards those of the military department. Those faults, however, are punished with the greatest severity which hurt the interests of the people; for which reason they seldom fall a sacrifice to that class of petty tyrants who in other countries prey upon an devour them. Every superior mandarin is obliged to inform himself of the faults of his inferiors and expose them; nay, he would be punished for them himself if he did not.

100
Privileges of princes, &c. in China.

Very little regard, as we have already had occasion to observe, is paid to hereditary rights in China. Even the princes of the blood enjoy no other privilege by birth but that of wearing a yellow girdle; and the names of their children, with the exact time of their birth, are inscribed in a yellow book appropriated to that purpose. Collateral princes are distinguished by an orange girdle, and their children are marked in a book of a red colour. The surnames of the princes of the reigning family are determined by the emperor alone; the rest not being allowed to assume any name that too much resembles those of the Moguls or Chinese. The rank even of the emperor's sons diminishes one degree every generation; so that, at the seventh, only the eldest branch has a title to wear the yellow girdle, the rest being sunk into the rank of plain citizens. An hereditary sovereignty, however, passes from one eldest son to another; and this title cannot be forfeited, unless the possessor be guilty of some crime. In this case the emperor appoints to the succession either one of his younger brothers or a cousin; but these must be always chosen from the same branch, as the lawful branch cannot be deprived of its right without the condemnation of all who compose it. The only hereditary authority of the other princes exists among these troops called the *Tartar bands*. There they enjoy, without opposition, that rank which they derive from their birth, but in every thing else are on a level with others. They are subjected to a military examination at stated periods, and are always promoted or degraded according to the degree of skill they exhibit. The same trial is undergone by the heir apparent and his sons; the only indulgence shewn them being, that schools are appointed for their particular use. The princes are likewise indulged with a tribunal appropriated on purpose for them, and before which alone they can be tried. An insult offered to a prince decorated with the yellow girdle is punished with death; but if he has omitted to put it on, the aggressor escapes with a bastinading. A prince may be put to death with the emperor's consent; but he escapes every slighter corporal punishment by paying a fine. Untitled princes have very few privileges superior to those of common citizens; and are generally very poor, unless possessed of some lucrative office. Thus they are sometimes reduced to the necessity of accepting the highest pay of a common soldier in the Tartar bands. When they, or any of their children, however, enter into the marriage-state, the emperor usually makes them a present of 100 ounces of silver. He will also relieve them on other occasions, assist their widows and orphans, &c. but in all this never departs from the most exact rules of economy; so that the mandarins in this respect are much better than the relations of the sovereign himself.

101
F. Amiot's account of the ancient religion of China.

With regard to the ancient religion of China, F. Amiot informs us, that, after making every possible research, comparing and reasoning upon his observations, he at last concluded, that "The Chinese are a distinct people, who have still preserved the characteristic marks of their first origin; a people whose primitive.

tive doctrine will be found, by thoſe who take the trouble of inveſtigating it thoroughly, to agree in its eſſential parts with the doctrine of the choſen people, before Moſes, by the command of God himſelf, had conſigned the explanation of it to the ſacred records; a people, in a word, whoſe traditional knowledge, when freed from whatever the ignorance or ſuperſtition of later ages has added to it, may be traced back from age to age, and from epocha to epocha, without interruption, for the ſpace of 4000 years, even to the renewal of the human race by the grandſon of Noah." The *king*, or canonical books of the Chineſe, everywhere inculcate the belief of a Supreme Being, the author and preſerver of all things. Under him they mention the names of *Tien*, or heaven; *Chang-tien*, or Supreme heaven; *Chang-ti*, or Supreme Lord; and of *Hoang-chan-ti*, Sovereign and Supreme Lord: "Names (ſays M. Groſier) correſponding to thoſe which we uſe when we ſpeak of God, the Lord, the Almighty, the Moſt High."

According to the Chineſe books, the Supreme Being is the principle of every thing that exiſts, and the father of all living; he is eternal, immoveable, and independent; his power knows no bounds; his ſight equally comprehends the paſt, preſent, and the future, penetrating even into the inmoſt receſſes of the heart. Heaven and earth are under his government; all events, all revolutions, are the conſequences of his will; he is pure, holy, and impartial; wickedneſs offends his ſight; but he beholds with an eye of complacency the virtuous actions of men. Severe, yet juſt, he puniſhes vice in a ſtriking manner even on the throne, and often precipitates from thence the guilty, to place upon it the man who walks after his own heart, whom he hath raiſed from obſcurity. Good, merciful, and full of pity, he relents on the repentance of the wicked: public calamities, and the irregularities of the ſeaſons, are only ſalutary warnings, which his fatherly goodneſs gives to men to induce them to reform and amend.

The performance of religious worſhip at the proper and appointed times, has given occaſion to the great exactneſs with reſpect to the kalendar, which is remarkable throughout the empire of China; and all the celebrated emperors have begun their reigns with a reformation of it. Our hiſtorians, however, not contented with diſcovering in the Chineſe religion the fundamental principles of the ancient patriarchal religion, have alſo found in it evident ſymptoms of a knowledge of the Trinity as believed among Chriſtians. "Among the ancient Chineſe characters (ſays M. Groſier), which have eſcaped the ravages of time, we find the following △. According to the dictionary of *Kang-hi*, this ſignifies union; according to the *Choue-ouen* (that book ſo highly eſteemed in China) △ is three united in one; it derives it from the characters *jou* (to enter or penetrate), and *ye*, one; whence it concludes, that △ means three united, penetrated, or incorporated into one. According to another book, accounted a learned and accurate explanation of the ancient characters, '△ ſignifies ſtrict union, harmony, the chief good of man, of heaven, and of earth; it is the union of the three *tſai* (powers, principles, or intelligences; for, united, they direct, create, and nouriſh together. The image [illegible] (three united in one figure) is not ſo obſcure in itſelf; however, it is difficult to reaſon upon it without being deceived: on this ſubject it is difficult to ſpeak."

"Father Amiot, ſpite of all the objections which the critics of Europe may make, ſeems to conjecture, that the character △ might have been, among the ancient Chineſe, the ſymbol of the moſt holy Trinity; 'and the more ſo (he adds), as the ancient books furniſh a number of texts, which give us reaſon to ſuppoſe them to have been poſſeſſed of ſome knowledge of this ſublime myſtery.' The book *See-ki* ſays, 'The emperor formerly offered up a ſolemn ſacrifice every three years to the Spirit, Trinity and Unity, *Chin-ſan-ye*.' The following celebrated text of *Lao-tſe* has long been known in Europe. '*Tao* is one by nature: the firſt begot the ſecond; two produced the third; the three created all things.'

"F. Amiot quotes another paſſage, which appears to be no leſs ſingular. He who is, as it were, viſible, and cannot be ſeen, is named *Khi*; he who may be heard yet ſpeaketh not to the ears, is called *Hi*; he whom, in a manner, we feel, yet cannot touch, is named *Ouei*. In vain do we interrogate our ſenſes reſpecting theſe three; our reaſon, which alone can give us any ſatisfaction, will tell us that they make only one. Above there is no light; below there is no darkneſs. He is eternal; there is no name which can be given him. He reſembles nothing that exiſts; he is an image without figure; a figure without matter: his light is ſurrounded by darkneſs. If we look up to him above, we behold no beginning; if we follow him, we diſcover no end. From what the *Tao* hath been at all times, conclude what he is, viz. that he is eternal: he is the beginning of wiſdom.' The commentaries which explain this paſſage ſpeak in ſuch ſtrong and preciſe terms, that F. Amiot forbears to quote them, leſt he might incur the cenſure of too many incredulous readers (A)."

The ſacrifices of the Chineſe were firſt offered up in the open fields, or on ſome mountain, upon what they call the *Tan*, which ſignifies a quantity of ſtones thrown together in a round form, or ſimply a round heap of earth. A double fence called *Kiao*, compoſed of turf and branches of trees, was raiſed around this; and, in the ſpace left between the two fences, two leſſer altars were erected on the right and left; upon which, immediately after the ſacrifice offered up to the *Tien*, they ſacrificed alſo to the *Cheng*, or good ſpirits of every rank, and to their virtuous anceſtors. The ſovereign alone had a right of ſacrificing upon this *Tan*; and the cuſtom of ſacrificing to inferior ſpirits, according to the Chineſe commentators, may be traced even to the days of *Fo-hi* himſelf. The ſame writers add, that, in addreſſing themſelves to the Chang-ti, they conſidered him as the ſovereign lord of the univerſe, clothed with all that power which was neceſſary to ſatisfy them with regard to the different objects

(A) It is a ſingular circumſtance that F. Amiot ſhould have paſſed over in ſilence ſuch unintelligible mummery, without a ſingle animadverſion. Reaſon humbly confeſſes every word of it to be abſolutely incomprehenſible; and faith itſelf has almoſt as hard a ſtruggle in believing it as the never-to-be-fathomed creed of Athanaſius.

China.

objects of their requests; but that, in offering up their prayers to the inferior objects of worship, they only implored their protection and mediation with the Chang-ti.

While the empire was confined within narrow bounds, one mountain was sufficient for the sacrifices; but in process of time it became necessary to consecrate four others. These were situated at the extremities of the empire, and were supposed to correspond with the four quarters of the world; and the prince went successively every year to one of these mountains to offer up sacrifices; taking occasion at the same time to show himself to his people, and to inform himself of their wants. This custom subsisted for a long time; but at length it was found convenient to add a fifth mountain in the centre of the empire; and ever since these have been called the five *Yo*, or the five mountains of sacrifice. This method of subjecting the emperor to regular annual journeys could not but be attended with many inconveniencies. It was found necessary on this account to consecrate some spot in the neighbourhood of his palace, which might be substituted for the *Yo* upon all occasions when the emperor could not repair to them. An edifice was therefore erected, which at once represented the *Kiao*, *Tan*, and the *Hall of ancestors*. This last was a necessary part of the edifice; because it was incumbent on those who offered up sacrifices, first to repair to this hall, and acquaint their ancestors with what they were about to perform; and thither also they returned after sacrificing, to thank the same ancestors for the protection they had received from the Chang-ti; after which they offered up a sacrifice of thanksgiving in honour of them, and performed certain other ceremonies to show their respect. The building contained five separate halls, appropriated to different purposes; originally it had neither paintings nor ornaments of any kind, and a staircase of nine steps conducted to the principal entrance. Afterwards, however it was much more richly ornamented, each of the five halls being decorated with columns, over which others were placed that supported a second roof. In succeeding times it was stripped of all its ornaments, with a view to bring back religion to its primitive simplicity. Its four gates were covered with fine moss, representing the branches of which the double fence of the ancient *Kiao* were formed. The ridge of the roof was covered with the same, and the whole was encompassed by a canal filled with water at the time of offering up the sacrifices. To this a second building was added, which they called the *temple of neatness*, and which was used only for purifications and ceremonies, the former being entirely consecrated to the worship of the Chang-ti.

At present there are only two temples in Peking, named the *Tian tan* and the *Ti tan*; in the construction of which all the elegance of Chinese architecture is displayed. These are both dedicated to the Chang-ti, but under different titles; in the one he is adored as the *eternal spirit*; in the other, as the creator and preserver of the world. The ceremonies of the modern sacrifices are greatly multiplied; and nothing can exceed the splendour and magnificence with which these solemnities are performed. Sometimes before the day appointed for the grand ceremony, the monarch, the grandees of the court, and all those whom their employments qualify to assist at the solemnity, prepare themselves by retirement, fasting, and continence; no audience is given by the emperor, and the tribunals are entirely shut; marriages, funerals, rejoicings, and entertainments of every kind, are then forbidden. At last, on the day appointed, the emperor appears, attended by an innumerable multitude, and his person surrounded by a vast number of princes, lords, and officers, while every part of the temple seems to correspond with the magnificence of the sovereign; all the vases and utensils employed in the sacrifices are of gold, and cannot be applied to any other purpose; even the instruments of music are of enormous magnitude, and never used anywhere else. All this grandeur, however, serves only to display in a more eminent manner the humility and abasement of the monarch during his devotion; at which time he rolls in the dust, and speaks of himself before the *Chang-ti* in terms of the most abject submission and humiliation.

103
Sect of Tao-sse.

The purity of the ancient Chinese religion has, however, been long contaminated by many idolatrous and fanatical sects. Among these, one named *Tao-sse* was founded by a philosopher called *Lao-kiun* or *Lao-tse*, who was born 603 B. C. He died in an advanced age, leaving to his disciples a book entitled *Tao-te*, being a collection of 5000 sentences. His morality has a great resemblance to that of Epicurus. It consists principally in banishing all vehement desires and passions capable of disturbing the peace and tranquillity of the soul. According to him, the care of every wise man ought to be only to endeavour to live free from grief and pain, and to glide gently down the stream of life devoid of anxiety and care. To arrive at this happy state he advises his followers to banish all thoughts of the past, and to abstain from every vain and useless inquiry concerning futurity, as well as all tormenting thoughts of ambition, avarice, &c. It was found by the disciples of this philosopher, however, that all their endeavours to obtain a perfect tranquillity of mind were vain, as long as the thoughts of death intervened; they therefore declared it possible to discover a composition from which drink might be made that would render mankind immortal. Hence they were led to the study of chemistry; and, like the western alchemists, wearied themselves in search of the philosopher's stone, until at last they gave themselves up to all the extravagancies of magic.

The desire of avoiding death, together with the credulity natural to unenlightened minds, quickly produced a number of converts to the sect of *Tao-sse*. Magical practices, the invocation of spirits, and the art of foretelling events by divination, quickly diffused themselves over the empire, and the imbecility of the emperors contributed to propagate the deception. Temples consecrated to spirits quickly reared their heads in every corner of the empire; and two of the most celebrated of the sect were authorized to maintain public worship there after the form which had been prescribed by their master. At the same time they distributed and sold at a dear rate, images of the imaginary spirits with which they had peopled the heavens and the earth. These were, by their command, worshipped as so many deities independent of the Supreme Being: and in like manner, several of the ancient emperors were invoked as gods.

Being patronized by the emperors of several dynasties,

China.

nasties, this sect became more and more powerful. At last they had the impudence to affix, during the night-time, to one of the gates of the imperial city, a book filled with mystic characters and magical figures. At break of day they informed the emperor of the sudden appearance of this book, and publicly declared that it was fallen from heaven. This trick easily imposed upon the weak prince. He immediately repaired, with a numerous train, to the spot where the sacred volume appeared; and having taken it into his hands in a respectful manner, carried it in triumph to his palace, where he shut it up in a golden box. Another emperor carried his reverence for the sect to such a height of impiety and extravagance, as to order a celebrated *Tao sse* to be publicly worshipped under the name of *Chang-ti*. The sect thus patronized by the princes, and accommodated to the credulity of the vulgar, continued to gain ground in spite of every opposition from the wiser part of the people, and is still very powerful in China. At present they offer up three different victims, a hog, a fowl, and a fish, to a spirit whom they invoke. Various ceremonies, such as howling, drawing fantastical figures upon paper, making a hideous noise with kettles and drums, are used in their incantations; and though it may readily be believed that they are for the most part unsuccessful, yet their credit is still kept up by those cases in which they succeed by accident.

The chief of the *Tao-sse* is invested by government with the dignity of grand mandarin, which is enjoyed by his successors: he resides in a sumptuous palace in a town of Kiang-si; and the superstitious confidence of the people attracts an immense number thither from all parts of the empire. Some arrive in order to be cured of diseases, others to get an insight into futurity. The impostor distributes to them small bits of paper filled with magical characters; and the ignorant wretches depart well satisfied, without grudging the expence of their journey, though ever so long.

104
Of the worshippers of Fo.

A still more pernicious and more widely diffused sect is that of the idol *Fo*, which came originally from India. The *Tao-sse* had promised to the brother of one of the emperors of China to introduce him to a communication with spirits. The credulous prince having heard of a great spirit named *Fo*, who resided in India, prevailed on his brother to send an embassy thither. On the arrival of the ambassadors, however, they could find only two worshippers of this deity, both of whom they brought to China. Several images of Fo were also collected at the same time: and these, together with some canonical books of the Indians, were placed on a white horse, and carried in procession to the imperial city.

This superstition was introduced into China about the 65th year of the Christian æra, and soon made vast progress. One of its principal doctrines is that of the metempsychosis, or transmigration of souls, of which M. Grosier thinks he was the inventor, and that Pythagoras, who travelled into several parts of India, had borrowed the doctrine from him. The account given of him by the bonzes is, that finding himself, at the age of 70, oppressed with infirmities, he called his disciples together, and told them he was unwilling to leave the world without communicating the secret and hidden mysteries of his doctrine; which were, in short, that all things had proceeded from a vacuum and nothing, and to that they must return. This doctrine produced a corresponding mode of action, or rather of inaction, in those who believed it: for thus the great happiness of man was made to consist in absolute annihilation: and therefore the nearer he could bring himself to this state during life, the happier he was supposed to be.

The common doctrine, however, which admits of a distinction between good and evil, finds more proselytes among the vulgar, whose situation in life will not allow them to spend their time in perpetual idleness. According to this, the righteous will be rewarded and the wicked punished after death. They say also, that the god Fo came to save mankind, and to expiate their sins; and that he alone can procure them a happy regeneration in the life to come. Five precepts are likewise inculcated on those who adopt this doctrine: 1. Not to kill any living creature; 2. Not to take away the goods of another; 3. Not to pollute themselves by uncleanness; 4. Not to lie; and, 5. Not to drink wine. Above all, they recommend to them to perform acts of mercy, to treat their bonzes well, build temples, &c.

The doctrine of metempsychosis has introduced into China an infinite number of idols, who are all worshipped on the supposition that the spirit of Fo has transmigrated into the animals they represent. These idols, however, seem not to be worshipped with great sincerity; but, like the images of saints in the more superstitious countries of Europe, are beaten and thrown in the dirt when their votaries happen not to obtain their desires, which they impute to the obstinacy or weakness of the idol. Nay, M. Grosier gives an account of one man, who having ineffectually paid a sum of money to the bonzes of a certain idol for the cure of his daughter, brought a formal accusation against the idol himself; and in spite of all that the bonzes could say in its behalf, got its worship suppressed throughout the province.

105
Bad character of the Bonzes.

The bonzes of China are represented as a most avaricious and hypocritical race of men, ready to practise every kind of villany, and even to subject themselves to the most intolerable tortures, in order to obtain money from the compassion of the public when they cannot get it in any other way; and an edict of one of the emperors is cited by M. Grosier, by which great numbers of their religious houses were suppressed. In order to perpetuate their sect, they purchase young children, whom they take care to instruct in all the mysteries and tricks of their profession; but excepting this, they are in general very ignorant, and few of them would be able to give any tolerable account of the tenets of their own sect. They are not subject to a regular hierarchy, but acknowledge superiors among them whom they call grand bonzes, who have the first place in all religious assemblies at which they happen to be present: and great profit is derived from certain religious clubs, both of men and women, at which the bonzes are always called to assist. Their wealth is likewise augmented by pilgrimages to certain places where there are temples more or less reverenced, and where a multitude of absurd ceremonies is performed. These bonzes, as may be easily imagined, are inveterate enemies to the progress of Christianity, telling

China.

ing the moſt abſurd ſtories concerning the miſſionaries; as that they pluck out the eyes of their converts to conſtruct teleſcopes with, &c. The literati, however, and the more ſenſible part of the nation, hold them in the greateſt contempt.

106
Ridiculous ſuperſtition of the *fong-choui.*

We ſhall conclude this detail of the Chineſe religion with giving an account of one other ſuperſtition which ſeems peculiar to the nation. It is named *fong-choui*, which ſignifies wind and water. By this they mean the lucky or unlucky ſituation of a houſe, burying-place, &c. If any imprudent perſon has built a houſe cloſe to that of a Chineſe, in ſuch a manner that the angle formed by its roof flanks the wall or roof of the former houſe, the proprietor ever after lives in terror of utter ruin and deſtruction from the malignant influence of that angle. An implacable hatred inſtantly commences betwixt the two families, and often gives riſe to a law-ſuit, which furniſhes matter of diſcuſſion for ſome of the ſuperior tribunals. If no redreſs can be had at law, however, the Chineſe is then reduced to the neceſſity of erecting, on the top of his houſe, an enormous image of a dragon, or ſome other monſter, with its mouth gaping towards the angle, and, as it were, threatening to ſwallow it up; after which the apprehenſions of the proprietor begin to ſubſide, and tranquillity is reſtored to the family. In this manner the governor of *Kien-tchang* ſecured himſelf from the influence of the church of the Jeſuits, which, being built on an eminence, overlooked his palace. Not depending, however, entirely on the good offices of his tutelary dragon, he alſo took the wiſe precaution of altering his principal apartments, and raiſing, at the diſtance of 200 paces from the church, a kind of large façade three ſtories high. But unluckily the death of his ſucceſſor was attributed to this façade; for the mandarin being attacked with a diſorder in the breaſt, which made him ſpit up a white phlegm, this ſymptom was thought to be owing to the walls of the façade, which were very white, and which were forthwith painted black. The ſalutary precaution, however, happened to be taken too late; for the governor died notwithſtanding the black colour of the walls.

"We ſhould never have done (ſays M. Groſier), were we to relate all the ſuperſtitious ideas of the Chineſe, reſpecting the lucky and unlucky ſituation of houſes, the quarter which doors ought to front, and the plan and day proper for conſtructing the ſtoves in which they cook their rice." But the object on which they employ their greateſt care is the choice of the ground and ſituation for a burying-place. Some quacks follow no other profeſſion than that of pointing out hills and mountains which have an aſpect favourable for works of that kind. When a Chineſe is perſuaded of the truth of ſuch information, there is no ſum which he would not give to be in poſſeſſion of the fortunate ſpot. The greater part of the Chineſe are of opinion that all the happineſs and misfortunes of life depend upon the *fong-choui.*

107
Jews and Mahometans in China.

A colony of Jews was eſtabliſhed in China about the year 206 B. C.; but they are now reduced to a ſmall number of families at Cai-fong, the capital of the province of Honan. The Mahometans have multiplied much more than the Jews. It is about 600 years ſince they firſt entered the empire, where they have formed different eſtabliſhments. At firſt their number was augmented only by marriages; but for ſome time paſt they have been more particularly attentive to the extending of their ſect and propagating their doctrine. The principal means employed for this purpoſe are, to purchaſe a great number of children brought up in idolatry, whom their poor parents are glad to part with; and theſe they circumciſe, and afterwards inſtruct in the principles of their religion. During the time of a famine which deſolated the province of Chang-tong, they purchaſed more than 10,000 of theſe children; for whom, when grown up, they procured wives, built houſes, and even formed whole villages of them. They are now become ſo numerous, that in the places where they reſide they entirely exclude every inhabitant who does not believe in their prophet, and frequent a moſque.

108
Ceremonies of marriage.

With regard to the manners of the Chineſe, they bear no reſemblance to thoſe of any other nation; and, if we may believe their hiſtorians, they are the ſame at this day that they were 4000 years ago. The women are condemned almoſt to perpetual impriſonment within the precincts of their own houſes, and are never ſeen even by their intended huſbands before marriage. He knows nothing of her looks or perſon, but from the account of ſome female relation or confidant, who in ſuch caſes acts the part of match-maker; though if impoſed upon either with regard to her age or figure, he can have recourſe to a divorce. The ſame matrons who negociate the marriage, alſo determine the ſum which the intended huſband muſt pay to the parents of the bride: for in China a father does not give a dowry to his daughter; it is the huſband who gives a dowry to the wife. When the day appointed for the marriage is arrived, the bride is placed in a chair or cloſe palanquin, the key of which is committed to the care of a truſty domeſtic, who muſt deliver it to none but the huſband. The latter, richly dreſſed, waits at his gate for the arrival of the proceſſion. As ſoon as it approaches, the key is put into his hands; he eagerly opens the chair, and for the firſt time perceives his good or bad fortune. If he is contented with his new ſpouſe, the bride deſcends and enters the houſe, where the marriage is concluded by feaſting and merriment as in other countries; but if the bridegroom is very much diſappointed, he ſuddenly ſhuts the chair, and ſends the bride home to her relations. To get rid of her in this manner, however, coſts a ſum equal to what he originally gave in dowry to obtain her.

The Chineſe women, even of the firſt rank, ſeldom quit their apartment, which is ſituated in the moſt retired part of the houſe, and in which they are ſecluded from all ſociety but that of their domeſtics. The book of ceremonies requires that there ſhould be two apartments in every houſe; the exterior one for the huſband, the interior for the wife. They muſt even be ſeparated by a wall or wooden partition, the door of which is carefully guarded; nor is the huſband at liberty to enter the wife's apartment, or ſhe to quit it, without ſufficient reaſon. According to the ſame book, the prattling and loquacity of a woman are reckoned ſufficient grounds for a divorce. If this be founded in fact, the women of China are either unexampled for taciturnity, or elſe multitudes of divorces muſt be daily occurrences. A woman, however, cannot be divorced on

China.

on any account, if ſhe loſes her parents after marriage, or if ſhe has worn three years mourning for the loſs of her huſband, father, or mother.

A widow of any rank above the common, who has children, ſeldom enters a ſecond time into the marriage ſtate, though thoſe of the ordinary rank generally do. The poorer ſort are not at liberty to follow their own inclination, but are ſold for the behoof of the parents of the deceaſed. As ſoon as the bargain is concluded, a couple of porters bring a chair, which is guarded by a number of truſty people. In this the widow is ſhut up, and thus conducted to her new huſband.

"Maſters (ſays M. Groſier), for the moſt part, are very deſirous of promoting marriage among their ſlaves, whatever Mr Paw may ſay; who, without any foundation, has ventured boldly to aſſert the contrary. They have even very ſtrong motives to induce them to encourage theſe marriages; the children produced by them are ſtill their ſlaves; and beſides their becoming new property to them, the fathers and mothers are thus more ſtrongly attached to their ſervice."

109 Concubinage tolerated.

Concubinage is tolerated in China, though not authorized by any law. This privilege is granted only to the emperor, the princes of the blood, and mandarins; and none but the emperor is permitted to have more than one. The common people generally avail themſelves of the toleration granted them in this reſpect, and will have two or three concubines if they can afford it. They are, however, careful to excuſe themſelves as well as they can to their wives in this reſpect, pretending only a deſire to have many children, and a number of women to attend their wives. Others, deſirous of having a male child, while perhaps their lawful wife cannot have any, take a concubine for this reaſon only, and diſmiſs her as ſoon as their wiſhes are accompliſhed; they then permit her to marry whom ſhe pleaſes, and frequently even provide a huſband for her themſelves. Theſe concubines are almoſt all procured from two cities named *Yang-tcheou* and *Sou-tcheou*, where they are educated, and taught ſinging, dancing, muſic, and every accompliſhment ſuitable to women of quality, or which can render them agreeable and pleaſing. The greateſt part of them are purchaſed in other places, to be again diſpoſed of; and this is the principal branch of trade carried on by theſe two cities. Unlawful intrigues are ſeldom heard of in China. Whoever ſeduces the wife of another is puniſhed with death; and the ſame puniſhment is generally inflicted on the perſon who debauches a young woman.

110 Education of children.

From the accounts we have of the education of children in China, one might be apt to conclude, that, inſtead of being the ignorant ſuperſtitious race already deſcribed, they ought to be the moſt intelligent people in the world. The book of ceremonies directs the education of a child to commence as ſoon as it is born, and deſcribes exactly the qualities which its nurſe ought to have. She muſt ſpeak little, adhere ſtrictly to truth, have a mild temper, behave with affability to her equals, and with reſpect to her ſuperiors. The child is taught to uſe the right hand as ſoon as it can put its hand to its mouth, and then it is weaned. At ſix years of age, if a male, he is taught the numbers moſt in uſe, and made acquainted with the names of the principal parts of the world; at ſeven, he is ſeparated from his ſiſters, and no longer allowed to eat with them, nor to ſit down in their preſence; at eight, he is inſtructed in the rules of good breeding and politeneſs; at nine, he ſtudies the kalendar; at ten, he is ſent to a public ſchool, where he learns to read, write, and caſt accounts; from 13 to 15 he is taught muſic, and every thing that he ſings conſiſts of moral precepts. It was formerly the cuſtom, that all the leſſons deſigned for the Chineſe youth were in verſe; and it is to this day lamented, that the ſame cuſtom is not followed, as their education has ſince been rendered much more difficult and laborious.

At the age of 15, the Chineſe boys are taught to handle the bow and arrow, and to mount on horſeback; at 20 they receive the firſt cap, if they are thought to deſerve it, and are permitted to wear ſilk dreſſes ornamented with furs; but before that period they are not allowed to wear any other thing than cotton.

Another method of initiating children into the principles of knowledge in this empire is, by ſelecting a number of characters expreſſive of the moſt common objects, engraving or painting them ſeparately on ſome kind of ſubſtance, and, under the thing repreſented, putting the name, which points out to them the meaning of the word.

As the Chineſe have no proper alphabet, they repreſent almoſt every thing by different characters. The labour of their youth, therefore, is intolerable; being obliged to ſtudy many thouſand characters, each of which has a diſtinct and appropriate ſignification. Some idea of their difficulties may be obtained from what we are told by F. Martini, who aſſures us, that he was under the neceſſity of learning 60,000 different characters before he could read the Chineſe authors with tolerable eaſe.

The book firſt put into the hands of the Chineſe children is an abridgement, which points out what a child ought to learn, and the manner in which he ſhould be taught. This volume is a collection of ſhort ſentences, conſiſting of three or four verſes each, all of which rhyme; and they are obliged to give an account in the evening of what they have learned in the day. After this elementary treatiſe, they put into their hands the four books which contain the doctrines of Confucius and Mencius. The ſenſe and meaning of the work is never explained to them until they have got by heart all the characters, that is to ſay, the *words* in the book; a method no doubt inconceivably diſguſting, and calculated utterly to deſtroy the genius of a boy, if he has any. While they are getting theſe characters by heart, indeed, they are likewiſe employed in learning to form them with a pencil. For this purpoſe they are furniſhed with large leaves of paper, on which are written or printed with red ink very big characters; and all they are required to do is to cover thoſe red characters with black ink, and to follow exactly their ſhape and figure; which inſenſibly accuſtoms them to form the different ſtrokes. After this they are made to trace other characters, placed under the paper on which they write. Theſe are black, and much ſmaller than the other. It is a great advantage to the Chineſe literati to be able to paint characters well; and on this account they beſtow great pains in forming the hands of young people. This is of the utmoſt conſequence to literary ſtudents in the examinations

nations which they are obliged to undergo before they can be admitted to the firft degree. Du Halde gives a remarkable inftance, viz. that "a candidate for degrees having, contrary to order, made ufe of an abbreviation in writing the character *ma*, which fignifies a horfe, had the mortification of feeing his compofition, though in other refpects excellent, rejected merely on that account; befides being feverely rallied by the mandarin, who told him a horfe could not walk unlefs he had all his legs."

After the fcholar has made himfelf mafter of the characters, he is then allowed to compofe; but the fubject of his compofition is pointed out to him only by one word. Competitions are likewife eftablifhed in China, but moft of them are of a private nature. Twenty or thirty families, who are all of the fame name, and who confequently have only one hall for the names of their anceftors, agree among themfelves to fend their children twice a month to this hall in order to compofe. Each head of a family in turn gives the fubject of this literary conteft, and adjudges the prize; but this cofts him a dinner, which he muft caufe to be carried to the hall of competition. A fine of about tenpence is impofed on the parent of each fcholar who abfents himfelf from this exercife.

Befides thefe private competitions, every ftudent is obliged to compete at leaft twice a-year under the infpection of an inferior mandarin of letters ftyled *Hio-kouan*. It frequently happens alfo, that the mandarins of letters order thefe ftudents to be brought before them, to examine the progrefs they have made in their ftudies, to excite a fpirit of emulation among them, and make them give fuch application as may qualify them for any employment in the ftate. Even the governors of cities do not think it below their dignity to take this care upon themfelves; ordering all thofe ftudents who refide near them to appear before their tribunal once a month: the author of the beft competition is honoured with a prize, and the governor treats all the candidates on the day of compofition at his own expence. In every city, town, and village in China, there are fchoolmafters who teach fuch fciences as are known in that country. Parents poffeffed of a certain fortune provide mafters for their children, to attend and inftruct them, to form their minds to virtue, and to initiate them in the rules of good breeding and the accuftomed ceremonies, as well as to make them acquainted with the laws and hiftory, if their age will admit. Thefe mafters have, for the moft part, attained to one or two degrees among the literati, and not unfrequently arrive at the firft employments of the ftate.

The education of the Chinefe women is confined to giving them a tafte for folitude, and accuftoming them to modefty and filence; and if their parents are rich, they are likewife inftructed in fuch accomplifhments as may render them agreeable to the other fex.

111
Drefs.

There is little diftinction in China between the ordinary drefs of men and women. Rank and dignity are diftinguifhed by certain acceffary ornaments; and the perfon would be feverely chaftifed who fhould prefume to affume them without being properly authorized. The drefs in general confifts of a long veft which reaches to the ground. One part of this veft, viz. that on the left fide, folds over the other, and is faftened to the right by four or five fmall gold or filver buttons, placed at a little diftance from one another. The fleeves are wide towards the fhoulder, growing narrower as they approach the wrift, where they terminate in the form of a horfe fhoe, covering the hands entirely, and leaving nothing but the ends of the fingers to be feen. Round their middle they wear a large girdle of filk, the ends of which hang down to their knees. From this girdle is fufpended a fheath containing a knife and two of thofe fmall fticks which they ufe as forks. Below this robe they wear a pair of drawers, in fummer made of linen, and in winter of fatin lined with fur, fometimes of cotton, and in fome of the northern provinces of fkins. Thefe are fometimes covered with another pair of white taffety. Their fhirts are always very fhort and wide, of different kinds of cloth, according to the feafon. Under thefe they wear a filk net to prevent it from adhering to the fkin. In warm weather they have their necks always bare; when it is cold, they wear a collar made of filk and fable, or fox's fkin, joined to their robe, which in winter is trimmed with sheep fkin, or quilted with filk and cotton. That of people of quality is entirely lined with beautiful fable fkins brought from Tartary, or with the fineft fox's fkin, trimmed with fable; and in the fpring it is lined with ermine. Above their robe they wear alfo a kind of furtout with wide fleeves, but very fhort, which is lined in the fame manner. The emperor and princes of the blood only have a right to wear yellow; certain mandarins have liberty to wear fatin of a red ground, but only upon days of ceremony: in general they are clothed in black, blue, or violet. The common people are allowed to wear no other colours but blue or black; and their drefs is always compofed of plain cotton cloth.

112
Chinefe obliged by the Tartars to cut off their hair.

Formerly the Chinefe were at great pains to preferve their hair; but the Tartars, who fubdued them, compelled them to cut off the greater part of it, and to alter the form of their clothes after the Tartar fafhion. This revolution in drefs was not effected without bloodfhed, though the conquerors at the fame time adopted in other refpects the laws, manners, and cuftoms of the conquered people. Thus the Chinefe are painted as if bald, but they are not fo naturally: that fmall portion of hair which they preferve behind, or on the tops of their heads, is all that is now allowed them. This they wear very long, and plait like a tail. In fummer they wear a kind of cap fhaped like an inverted cone, lined with fatin, and covered with ratan or cane very prettily wrought. The top terminates in a point, to which they fix a tuft of red hair, which fpreads over it, and covers it to the brim. This hair grows between the legs of a kind of cow, and is capable of taking any colour, efpecially a deep red. This ornament is much ufed, and any perfon who choofes may wear it.

The mandarins and literati wear a cap of the fame form as the foregoing, only it is lined with red fatin, and covered on the outfide with white. A large tuft of the fineft red filk is fixed over it, which is fuffered to hang down or wave with the wind. People of diftinction generally ufe the common cap when they mount on horfeback or during bad weather; being better calculated to keep off rain, and fhelter thofe who wear it from the rays of the fun. For winter they have another cap bordered with fable, ermine, or fox's

China. fox's ſkin, and ornamented with a tuft of ſilk like the former. In theſe fur-trimmings they are very curious, ſometimes expending 40 or 50 ounces of ſilver upon them.

The Chineſe people of rank never go abroad without boots made of ſatin or ſome other ſilk, and ſometimes of cotton, but always dyed. They have neither heel nor top, and are made to fit the foot with the greateſt exactneſs. When they travel on horſeback, however, they have others made of the ſkin of a cow or horſe made very pliable. Their boot-ſtockings are of ſilk ſtuff, quilted and lined with cotton, reaching above the top of their boot, and ornamented with a border of velvet or cloth. In ſummer they wear a cooler kind, and in their houſes a ſort of ſlippers made of ſilk ſtuff. The common people are contented with black ſlippers made of cotton cloth. The fan is alſo a neceſſary appendage of the Chineſe dreſs, and is reckoned equally neceſſary with the boots.

The dreſs of the women conſiſts of a long robe quite cloſe at top, and long enough to cover even their toes, with ſleeves ſo long that they could hang down upon the ground, did they not take care to tuck them up; but their hands are ſeldom ſeen. The colour of their dreſſes is entirely arbitrary, but black and violet are generally choſen by thoſe advanced in life. The young ladies, like thoſe of Europe, make uſe of paint to give a bloom to their complexions; but this, though not the ſame with the kind uſed in Europe, agrees with it in the effect of ſoon wrinkling the ſkin. Their general head-dreſs conſiſts in arranging their hair in ſeveral curls, among which are interſperſed ſmall tufts of gold or ſilver flowers. According to Du Halde, ſome of them ornament their heads with the image of a fabulous bird, concerning which many ſtories are told. This is made of copper or ſilver gilt, its wings extended and lying pretty cloſe to the head-dreſs, embracing the upper part of their temples, while the long ſpreading tail forms a kind of plume on the top of the head. Its body is directly over the head, and the neck and bill hang down, the former being joined to the body by a concealed hinge, in order that it may play freely, and move about on the leaſt motion of the head. The whole bird adheres to the head by means of the claws, which are fixed in the hair.

Ladies of quality ſometimes wear ſeveral of theſe birds made up into a ſingle ornament, the workmanſhip of which is very expenſive. Young ladies wear alſo a crown made of paſteboard, the fore part of which riſes in a point above the forehead, and is covered with jewels. The reſt of the head is decorated with natural or artificial flowers, among which ſmall diamond pins are interſperſed. The head-dreſs of the ordinary claſs of women, eſpecially when they are advanced in years, conſiſts only of a piece of very fine ſilk wrapped round their heads.

113 Abſurd cuſtom of preventing the feet of female infants from growing.

All authors agree, that an abſurd cuſtom prevails throughout China, of confining the feet of female infants in ſuch a manner that they are never allowed to grow to near their full ſize. The ſmallneſs of their feet is accounted ſuch a valuable beauty, that the Chineſe women never think they can pay too dear for it. As ſoon therefore as a female infant is born, the nurſe wraps up its feet in very tight bandages; and this torture muſt be endured until their feet have ceaſed to grow. So prevalent is the force of cuſtom, however, that as the child grows up ſhe voluntarily ſubmits to new tortures, in order to accompliſh the purpoſe more effectually. Thus the Chineſe women are deprived almoſt entirely of the uſe of their feet; and are ſcarce able to walk, in the moſt awkward hobbling manner, for the ſhorteſt ſpace. The ſhoe of a full grown Chineſe woman will frequently not exceed ſix inches.

The Chineſe uſe white as the colour proper for mourning; and though a ſon cannot wear this while his father and mother are alive, he can uſe no other for three years after their death; and ever afterwards his clothes muſt be of one colour. The law has forbidden the uſe of ſilk and furs to children; and has even preſcribed the time when they are firſt to wear a cap. This is put upon their heads by the maſter of ceremonies himſelf, who addreſſes them in the following manner: "Conſider that you now receive the dreſs of thoſe who have attained to maturity, and that you ceaſe to be children; renounce, therefore, all childiſh thoughts and inclinations, aſſume a grave and ſerious deportment, apply with reſolution to the ſtudy of virtue and wiſdom, and endeavour to merit a long and happy life." "This ceremony (ſays M. Groſier), which may appear trifling, is attended with the happieſt effects. The Chineſe give a kind of importance to every thing which can inſpire youth with a taſte for morality and a love of good order. It might be uſeful to mankind at every fixed epocha of their lives, to remind them of thoſe new duties impoſed by each ſucceſſive change; but, by uniting the ſolemnity of a public ceremony to this inſtruction, it will make a deeper impreſſion, and remain much longer imprinted on their memories."

114 Exceſſive ceremoniouſneſs of the Chineſe.

Nothing can appear more irkſome to an European than the multitude of ceremonies uſed on all occaſions by the Chineſe. An invitation to an entertainment is not ſuppoſed to be given with ſincerity until it has been renewed three or four times in writing. A card is ſent on the evening before the entertainment, another on the morning of the appointed day, and a third when every thing is prepared and the gueſts ready to ſit down to the table. The maſter of the houſe always introduces his gueſts into the hall, where he ſalutes them one after another. He then orders wine to be brought him in a ſmall cup made of ſilver, porcelain, or precious wood, and placed upon a ſmall varniſhed ſalver. He lays hold of it with both his hands, makes a bow to all the ſurrounding gueſts, and advances towards the fore part of the hall, which generally looks into a large court. He there raiſes his eyes and the cup towards heaven; after which he pours the wine on the ground, He afterwards pours ſome wine into a ſilver or porcelain cup, makes a bow to the moſt conſiderable perſon in company, and then goes to place the cup on the table before him; for in China every gueſt has a table for himſelf. The perſon for whom he intends this honour, however, generally ſaves him the trouble of placing the cup; calls for wine in his turn, and offers to place the cup on the maſter's table, who endeavours to prevent him, with a thouſand apologies and compliments according to the rules of Chineſe politeneſs. A ſuperior domeſtic conducts the principal gueſt to an elbow-chair covered with rich flowered ſilk, where the ſtranger again begins his compliments,

pliments, and begs to be excuſed from ſitting in ſuch an honourable ſeat, which nevertheleſs he accepts of; and all the reſt of the gueſts do the ſame, otherwiſe the cermonial would be gone through with each of them. The entertainment is concluded by ſome theatrical repreſentations, accompanied with the muſic of the country; which, however, would give but little pleaſure to an European. Beſides the gueſts, a certain number of people are admitted into the court in order to behold theſe theatrical repreſentations; and even the women are allowed to view them through a wicket, contrived ſo that they may behold them without being ſeen themſelves.

The entertainments of the Chineſe are begun, not by eating, but by drinking; and the liquor they drink muſt always be pure wine. The intendant, or *maitre d'hotel*, falling down on one knee, firſt invites the gueſts to take a glaſs; on which each of them lays hold with both hands of that which is placed before him, raiſing it as high as the forehead, then bringing it lower down than the table, and at laſt putting it to his mouth: they all drink together, and very ſlowly, taking three or four draughts. While they are drinking, the diſhes on each of the tables are removed, and others brought in. Each of the gueſts has twenty-four ſet before him in ſucceſſion; all of them fat, and in the form of ragouts. They never uſe knives in their repaſts; and two ſmall pointed ſticks, ornamented with ivory or ſilver, ſerve them inſtead of forks. They never begin to eat, however, until they are invited by the *maitre d'hotel;* and the ſame ceremony muſt be gone through every time they are going to take a cup of wine, or begin a new diſh. Towards the middle of the entertainment the ſoup is brought in, accompanied with ſmall loaves or meat pies. Theſe they take up with their ſmall ſticks, ſteep them in the ſoup, and eat them without waiting for any ſignal, or being obliged to keep time with the reſt of the gueſts. The entertainment, however, continues in other reſpects with the utmoſt formality until tea is brought in; after which they retire from table and amuſe themſelves in another hall, or in the garden, for a ſhort time, until the deſſert be brought in. This, like the entertainment itſelf, conſiſts of 24 diſhes, which are made up of ſweetmeats, fruits differently prepared, hams and ſalted ducks which have been baked or dried in the ſun, with ſhell and other kinds of fiſh. The ſame ceremonies which preceded the repaſt are now renewed, and every one ſits down at the ſame place he occupied before. Larger cups are then brought in, and the maſter invites the gueſts to drink more freely.

Theſe entertainments begin towards evening, and never end till midnight. A ſmall ſum of money is given to the domeſtics; when every one of the gueſts goes home in a chair preceded by ſeveral ſervants, who carry large lanthorns of oiled paper, on which are inſcribed the quality, and ſometimes the name, of the maſter. Without ſuch an attendance they would be taken up by the guard; and the day following they never fail to return a card of thanks to the officer.

Their method of drinking tea is not like that of other nations. A ſmall quantity of bohea, ſufficient to tinge the water and render it palatable (for they drink no green), is taken in the morning, and thrown into a veſſel adapted to the number in family. This ſtands till milk-warm; in which ſtate it is kept the whole day, and a cup drank now and then without ſugar or milk, in order to exhilarate the ſpirits when exhauſted by fatigue: and if a ſtranger call by accident, or a viſitor by appointment, the firſt thing preſented, after the uſual ceremonies of meeting, is a very ſmall pipe filled with tobacco of their own growth, and a cup of the tea already mentioned, or of ſome freſh made of better quality, together with ſweetmeats, &c. Tea is the daily beverage in China, and is drank by all ranks of people.

Some change has been made in the ceremonial of the Chineſe by the Tartar conqueſt, and ſome new diſhes alſo introduced by the ſame means; and here M. Groſier obſerves, that the Tartars are much better cooks than the Chineſe. All their diſhes are highly ſeaſoned; and by a variation in the proportions of their ſpiceries, they are able to form a variety of diſhes out of the ſame materials. None of their viands, however, are more eſteemed than ſtags ſinews, and the neſts of a particular ſpecies of birds, which have the property of giving a moſt agreeable reliſh to whatever is mixed with them. Other diſhes are introduced at theſe repaſts, which would be accounted very diſagreeable with us; ſuch as the fleſh of wild horſes, the paws of a bear, and the feet of ſeveral wild animals. The greater part of theſe proviſions are brought preſerved in ſalt from Siam, Camboya, and Tartary.

115 Chineſe wines.

The wines of China have no reſemblance to ours either in taſte or quality, being procured from rice, and not from the vine. A particular kind of rice is employed for making them, and the grain is ſteeped for 20 or 30 days in water, into which ingredients of a different nature are ſucceſſively thrown: they afterwards boil it; and as ſoon as it becomes diſſolved by the heat, it immediately ferments, and throws up a vaporous ſcum not unlike new wine. A very pure liquor is found under this ſcum, which is drawn off and put into veſſels well glazed: From the remaining leys an inflammable ſpirit is made, little inferior, and ſometimes even ſuperior to the European. Another kind of wine is uſed by the Chineſe, or rather Tartars, called *lamb wine*. It is very ſtrong, and has a diſagreeable ſmell; and the ſame may be believed of a kind of ſpirit diſtilled from the fleſh of ſheep; though this laſt is ſometimes uſed by the emperors.

Theſe entertainments exceed the bounds of ordinary repaſts; the Chineſe being naturally ſober, and thoſe in eaſy circumſtances living chiefly on pork; for which reaſon a great number of hogs are bred in the country. Their fleſh is much eaſier of digeſtion, and more agreeable to the taſte than thoſe of Europe. The Chineſe hams are in high eſtimation. The common people live very poorly; being ſatisfied, in time of ſcarcity, with the fleſh of dogs, horſes, cats, and rats, which laſt are ſold publicly in the ſtreets.

116 Public feſtivals.

There are ſeveral public feſtivals annually celebrated in China. One is that already mentioned, in which the emperor tills the ground with his own hands. This is alſo celebrated on the ſame day throughout the empire. In the morning the governor of every city comes forth

China. forth from his palace crowned with flowers, and enters his chair amidst the noise of different instruments which precede it; a great number of people attending, as is usual on all such occasions. The chair is surrounded by litters covered with silk carpets, on which are represented either some illustrious persons who have supported and encouraged agriculture, or some historical painting on the same subject. The streets are hung with carpets, triumphal arches are erected at certain distances, lanthorns everywhere displayed, and all the houses illuminated. During the ceremony a figure resembling a cow, made of baked earth, with gilt horns, is carried in procession, and of such enormous magnitude that 40 men are scarcely sufficient to support it. A child follows with one foot naked and the other shod, who is called the *spirit of labour and diligence*, and keeps continually beating the image with a rod to make it advance. Labourers, with their implements of husbandry, march behind; and the procession is closed by a number of comedians and people in masks. The governor advances towards the eastern gate, and returns in the same manner. The cow is then stripped of its ornaments, a prodigious number of earthen calves taken from its belly and distributed among the people; after which the large figure is broken in pieces and distributed in the same manner. The ceremony is ended by an oration in praise of agriculture, in which the governor endeavours to excite his hearers to the practice of that useful art.

Other two festivals are celebrated in China with still more magnificence than that above described. One of them is at the commencement of the year; the other is called the *feast of lanthorns*. During the celebration of the former, all business, whether private or public, is suspended, the tribunals are shut, the posts stopped, presents are given and received, and visits paid. All the family assemble in the evening, and partake of a feast to which no stranger is admitted; though they become a little more sociable on the following day.

The feast of lanthorns ought to take place on the 15th day of the first month, but usually commences on the evening of the 13th, and does not end till that of the 16th. At that time every city and village, the shores of the sea, and the banks of all the rivers, are hung with lanthorns of various shapes and sizes; some of them being seen in the courts and windows of the poorest houses. No expence is spared on this occasion; and some of the rich people will lay out eight or nine pounds sterling on one lanthorn. Some of these are very large, composed of six wooden frames either neatly painted or gilt, and filled up with pieces of fine transparent silk, upon which are painted flowers, animals, and human figures; others are blue, and made of a transparent kind of horn. Several lamps, and a great number of wax candles, are placed in the inside: to the corners of each are fixed streamers of silk and satin of different colours, with a curious piece of carved work on the top. They are likewise acquainted with our magic lanthorn, which they sometimes introduce into this festival. Besides this, they have the art of forming a snake 60 or 80 feet in length, filled with lights from one end to the other; which they cause twist itself into different forms, and move about as if it were a real serpent. During the same festival all the varieties of the Chinese fire-works, so justly admired, and which, some time ago at least, surpassed every thing of the kind that could be done in Europe, are exhibited.

117 Magnificence of the viceroys.

Every public ceremony in China is carefully rendered as striking as possible. A viceroy never quits his palace but with a royal train, dressed in his robes of ceremony, and carried in a chair elegantly gilt, which is borne upon the shoulders of eight domestics; two drummers marching before the guards, and beating upon copper basons to give notice of his approach. Eight other attendants carry standards of wood varnished, upon which are inscribed in large characters all his titles of honour. After these come 14 flags with the symbols of his office; such as the dragon, tyger, phœnix, flying tortoise, &c. Six officers follow, each bearing a piece of board in shape like a large shovel, on which are written in large golden characters the qualities of the mandarin himself; two others carry, the one a large umbrella of yellow silk, and the other the cover in which the umbrella is kept. The first guards are preceded by two archers on horseback; the latter are followed by others armed with a kind of weapons composed of hooked blades, fixed perpendicularly to long poles ornamented with four tufts of silk, placed at a small distance above one another. Behind these are two other files of soldiers, some of whom carry large maces with long handles; others iron maces in the shape of a snake; others are armed with huge hammers; while those behind them carry long battle-axes in the form of a crescent: others follow, who have battle-axes of another kind; and behind these are some with the hooked weapons already described.

Behind these come soldiers armed with triple-pointed spears, arrows, or battle-axes; having in front two men who carry a kind of box containing the viceroy's seal. Then come two other drummers to give notice of his approach. Two officers follow, having on their heads felt hats, adorned with plumes of feathers, and each armed with a cane to recommend regularity and good order to the surrounding multitude. Two others bear maces in the form of gilt dragons. These again are followed by a number of magistrates and officers of justice: some of whom carry whips or flat sticks, while others have chains, hangers, and silk scarfs. Two standard-bearers and a captain command this company, which immediately precede the governor. His chair is surrounded by pages and footmen, and an officer attends him who carries a large fan in form of a screen; he is followed by several guards differently armed, together with ensigns and other officers, who are also followed by a great number of domestics all on horseback, carrying various necessaries for the use of the mandarin. If he marches in the night-time, instead of flambeaux, as is customary in Europe, large lanthorns, exceedingly pretty, are carried before him; on the transparent part of which are written, in very conspicuous characters, his quality, titles, and rank, as mandarin. These are also intended to give notice to the passengers to stop, and to those who are sitting to rise up with respect; for whoever neglects either the one or the other is sure to receive a severe bastinading.

 The

China.

The emperor marches with ſtill more magnificence, in proportion to his ſuperior quality. The trumpets uſed in this proceſſion are about three feet long, eight inches in diameter at the lower extremity, and pretty much reſembling a bell in ſhape: their ſound is peculiarly adapted to that of the drums. His cavalcade is cloſed by 2000 mandarins of letters, and as many of arms. Sometimes the great mandarins, as well as the emperor, travel in barks: their attendance is then ſomewhat different, but the magnificence almoſt the ſame. The honours paid to a viceroy who has governed a province with equity are exceedingly great on his departure from it. He has ſcarcely left the capital of the province when he finds on the highway, for the ſpace of two or three leagues, tables ranged at certain diſtances, each of which is ſurrounded with a long piece of ſilk that hangs down to the earth. On theſe wax candles are placed even in the open day: perfumes are burnt upon them; and they are loaded with a profuſion of victuals, and various kinds of fruit, while tea and wine are prepared for him on others. The people throw themſelves on their knees as he paſſes, and bow their heads even to the earth; ſome ſhed tears, or pretend to do ſo; ſome preſent him with wine and ſweetmeats; others frequently pull off his boots and give him new ones. Theſe boots, which he has perhaps uſed only for a moment, are conſidered as a valuable monument; thoſe firſt taken off are preſerved in a cage over the gate of the city; the reſt are carefully kept by his friends.

118 Knaviſh diſpoſition of the Chineſe.

Hitherto our author, M. Groſier, has ſeemed inclined to give a favourable idea of the Chineſe, and to cauſe us look upon them as many degrees ſuperior to ourſelves in the practice of virtue and morality; but when he comes to give an account of their dealings in trade, he is then obliged to confeſs that they are as diſhoneſt and knaviſh a race as any that exiſt. "The moſt frequented fairs of Europe (ſays he) afford but a faint idea of that immenſe number of buyers and ſellers with which the large cities of China are continually crowded. We may almoſt ſay, that the one half are employed in over-reaching the other. It is, above all, againſt ſtrangers that the Chineſe merchants exerciſe, without any ſenſe of ſhame, their inſatiable rapacity. Of this F. du Halde gives a ſtriking example, which might be ſupported by many others: 'The captain of an Engliſh veſſel bargained with a Chineſe merchant at Canton for ſeveral bales of ſilk, which the latter was to provide againſt a certain time. When they were ready, the captain went with his interpreter to the houſe of the Chineſe merchant to examine whether they were ſound and in good condition. On opening the firſt bale, he found it according to his wiſh, but all the reſt were damaged and good for nothing. The captain on this fell into a great paſſion, and reproached the merchant in the ſevereſt terms for his diſhoneſty. The Chineſe, after having heard him for ſome time, with great coolneſs, replied, 'Blame, Sir, your knave of an interpreter: he aſſured me that you would not inſpect the bales.'

"The lower claſs of people are, above all, very dexterous in counterfeiting and adulterating every thing they ſell. Sometimes you think you have bought a capon, and you receive nothing but ſkin; all the reſt has been ſcooped out, and the place ſo ingeniouſly filled, that the deception cannot be diſcovered till the moment you begin to eat it. The counterfeit hams of China have been often mentioned. They are made of a piece of wood cut in the form of a ham, and coated over with a certain kind of earth which is covered with hog's ſkin. The whole is ſo curiouſly painted and prepared, that a knife is neceſſary to detect the fraud. Mr Oſbeck relates, that having one day obſerved a blind man carrying about for ſale ſome of thoſe trees called by the Chineſe, *Fokei*, he purchaſed one, which to appearance had fine double red and white flowers; but on cloſer examination, he found that the flowers were taken from another tree, and that one calyx was ſo neatly fitted into the other, with nails made of bamboo, that he ſhould ſcarcely have diſcovered the deceit had not the flowers begun to wither. The tree itſelf had buds, but not one open flower.

"The robbers in China ſignalize themſelves alſo by the dexterity and ingenuity which they diſplay in their profeſſion. They ſeldom have recourſe to acts of violence, but introduce themſelves into a houſe either privately or by forming ſome connection with the family. It is as difficult in China to avoid robbery as it is to apprehend the criminal in the fact. If we are deſirous of finding among the Chineſe openneſs of temper, benevolence, friendſhip, and, laſtly, virtue, we muſt not ſeek for it in cities, but in the boſom of the country, among that claſs of men who have devoted themſelves to labour and agriculture. A Chineſe ruſtic often diſcovers moral qualities which would add a luſtre to the character of men of the moſt exalted rank. It appears that rural life naturally inſpires ſentiments of benevolence; by continually receiving the gifts of nature, the mind is enlarged, and men are inſenſibly accuſtomed to diffuſe them to thoſe around them."

The internal commerce of China is much greater than that of all Europe; but its foreign trade is by no means equal to that of any of the grand European powers. Its internal commerce is greatly facilitated by the vaſt number of canals and rivers with which the country is interſected. The Chineſe, however, are not at all fitted for maritime commerce: Few of their veſſels go beyond the ſtraits of Sunda; their longeſt voyages to Malacca extended only as far as Acheen, towards the ſtraits of Batavia, and northwards to Japan.

Their commerce with the laſt mentioned iſland, conſidering the article of exchange, which they procure at Camboya or Siam, produces them cent. per cent. Their trade with the Manillas brings only about 50 per cent. Their profit is more conſiderable about Batavia; and the Dutch ſpare no pains to invite them to traffic at their ſettlements. The Chineſe traders go alſo, though not very frequently, to Acheen, Malacca, Thor, Patan, and Ligor, belonging to Siam and Cochin-china; from whence they bring gold and tin, together with ſome objects of luxury for the table. A great obſtacle to the foreign commerce of the Chineſe is their indifference about maritime affairs, and the bad conſtruction of their veſſels. This they themſelves acknowledge; but ſay, that any attempt to remove it would be derogating from the laws, and ſubverting the conſtitution of the empire.

119 Burying-places deſcribed.

The burying-places in China are always ſituated at

China.

a ſmall diſtance from a city or town, and generally upon ſome eminence, having pines or cypreſſes uſually planted around them. The form of the tombs is various according to the different provinces, and the ſituation of thoſe for whom they are intended. The coffins of the poor are placed under a ſhed covered with thatch, or incloſed in a ſmall building of brick in the form of a tomb. The tombs of the rich are ſhaped like a horſe-ſhoe, well whitened, and finiſhed with great taſte; but thoſe of the mandarins and people of quality are much more ſumptuous and elegant. A vault is firſt conſtructed, in which the coffin is ſhut up; over this vault is raiſed a pyramid of earth well beat together, about 12 feet in height and 10 in diameter. A layer of lime and ſand laid over this earth makes a kind of plaſter, which renders the whole very durable and ſolid; various kinds of trees being planted around it in regular order. Before it is placed a large and long table of white marble, on the middle of which is ſet a cenſer, accompanied with two vaſes, and the ſame number of candleſticks of exquiſite workmanſhip. Beſides this a great number of figures, repreſenting officers, eunuchs, ſoldiers, ſaddled horſes, camels, lions, tortoiſes, &c. are ranged round the tombs in different rows; which F. du Halde aſſures us, produces a very ſtriking effect.

When a Chineſe dies in a province in which he was not born, his children have a right, nay it is their indiſpenſable duty, to tranſport the body to the burying-place of their anceſtors. A ſon, who ſhould be wanting in this reſpect, would be diſgraced, and his name never placed in the hall of his anceſtors. This is a vaſt building, conſidered as common to all the branches of the ſame family, and to which they all repair at a certain ſeaſon of the year. Sometimes they amount to ſeven or eight thouſand perſons, whoſe fortune, dignity, and rank in ſociety, are all very different; but there no diſtinction of rank is known; age only gives precedence, and the oldeſt always takes place of all the reſt, though he ſhould be the pooreſt in the company. The diſtinguiſhing ornament of this hall is a long table ſet againſt the wall, upon which is generally ſeen the image of one of their anceſtors, who has filled ſome office of diſtinction in the empire with honour to himſelf, or who has been rendered illuſtrious by his talents and abilities. Sometimes it only contains the names of men, women, and children belonging to the family, inſcribed upon tablets, together with their age, the day of their death, and the dignities they enjoyed at that time. Theſe tablets are ranged in two rows upon ſteps, and are only about a foot high each. In the ſpring, and ſometimes in the autumn, the relations of the deceaſed repair to this hall, where the only privilege enjoyed by the richeſt is that of preparing an entertainment, and treating the whole family at their own expence; but they never allow themſelves to taſte a bit of any thing until an offering has been firſt made to their anceſtors. This does not, however, excuſe them from viſiting the real tomb of their anceſtors once or twice a-year, generally in the month of April. At this time they pluck the weeds and buſhes from around the tomb, renew their expreſſions of grief, and conclude by placing upon it wine and proviſions, which ſerve to dine their aſſiſtants.

120 Funeral ceremonies.

The funeral ceremonies are conſidered by the Chineſe as the moſt important of any. A few moments after a perſon has expired, he is dreſſed out in his richeſt attire, and adorned with every badge of his dignity; after which he is placed in the coffin. The preparation of a coffin, in which his body may be incloſed after death, is one of the chief objects of attention to a Chineſe during his life, and great expence is often thrown out upon it; inſomuch that the poor will give all they are worth, and the rich expend a thouſand crowns, nay, a ſon will ſell himſelf for a ſlave in order to purchaſe a coffin for his father. Sometimes the coffin, when purchaſed with all this labour and expence, will remain twenty years uſeleſs in the family, and is conſidered as the moſt valuable piece of furniture in his poſſeſſion.

The manner of interment is as follows: Firſt they ſprinkle ſome lime in the bottom of the coffin; then they lay the body in it, taking care to place the head on a pillow, and to add a great deal of cotton, that it may remain more ſteady, and be prevented from ſhaking. In this manner the body remains expoſed ſeven days; but the time may be reduced to three, if any weighty reaſon makes it neceſſary; and, during this interval, all the relations and friends, who are purpoſely invited, come and pay their reſpects to the deceaſed, the neareſt relations even remaining in the houſe. The coffin is expoſed in the hall of ceremony, which is then hung with white, but ſome pieces of black or violet-coloured ſilk are here and there interſperſed, as well as ſome other ornaments of mourning. Before the coffin is placed a table, on which ſtands the image of the deceaſed, or a carved ornament inſcribed with his name; and theſe are always accompanied with flowers, perfumes, and lighted wax candles.

In the mean time thoſe who enter the hall are accuſtomed to ſalute the deceaſed as if he were ſtill in life. They proſtrate themſelves before the table, and knock their foreheads ſeveral times againſt the earth; after which they place on the table ſome perfumes and wax candles provided for the purpoſe. The ſalutation which they have made to the deceaſed is returned by the eldeſt ſon accompanied by his brothers. The latter come forth from behind a curtain, which hangs on one ſide of the coffin, creeping along the ground until they reach the ſpot where thoſe ſtand whom they are going to ſalute; after which, without riſing up, they return to the place from whence they came. The women are alſo concealed behind the ſame curtain, from whence they every now and then ſend forth diſmal cries.

After a number of ceremonies and invitations, the funeral proceſſion at laſt commences. A troop of men march in a file, carrying different figures made of paſteboard, and repreſenting ſlaves, lions, tigers, horſes, &c. Others follow, marching in two files; ſome of which carry ſtandards, ſome flags or cenſers filled with perfumes; while melancholy and plaintive airs are played by others on different muſical inſtruments. Theſe muſicians immediately precede the coffin, which is covered with a canopy in form of a dome, of violet-coloured ſilk; its four corners are ornamented with tufts of white ſilk very neatly embroidered, and covered at the top with net-work. The coffin is placed on the bottom of this machine, and is carried by 64 men,

China.

men. The eldeſt ſon, clothed in a frock of canvas, having his body bent and leaning on a ſtaff, follows near the coffin; and behind him his brothers and nephews, but none of them clothed in canvas. Then come the relations and friends, all clad in mourning, and followed by a great number of chairs covered with white ſtuff, which contain the wives and female ſlaves of the deceaſed. Theſe make great ſhow of ſorrow by their doleful cries; but M. Groſier obſerves, that, in ſpite of all they can do, the lamentations of the Chineſe are ſo methodical, that an European would be apt to conclude that they were the effects of art rather than the natural effuſions of a mind agitated and oppreſſed with grief. When they arrive at the burying place, the coffin is depoſited in a tomb appropriated for it, not far from which there are tables arranged in different halls, and on which the aſſiſtants are entertained with great ſplendour. The entertainment is ſometimes followed by freſh marks of homage to the corpſe; but theſe are often changed into thanks to the eldeſt ſon; who, however, anſwers only by ſigns. But if the deceaſed was a grandee of the empire, a certain number of his relations never leave the tomb for a month or two. There they reſide in apartments purpoſely provided for them, and every day renew their marks of grief in company with the children of the deceaſed. The magnificence of theſe funeral ceremonies is proportioned to the wealth or dignity of the deceaſed. That of one of the brothers of the emperor was attended by 16,000 people, each of whom had a particular office aſſigned him relating to the ceremony.

121 Mourning.

Mourning continues in China for three years; and during all this time they are obliged to abſtain from the uſe of fleſh and wine; nor can they aſſiſt at any entertainment of ceremony, or attend any public aſſembly. At firſt they are not even permitted to go abroad; and when they do ſo they are carried in a chair covered with a white cloth. Sometimes the filial piety of the Chineſe is carried to ſuch a length, that they preſerve the bodies of their deceaſed fathers in their houſes for three or four years; and thoſe who do ſo impoſe alſo upon themſelves a great number of other duties, uſing no other ſeat during the day but a ſtool covered with white ſerge, and no other bed but a plain mat made of reeds, which is placed near the coffin.

122 Diverſions of hunting and fiſhing.

According to M. Groſier, the only diverſions of the Chineſe are thoſe of hunting and fiſhing, dancing not being practiſed, and gaming forbidden by law. Fiſhing is conſidered by them rather as an object of commerce and induſtry than amuſement. They catch fiſh by various methods; uſing nets in their great fiſheries, but lines in the private. In certain provinces alſo they uſe a certain kind of bird whoſe plumage greatly reſembles that of a raven, but with a much longer bill, very ſharp and hooked. This method of fiſhing is practiſed in boats, of which great numbers may be ſeen on the river about ſun-riſing, with the fiſhing-birds perched on their prows. Theſe birds are taught to catch fiſh almoſt in the ſame manner that dogs purſue game. The fiſhermen, after making ſeveral turns with their boats, beat the water ſtrongly with one of their oars. This ſerves as a ſignal to the birds, who inſtantly plunge into the water, and diving, ſwallow as many ſmall fiſhes as they can, repairing immediately afterwards to the boat, and carrying a large one by the middle in their bill. The ſmall ones are prevented from paſſing into the ſtomach by a ring placed on purpoſe to confine its gullet: and thus the fiſherman by ſtroaking its neck with the head downwards, makes the bird diſgorge all thoſe ſmall fiſh it has ſwallowed. When they have done fiſhing, the rings are taken off, and the birds allowed to feed. When the fiſh happens to be too large for a ſingle bird, the others have ſagacity enough to aſſiſt it; one taking it by the tail, another by the head, &c. and thus they tranſport it to their maſter.

Another method of fiſhing, practiſed only in China, is as follows: They nail a board about two feet in breadth, which is covered with a white ſhining kind of varniſh, upon the edges of a long narrow boat, from one end to the other. This board is placed in ſuch a manner as to ſlope almoſt imperceptibly to the water. It is uſed only in the night-time, and is always turned towards the moon, that the reflection of light from the luminary may increaſe the ſplendour of the varniſh. The fiſh in ſporting, often miſtake this varniſhed board for water; and endeavouring to throw themſelves into it, fall into the boat.

The ſoldiers have a particular method of fiſhing with a bow and arrow; the latter of which is fixed to the bow by a ſtring, both to prevent it from being loſt, and to enable them to draw out the fiſh which the arrow has pierced; others make uſe of tridents to catch large fiſh which are ſometimes found in the mud.

Beſides theſe diverſions the Chineſe have ſome ſtrolling players, but no regular theatres; they have likewiſe muſicians and ſingers, but no operas, or indeed any public ſpectacle worthy of notice.

123 Of the Chineſe language.

The language of the Chineſe is not only very ancient, but, in M. Groſier's opinion, is ſtill ſpoken as in the moſt early ages without any variation. His reaſons for this opinion are, 1. We do not perceive in hiſtory, nor even in the moſt fabulous traditions, a ſingle fact tending to occaſion any doubt of the language ſpoken by the ancient Chineſe being different from that uſed at preſent. 2. China has never changed its inhabitants; and if revolutions have occaſioned any mixture of new languages, it appears that the ancient language has always been predominant, and that the new ſettlers have learned and ſpoken it, as the Manchew Tartars after their conqueſt. 3. The moſt intelligent and diſcerning of the literati agree, that the firſt chapters of the *Chou-king* were written under the reign of Yao, 2300 years before Chriſt; and in theſe ſeveral ſpeeches of the firſt emperors are related word for word; and it is not probable that the language of theſe princes was different from that of the hiſtorian. 4. A compliment paid to Yao by one of his ſubjects, with the anſwer of that prince, are ſtill preſerved, as well as two ſongs compoſed under the ſame reign. 5. The moſt ancient inſcriptions in China are all in the language ſpoken throughout the empire at this day. 6. The Chineſe have borrowed nothing from other nations; and their attachment to their own cuſtoms, and to antiquity, muſt undoubtedly be very unfavourable to any innovation. The language ſpoken by the vulgar, indeed, muſt have undergone ſome changes; but theſe may be accounted trivial, affecting only

China.

only the pronunciation; which indeed appears to be varied in ſome few inſtances. It is certain, however, that the Chineſe players act theatrical pieces which were written 1000 years ago, and that theſe are ſtill underſtood throughout the empire.

The language of China has no alphabet; all the words which compoſe it conſiſt of one ſyllable only, and are very few in number. Theſe always remain the ſame, and continue monoſyllables even when two are joined together, being united in the ſame manner as the French words *bon* and *jour* are united to form *bon-jour*. Theſe monoſyllables never form but one ſound. When written by an European, they begin with the letters *ch*, *tch*, *f*, *g*, or *j*, *i*, *h*, *l*, *m*, *n*, *g*, *ng*, *p*, *ſ*, *ts*, *v*, *ou*; the final letters being *a*, *e*, *i*, *o*, *oi*, *ou*, *u*, *l*, *n*, *gn*. The middle of Chineſe words conſiſts of vowels and conſonants producing only one ſound, and pronounced always as monoſyllables. The whole primary words of the language are in number only about 330, though ſome dictionaries make them 484. The ſenſe of theſe words, however, is varied by the accents and changes of the voice in pronouncing them almoſt *ad infinitum*. Two principal accents are known in China; the *ping*, that is, *even*, without elevating or depreſſing the voice. This is divided into *tſing*, *clear*, and *tcho*, *obſcure*; or rather *open* and *mute*. The accent *tſe* is ſubdivided into *tchang*, ſharp, *kiu*, grave, and *jou*, re-entering. The tone is *chang* when one raiſes the voice at the end of a word, as when the negative *no* is pronounced with great emphaſis and force; it is *kiu* when one depreſſes the voice with an air of timidity. When the accent is *jou*, the voice is drawn back as it were into the throat; and the aſpiration which takes place on certain words beginning with the letters *c*, *k*, *p*, *t*, ſtill adds to theſe varieties.

By theſe differences in pronunciation the ſignification of the words is totally changed; thus the word *tchu*, pronounced by lengthening the *u*, and with a clear tone of voice, ſignifies *maſter* or *lord*: if it is pronounced in an uniform tone by lengthening the *u*, it ſignifies *hog*; when pronounced lightly and with rapidity, it ſignifies *kitchen*; and when articulated with a ſtrong voice depreſſed towards the end, it ſignifies a *pillar*.

By the conjunction and modification of theſe different monoſyllables, a Chineſe can expreſs every thing he has occaſion for; and it may be eaſily ſeen what variety muſt reſult from this art of multiplying words. The Chineſe language therefore has words expreſſive of the ſmalleſt variation of circumſtance, and which cannot be expreſſed in the European languages without a circumlocution. Thus inſtead of the five words, calf, bull, ox, heifer, cow, every time that a cow has a calf ſhe acquires a new name in the language of this empire; and ſtill another when ſhe becomes barren. An ox fed for ſacrifice has a particular name, which is changed when he goes to the altar. In like manner, a whole dictionary might be compoſed of the words that are employed to expreſs the different parts of the emperor's palace, and thoſe that are in a manner conſecrated to it; others being employed when the palaces of princes or mandarins are ſpoken of. Thus the number of their characters are augmented beyond all bounds, ſo that the greater part of their literati ſpend all their lives in ſtudying them.

In the Chineſe there are four different languages: 1. The *Kou-ouen*, or claſſical language. This is not ſpoken at preſent, though it is generally believed to have been the language of the early ages. It is ſo laconic, and the ideas are ſo crowded, that it is very difficult to be underſtood; however, the literati, who can read and underſtand it, are much delighted with it.

2. The *Ouen-tchang* is the language uſed in compoſitions where a noble and elevated ſtyle is requiſite. It is never ſpoken, but certain ſentences and complimentary expreſſions are ſometimes borrowed from it. It approaches near to the laconic brevity and majeſtic ſolemnity of the *Kou-ouen*, and is equally proper for every kind of ſubject, excepting only the ambiguities of metaphyſics, and the formal rugged diction uſed in treating of the abſtract ſciences.

3. The *Kouan-ha* is the language of the court, of people in office, and of the literati. It admits of ſynonymous expreſſions to moderate the brevity of monoſyllables; of pronouns and relatives; prepoſitions, adverbs, and particles; to ſupply the want of caſes, moods, tenſes, and numbers, which have place in other languages.

4. *Hing-tan* is a kind of corrupted language, or provincial dialect, ſpoken by the lower claſſes in China; and of which every province, city, and almoſt every village, has its own. Beſides the ſenſe of the words which is changed in a great variety of places, they are ſo altered by diverſity of pronunciation as to be almoſt unintelligible.

This language is ſo abſolutely original, that no traces of the moſt diſtant relation can be perceived, either in reference to the form of the character, the ſyſtem on which it appears to have been conſtructed, or its peculiar idiom to any other known language to be met with upon the face of the earth. Many attempts indeed have been made by the learned and ingenious, to diſcover ſome affinity between it and different languages; but we apprehend without ſucceſs. Etymological compariſons are often fanciful and ſtrained, and ſeldom fail to lead to erroneous concluſions. It may indeed be admitted that it is poſſible to trace a reſemblance between the ſounds of the Chineſe language and thoſe of other nations, yet no art or ingenuity, no *etymological trick*, as Mr Barrow expreſſes himſelf, will ever be able to trace any analogy between their written characters, farther than that they are made up of points and lines, which might conſtitute an affinity between the Chineſe and any other language on the face of the earth. It has no alphabetical arrangement, but conſiſts purely of a prodigious number of arbitrary ſigns, ſettled by convention, and which have no external affinity to the things they are meant to deſcribe. The ridiculous conjectures often made on this ſubject by etymologiſts might be pardoned if they were meant to be ſatirical, like Dean Swift's antiquity of the Engliſh tongue, from which he makes the Hebrew, Greek, and Latin, to be derivatives.

Such is the nature of the Chineſe language, that it would be abſurd to expect among that people ſuch high attainments in every branch of literature as are to be met with in Europe. In the opinion of ſome very eminent men, their acquaintance with erudition of any kind was as great 2000 years ago as it is at preſent, while others are perſuaded that they are rather on the decline.

China.

decline. They pretend indeed, but without adducing any ſatisfactory proof of its truth, that the monuments of literature were deſtroyed by the tyrant She-whang-te, 200 years before the Chriſtian era, that ſucceeding generations might conſider him as the firſt civilized emperor who had ſwayed the ſceptre over that extenſive country. The chief works at preſent among them which are moſt valued, ſtudied, and leaſt underſtood, are the five claſſics collected by their favourite Cong-foo-tſe, 450 years B. C. and which it ſeems had the good fortune to eſcape the unlettered fury of She-whang-te. Theſe claſſics are enumerated by Mr Barrow in the following order.

1. *Shoo-king*. A collection of records and annals of various princes, commencing more than 2000 years B. C.

2. *Shee-king*. Odes, ſonnets, and maxims; moſt of them ſo abundant in metaphor, and ſo obſcure, that much of the ſenſe is to be made out by the tranſlator.

3. *Ye king*. The perfect and the broken lines of Fo-ſhee; the moſt ancient relick in China, and perhaps the firſt attempt at written language: now perfectly incomprehenſible.

4. *Chung-choo*. Spring and autumn. The hiſtory of ſome of the kings of Loo: the work principally of Cong-foo-tſe.

5. *Lee kee*. Ceremonies and moral duties, a compilation of Cong-foo-tſe.

Without a complete change of the Chineſe language, and a more extenſive and friendly intercourſe with foreign nations, it is not at all probable that that people will ever rank high for their knowledge of literature.

124
Chineſe writing.

There are five kinds of writing mentioned by the Chineſe literati; the moſt modern of which is a method of tracing out the characters with a pencil. This is difficult, and requires much experience; at any rate it disfigures the characters greatly, and is therefore only uſed in the preſcriptions of phyſicians, prefaces to books, and inſcriptions of fancy. The tracing of characters with neatneſs and accuracy, however, as we have already had occaſion to obſerve, is greatly admired in China. They are often preferred to the moſt elegant painting; and ſome will give a moſt exorbitant price for a page of an old book, if it happens to be neatly written. They pay particular attention to well formed characters even in the moſt common books; and if any of the leaves happen to fall off, will replace them with the greateſt attention. To apply them to any vile purpoſe, tread them under foot, &c. would be reckoned an unpardonable violation of decency and politeneſs; nay, it often happens, that workmen, ſuch as maſons and joiners, dare not tear a printed leaf of paper fixed to the wall.

125
Of their poetry.

Punctuation was not formerly uſed in China, nor are points as yet employed in works of an elevated ſtyle, or ſuch as are to be preſented to the emperor. Poetry is ſeldom an object of attention, though the taſte for it ſeems to be pretty general in China. Their verſification has its rules, and is no leſs difficult than that of other nations. Only the moſt harmonious, energetic, and pictureſque words, are to be employed, and they muſt always be uſed in the ſame ſenſe in which they were uſed by the ancients. Each verſe can contain only a certain number of words; all of which muſt be ranged according to the rules of quantity, and terminate in rhyme. The number of verſes in a ſtrophe is not determined; but they muſt be uniform, and preſent the ſame diſtribution of rhymes. The ſmall number of poetical expreſſions contained in the Chineſe language has rendered it neceſſary to extend the poetical licence to a great length in this reſpect. The Chineſe poets are allowed to employ a blank verſe in every four. They are acquainted with moſt kinds of poetry in uſe among us. They have ſtanzas, odes, elegies, idyls, eclogues, epigrams, ſatires, and even *bouts rimes*. The common people have alſo ballads and ſongs peculiar to themſelves. Some of the moſt diſtinguiſhed of the literati have even thought it of importance enough to turn the moſt celebrated maxims of morality, with the rules of civility, into verſe. Their poetry is ſeldom diſgraced by any kind of obſcenity; and indeed any ſuch thing would be ſeverely puniſhed by government. That ſevere attention with which every thing tending to corrupt the morals is watched in China, prohibits not only poems of this kind, but likewiſe romances of all ſorts. The police, however, permits ſuch novels as have an uſeful tendency, and in which nothing is introduced prejudicial to ſound morality. Every author who writes againſt government is puniſhed with death, as well as all thoſe who have had any hand in the printing or diſtribution of his works.

126
Chineſe paper.

The arts of making paper and printing have been long known among the Chineſe. That kind of paper now in uſe was firſt manufactured about 105 years before the Chriſtian era. Before that period they uſed cloth, and various kinds of ſilk ſtuff, inſtead of paper; and to this day they ſtill preſerve a cuſtom of writing the praiſes of the dead upon large pieces of ſilk, which are ſuſpended on one ſide of the coffin, and carried in funeral proceſſions; and of ornamenting their apartments with maxims and moral ſentences written in the ſame manner. In ages ſtill more early, they wrote with a kind of ſtyle upon pieces of bamboo, or even upon plates of metal. The firſt paper was invented by a mandarin. He took the bark of trees, hemp, and old pieces of ſilk-ſtuff, boiling them together until they were reduced to a kind of paſte, of which he formed his paper; which by degrees was brought to perfection, and the art of whitening and giving it a luſtre found out. A great number of different ſubſtances are now uſed in this empire for making paper; ſuch as the bamboo reed, the cotton ſhrub, the bark of the plant called kou-chu, and of the mulberry tree; hemp, the ſtraw of wheat and rice, parchment, the cods of the ſilk-worm, and ſeveral other ſubſtances unknown in Europe. In this manufacture the bark of trees and ſhrubs is uſed, and the woody ſubſtance of the bamboo and cotton tree, after it has been macerated and reduced to a thin paſte. Moſt of the Chineſe paper, however, is attended with the diſadvantage of being very ſuſceptible of moiſture, readily attracts the duſt, and worms inſenſibly get into it: to prevent which inconveniences, it is neceſſary to beat the books often, and expoſe them to the ſun. That made of cotton is the pretteſt, and moſt uſed of any. All of them, however, are much ſofter and ſmoother than ours; which is abſolutely neceſſary for their method of writing with

a

China.

a pencil, in order that it may run with freedom, which it could not do upon ours. It is formed into sheets of an enormous size; so that it would be no difficult matter to procure from the manufactories of this empire sheets of paper 30 or 40 feet long.

127 Ink.

The Chinese ink came originally from Corea; and it was not until the year 900, that they hit upon the method of making it to perfection. The best is made in *Hoei-tcheou* in the province of *Kiang-nan;* but its composition is a secret, which the workmen conceal not only from strangers but from their fellow-citizens. When a Chinese has occasion to write, he places upon his table a piece of polished marble, having a cavity at one of its extremities to contain a little water. In this he dips the end of his cake of ink, and rubs it upon the smooth part of the marble; and as he presses more or less strongly, the liquor acquires a deeper or lighter tinge of black. When he has done writing, the stone is carefully washed; for it would be dishonoured by allowing the least spot to remain. Then pencils used in writing are commonly made of the fur of a rabbit, and consequently very soft.

128 Their method of printing.

The Chinese method of printing is exceedingly different from ours; and indeed it would be in a manner impossible to have moveable types for such a number of characters as their language requires. The whole work which they intend to print is therefore engraved upon blocks of wood; and their method of proceeding is as follows. They first employ an excellent writer, who transcribes the whole upon very thin paper. The engraver glues each of the leaves of the manuscript upon a piece of plank made of any hard wood: he then traces over with a graver the strokes of the writing, carves out the characters in relief, and cuts down the intermediate part of the wood. Thus each page of a book requires a separate plank; and the excessive multiplication of these is no doubt a very great inconvenience, one chamber being scarce sufficient to preserve those employed for a single book. The advantages are, that the work is thus free from typographical errors, and the author has no occasion to correct the proofs. Thus also the booksellers in China have a decided advantage over those of Europe, as they are able by this method of printing to throw off copies according to their sale, without running the risk of being ruined by too large an edition. In this method the beauty of the work depends entirely upon the skill of the writer previously employed. The engravers are exceedingly dexterous, and imitate every stroke so exactly, that it is sometimes difficult to distinguish a printed work from one that is only written.

The method of printing in China is not by a press as in Europe, as neither their wooden planks nor their soft paper could sustain so much pressure. They first place the plank level, and then fix it in that position. The printer is provided with two brushes, and with the hardest daubs the plank with ink; and one daubing is sufficient for four or five leaves. After a leaf has been adjusted upon the plank, the workman takes the second brush, which is softer than the former, and of an oblong figure, and draws it gently over the paper, pressing it down a little, that it may receive the ink. The degree of pressure is to be regulated by the quantity of ink upon the planks: and in this manner one man is able to throw off almost 10,000 copies a day. The ink used for printing is different from that formerly described, and which is used in writing. The leaves, on account of the thinness of the paper, are printed only upon one side; on which account each leaf of a book is double, so that the fold stands uppermost, and the opening is towards the back, where it is stitched. Hence the Chinese books are not cut on the edges, but on the back. They are generally bound in gray pasteboard, which is very neat; and those who wish to have them more elegantly done, get the pasteboard covered with satin, flowered taffety, and sometimes with gold and silver brocade. Their books are neither gilt nor coloured on the edges like ours.

It has been so justly and so frequently observed, that the liberty of the press must ever prove fatal to the existence of tyranny and superstition, that it is a circumstance peculiarly singular to behold the liberty of the press flourishing under a despotic government; yet this is actually the case in China, although its government may be said to be founded on error and supported by oppression. It was the liberty of the press which accomplished the overthrow of sacerdotal tyranny in many European countries, by enlightening the minds of those who were enslaved. When the art of printing first found its way into England, an intelligent person observed to the abbot of Westminster, "If you don't take care to destroy that machine, it will very soon destroy your trade." It was fortunate, however, for succeeding generations, that neither the abbot nor his sanctified contemporaries had the penetration to discover the truth of this prediction, otherwise the ages of darkness and superstition might perhaps have been protracted to the present day.

129 Vast quantity of silk produced.

The art of manufacturing silk, according to the best authorities, was communicated by the Chinese to the Persians, and from them to the Greeks. The art has been known in this empire from the remotest antiquity; and the breeding of silk-worms and making of silk was one of the employments even of the empresses in very early ages.

The most beautiful silk in the whole empire is that of *Tche-kiang*, which is wrought by the manufactories of Nanking. From these are brought all the stuffs used by the emperor, and such as he distributes in presents to his nobility. A great number of excellent workmen are also drawn to the manufactories of Canton by the commerce with Europe and other parts of Asia. Here are manufactured ribbons, stockings, and buttons. A pair of silk stockings here costs little more than 6s. sterling.

The quantity of silk produced in China seems to be almost inexhaustible; the internal consumption alone being incredibly great, besides that which is exported in the commerce with Europe and the rest of Asia. In this empire all who possess a moderate fortune wear silk clothes; none but the lower class of people wearing cotton stuffs, which are commonly dyed blue. The principal stuffs manufactured by them are plain and flowered gauzes, of which they make summer dresses; damask of all colours; striped and black satins; naped, flowered, striped, clouded, and pinked taffeties; crapes, brocades, plush, different kinds of velvet, and a multitude of other stuffs unknown in Europe. They make particular

China.

particular uſe of two kinds; one named *touan-tſe*, a kind of ſatin much ſtronger, but which has leſs luſtre, than that of Europe; the other a kind of taffety, of which they make drawers and linings. It is woven exceedingly cloſe, and is yet ſo pliable that it may be rumpled and rubbed between the hands without any creaſe; and even when waſhed like cotton-cloth, it loſes very little of its luſtre. They manufacture alſo a kind of gold brocades, but of ſuch a ſlight nature, that they cannot be worn in clothes: they are fabricated by wrapping fine ſlips of gilt paper round the threads of ſilk.

130 Porcelain.

Porcelain is another great branch of Chineſe manufacture, and employs a vaſt number of workmen. The fineſt is made in a village called *King te-Ching* in the province of *Kiang-ſi*. Manufactories have alſo been erected in the provinces of Fo-kien and Canton, but their produce is not eſteemed: and one which the emperor cauſed to be erected at Peking, in order to be under his own inſpection, miſcarried entirely.

The Chineſe divide their porcelain into ſeveral claſſes, according to its different degrees of fineneſs and beauty. The whole of the firſt is reſerved for the uſe of the emperor, ſo that none of it ever comes into the hands of other perſons, unleſs it happen to be cracked or otherwiſe damaged in ſuch a manner as to be unworthy of being preſented to the ſovereign. Among that ſent to the emperor, however, there is ſome porcelain of an inferior quality, which he diſpoſes of in preſents. There is ſome doubt, therefore, whether any of the fineſt Chineſe porcelain was ever ſeen in Europe. Some value, however, is now put upon the European porcelain by the Chineſe themſelves.

131 Glaſs of little eſtimation.

The uſe of glaſs is very ancient in China, though it does not appear that great value was ever put upon this kind of ware, the art of manufacturing it having been frequently loſt and revived again in this empire. They greatly admire the workmanſhip of the European cryſtal, but prefer their own porcelain, which ſtands hot liquors, and is much leſs liable to be broken. The little eſtimation in which this ſubſtance was held, is even mentioned by their own writers in ſpeaking of the falſe pearls, mirrors, and other toys which were made in former ages. The remembrance of a very large glaſs veſſel, however, which was made in 627, is ſtill preſerved; and of which it was ſaid that a mule could as eaſily enter it as a gnat could enter a pitcher. In order to tranſport this monſtrous veſſel from the place where it was manufactured to the emperor's palace, it was neceſſary to incloſe it in a net, the four corners of which were fixed to four carriages. The ſame indifference with regard to glaſs is ſtill entertained by the preſent emperors; however, a glaſs-houſe is eſtabliſhed at Peking, where a number of vaſes and other works are made; and theſe are ſo much the more difficult in the execution, as none of them are blown. This manufactory, as well as many others, is conſidered only as an appendage of the court, deſtined for the purpoſes of pomp and magnificence.

132 Medicine.

It ſeems evident that medicine muſt have been one of the earlieſt ſtudies to which mankind turned their attention, at leaſt when they had attained to ſome degree of civilization. It is the common lot of humanity to be born to trouble as the ſparks fly upward, and therefore an aſſiduous application to the ſtudy of thoſe diſeaſes to which man is ſubject, either with a view to effect a radical cure, or even to mitigate the virulence of their ſymptoms, muſt have ſecured to ſuch characters the eſteem and admiration of the world. Even ſavages have diſcovered reſpect for ſuch of their own nation as could remove obſtructions, heal bruiſes, or adminiſter relief to the miſerable in any ſhape whatever. The Chineſe in this reſpect are perfectly unique, and ſeem to differ from every nation under heaven in their notions of medicine. They have no public ſeminaries where the healing art may be taught, becauſe they do not conſider the knowledge of any branch of medicine as in the ſmalleſt degree neceſſary. The very beſt performances of this nature to be met with in China, are little more than mere enumerations of the names and ſuppoſed qualities of different plants, —a ſufficient ſtock of knowledge for conſtituting a Chineſe phyſician. In a country where the people are ſo credulous, and the medical art at ſuch a low ebb, it would be a ſingular circumſtance to find no quacks. In every city, therefore, of this vaſt empire, multitudes are to be met with continually vending noſtrums, as pretended ſpecifics for ſome diſeaſe or other, and the eaſy credulity of the people affords them a comfortable ſubſiſtence.

Were the Chineſe perpetual ſtrangers to every ſpecies of diſeaſe, it would enable us to account for their unnatural apathy or indifference about the ſtudy of phyſic; but it will remain an inexplicable paradox, when we are aſſured upon undoubted authority, that they are ſubject to a multiplicity of diſtempers. The ſmallpox, ophthalmia, contagious fevers, ſometimes the venereal or Canton ulcer, as it is denominated by themſelves, are a few of the maladies incident to the Chineſe, which might conſtitute a powerful ſtimulus, one would imagine, to the ſtudy of phyſic, with unremitting aſſiduity, which it is certain they do not, as appears from the ſubſequent aſſertion of Dr Gregory. "In the greateſt, moſt ancient, and moſt civilized empire on the face of the earth, an empire that was great, populous, and highly civilized 2000 years ago, when this country was as ſavage as New Zealand is at preſent, no ſuch good medical aid can be obtained among the people of it, as a ſmart boy of 16, who had been but 12 months apprentice to a good and well employed Edinburgh ſurgeon, might reaſonably be expected to afford." This gives us a melancholy picture of the ſtate of medicine in China, which, however, is confirmed by the united teſtimony of Sir George Staunton and Mr Barrow.

The people of China are ſaid to be in the poſſeſſion of a method for aſcertaining whether a man has been murdered, or committed an act of ſuicide, of the probability of which our readers will be able to judge from the following proceſs. The body to be examined is waſhed with vinegar. A large fire is kindled in a pit dug for the purpoſe, ſix feet long, three wide, and the ſame in depth. The fire receives new acceſſion of fuel till the pit acquires the temperature of a heated oven, when the whole of the remaining fuel is taken out, and a large quantity of wine is poured into the pit. The body is then placed at full length on oſier twigs over the mouth of it, and covered with a cloth for two hours, that the ſteam of the wine may act upon the body in all directions. The Chineſe, it is

China.

is said, assert that if the blows given the body were so violent as to occasion death, this process makes the marks of them clearly appear, let the state of the body, when subjected to this test, be ever so cadaverous.

133
Of their music.

With regard to the music of the Chinese, we have the same stories related as of the Greeks and Egyptians, viz. that in former ages the musicians could make brute animals leap at the sound of their instruments. Our author, M. Grosier, indeed does not quote any Chinese author who asserts that the ancient music could make trees dance, or stones arrange themselves into a city; but he quotes them, asserting, "that the musicians could call down superior spirits of every age from the ethereal regions; raise up the manes of departed beings; inspire men with a love of virtue; and lead them to the practice of their duty." Effects of this supernatural kind are attributed to the sacred music by the inspired writers; as in the case of Saul, out of whom an evil spirit departed at the sound of David's harp; and of Elisha, who was inspired with the spirit of prophecy at the sound of a musical instrument. It is probable, therefore, that the relations both of the Greeks and Chinese are founded upon facts of this kind; and we cannot from thence infer, that the music of early ages was at all superior to that which followed. According to those who have employed much time in these researches, the ancient Chinese were acquainted with the division of the octave into twelve semitones; and that before the time of Pythagoras, or even Mercury himself: that the lyre of Pythagoras, his invention of the diatonic tetrachords, and the formation of his grand system, were merely borrowed from the ancient Chinese. In short, it is maintained, that the Greeks, even Pythagoras himself, did nothing but apply to strings that theory which the Chinese had before formed, and applied to pipes.

At present the Chinese are not acquainted with the use of our musical notes; they have not that diversity of signs which distinguish the different tones, and the gradual elevation or depression of the voice, nor any thing to point out the various modifications of sound to produce harmony. They have only a few characters to mark the principal notes; and all the airs they learn are repeated merely by rote. The emperor Kang-hi was therefore greatly astonished at the facility with which an European could catch and remember an air the first time he heard it. In 1679 he sent for Fathers Grimaldi and Pereira, to play some tunes on the harpsichord, of which they had before made him a present. He was greatly entertained with their music, but altogether astonished when he found that F. Pereira could take down a Chinese air while the musicians were playing it, and then repeat the whole without omitting a single note. Having made several trials of this kind in order to satisfy himself, he bestowed the highest encomiums upon the European music, and the means furnished by it to facilitate and lessen the labour of the memory. "I must confess (says he) that the European music is incomparable, and that the like of this F. Pereira is not to be found in my whole kingdom."

134
Musical instruments.

The Chinese have always distinguished eight different sounds; and they believe that nature, in order to produce these, formed eight different kinds of sonorous bodies. The order in which they distribute these sounds, and the instruments they have contrived to produce them, are, 1. The sounds of skin produced by drums; 2. That of stone produced by the *king*; 3. The sound of metal by bells; 4. That of baked earth by the *huien*; 5. Of silk by the *kin* and *che*; 6. Of wood by the *yu* and *tchou*; 7. Of the bamboo by the *koan*, and different flutes; 8. That of a gourd by the *cheng*.

The drums were originally composed of a box made of baked earth, and covered at the extremities with the skin of some animal; but on account of the brittleness of baked earth, wood was soon substituted in its stead. Most of these instruments are shaped like our barrels, but some are cylindrical.

The instruments formed of the sonorous stones are called *king*, distinguished into *tse king* and *pien-king*. The *tse-king* consists only of one stone, and therefore produces only one note. The *pien-king* consists of 16 stones suspended together, and thus forming an instrument capable of producing all the tones admitted into the music of the ancient Chinese. They are cut into the form of a carpenter's square; their tone is flattened by diminishing their thickness, and is made sharper by abridging their length.

Although in the estimation of the Chinese, universal nature has been forced to contribute towards the perfection of their music, by furnishing them with the skins of different animals, metals, stones, baked earths, and the fibrous parts of plants, Mr Barrow could discover no instrument among them of a musical nature, the tones of which would have been even tolerable to a delicate European ear; and only one person in the course of his investigations and researches could with any propriety be said to sing from tenderness and feeling. Yet without the smallest authority for such a bold assertion, a certain Jesuit has maintained, that the musical system of the Chinese was borrowed from them by the Greeks and Egyptians before the time of Orpheus! He who can believe this extravagant assertion, after comparing the music of these countries together at any given period, will find it an easy matter to give credit to any thing whatever.

155
Bells of immense size.

The bells in China have always been made of a mixture of tin and copper. They are of different shapes, and those of the ancients were not round but flattened, and in the lower part resembling a crescent. An instrument, corresponding to the king, already mentioned, is composed of 16 bells of different sizes. Some of their bells used on public occasions are of enormous magnitudes. One at Peking is described as $13\frac{1}{2}$ feet in diameter, $12\frac{1}{2}$ in height, and 42 in circumference; the weight being upwards of 120,000 pounds. It is used for announcing the hours or watches of the night; and its sound, which is prodigiously loud and strong, has a most awful effect in the nighttime, by reverberating round the walls and the echo of the surrounding country. There are several others likewise of vast size in the same city; one of which deserves greatly to be admired on account of the beautiful characters with which it is covered; and which are as neat and perfect as if traced out by the hand of the finest writer, or formed by means of a stamp upon wax. F. le Compte tells us, that in all the cities

 of

of China there are bells for marking the hours and watches of the night. They generally divide the night into five watches, beginning at feven or eight in the evening. On the commencement of the firft they give one ftroke, which is repeated a moment after; and thus they continue for two hours till the beginning of the fecond: they then give two ftrokes, which are repeated at equal intervals till the beginning of the third watch; and thus they proceed to the fourth and fifth, always increafing the number of the ftrokes. For the fame purpofe alfo they ufe enormous drums, which they beat in a fimilar manner. F. Magaillans mentions one at Peking upwards of 40 feet in circumference.

The inftrument called *huien*, which is made of baked earth, is highly efteemed by the Chinefe on account of its antiquity. It is diftinguifhed into two kinds, the great and fmall; the former being of the fize of a goofe's egg; the latter of that of a hen's. It has fix holes for the notes, and a feventh for the mouth.

The *kin* and *tche* have been known from the remoteft antiquity. The kin has feven ftrings made of filk, and is diftinguifhed into three kinds, differing only in fize. The body is formed of a kind of wood varnifhed black, and its whole length is about five feet five inches. The *tche* is about nine feet in length, has 25 ftrings, and is divided into 25 kinds. F. Amiot affures us, that we have no inftrument in Europe which deferves to be preferred to it.

The inftruments which emit the found of wood are the *tchou*, the *yu*, and the *tchoung-ton*. The firft is fhaped like a bufhel, and is beat on the infide with a hammer; the fecond, which reprefents a tyger fquatting, is made to found by fcraping its back gently with a rod; the third is a collection of twelve pieces of boards tied together, which are ufed for beating time, by holding them in the right hand, and knocking them gently againft the palm of the left.

Many inftruments are conftructed of the bamboo. Thefe confift of pipes joined together, or feparate, and pierced with more or fewer holes. The principal of all thefe wind inftruments is the *cheng*, which emits the found of a gourd. This is formed by cutting off the neck of a gourd, and referving only the lower part. To this a cover is fitted, having as many holes as are equal to the number of founds required. In each of thefe holes a pipe made of bamboo is fixed, and fhorter or longer according to the tone intended. The mouth of the inftrument is formed of another pipe fhaped like the neck of a goofe; which is fixed to the gourd on one fide; and ferves to convey the air to all the pipes it contains. The ancient *cheng* varied in the number of their pipes; thofe ufed at prefent have only 13.

136 Chinefe painting.

The painting of the Chinefe is undoubtedly inferior to that of the Europeans, though we are not by any means to judge of the abilities of the painters of this empire by the performances which are brought to Europe. M. Grofier remarks, that the works of the eminent Chinefe painters are never brought to Canton, becaufe they cannot find purchafers among the European merchants. The latter delight only in obfcene pictures, which are not permitted by government, nor indeed will any artift of character execute them, though they prevail upon fome of the inferior daubers to gratify them in this refpect. It feems, however, to be univerfally agreed, that the Chinefe have no notion of correctnefs or perfpective, and little knowledge of the proportions of the human body, though it cannot be denied that they excel in painting flowers and animals. In thefe they pride themfelves in a fcrupuloufly exact imitation of nature, infomuch that it is no uncommon thing to hear a painter afk his pupil how many fcales there are between the head and tail of a carp.

Painting was formerly much efteemed in China, but has now fallen into difrepute on account of its political inutility. The cabinets and galleries of the emperor, however, are filled with European paintings, and the celebrated artifts Caftiglioni and Attiret were both employed; but their offer of erecting a fchool of painting was rejected, left they fhould by this means revive the tafte for that art which it had been formerly thought prudent to fupprefs.

Painting in frefco was known in China long before the Chriftian era; and, like the Grecians, the Chinefe boaft much of their celebrated painters of antiquity. Thus we are told of a door painted by Fan-hien, which was fo perfect an imitation, that the people who entered the temple where it was, attempted to go out by it, unlefs prevented by thofe who had feen it before. The prefent emperor has in his park an European village painted in frefco, which produced the moft agreeable deception. The remaining part of the wall reprefents a landfcape and little hills, which are fo happily blended with the diftant mountains, that nothing can be conceived more agreeable. This was the production of Chinefe painters, and executed from defigns fketched out for them.

After this account of the ftate of painting in China, chiefly on the authority of M. Grofier, we beg leave to remark, upon the authority of more recent, and feemingly more competent as well as more inquifitive obfervers, that painting in China is at a low ebb, which made a certain artift once exclaim, "Thefe Chinefe are fit for nothing but weighing filver, and eating rice." They can copy with tolerable exactnefs what is laid before them, but fo deficient are they in refpect to a judicious alternation of light and fhade; and therefore without difcovering a fingle fymptom of tafte, beauties and defects are alike flavifhly imitated. Their fuppofed excellence in drawing flowers, birds, and infects to the life, is moft remarkable in the city of Canton; from which Mr Barrow conjectures that they acquire their eminence by copying the productions of Europe, occafionally fent over to be transferred to the porcelain defigned for exportation.

137 Engraving.

Engraving in three, four, or five colours, is very ancient among the Chinefe, and was known in this empire long before its difcovery in Europe.

138 Sculpture.

Sculpture is very little known in this empire; nor is there a fingle ftatue in any of the fquares or public edifices of Peking, not even in the emperor's palace. The only real ftatues to be met with in the empire are thofe which, for the fake of ceremonious diftinction, are ufed to ornament the avenues leading to the tombs of princes and men of great rank; or thofe that are placed near the emperor's coffin, and that of his fons and daughters, in the interior part of the vault, where their remains are depofited.

139 Architecture.

The Chinefe architecture is entirely different from that

China.

that of the Greeks or Romans; but has nevertheless certain proportions of its own, and a beauty peculiar to itself. The habitations of the emperor are real palaces, and announce in a striking manner the majesty and grandeur of the master who inhabits them. All the missionaries who had access to the inside of the emperor's palace at Peking, agreed, that if each of its parts, taken separately, does not afford so much delight to the eye as some pieces of the grand architecture of Europe, the whole presents a sight superior to any thing they had ever seen before. In the Chinese architecture, when a pillar is two feet in diameter at the base, its height must be 14 feet; and by measures of this kind the height of every building is determined.

Almost all the houses and buildings in China are constructed of wood. One reason of this may be the dread of earthquakes; but, besides this, such buildings are rendered eligible by the heat and dampness of the southern provinces, and the excessive cold in the northern, which would render stone houses almost uninhabitable. Even at Peking, where the rains are but of short duration, it is found necessary to cover the small marble staircases belonging to the imperial palace with pieces of felt; the humidity of the air moistens and soaks into every thing. During winter the cold is so excessively severe, that no window can be opened to the north; and water continues constantly frozen to the depth of a foot and a half for more than three months. For the same reasons a variety of stories are not used in the Chinese buildings; as neither a second nor third story would be habitable during the great heats of summer or the rigorous cold of winter. Though Peking is situated in the northern part of the empire, the heat there, during the dogdays, is so intolerably scorching, that the police obliges tradesmen and shopkeepers to sleep in the open air in the piazzas of their houses, lest they should be stifled by retiring into their inner apartments. The habitations of people of rank, or of those in easy circumstances, generally consist of five large courts, inclosed with buildings on every side. The method of building with several stories was, however, followed for several centuries, when the court resided in the southern provinces; and the taste for this kind of building was carried to such a height, that immense edifices were erected from 150 to 200 feet in height, and the pavilions or towers at the extremities rose upwards of 300 feet. This kind of building, however, at length became disgusting; though either to preserve the remembrance of it, or for the sake of variety, there are still some buildings to be seen several stories high in the palaces belonging to the emperor.

140 Bridges.

A multiplicity of bridges is rendered necessary in China by the vast number of canals and rivers which intersect the empire. Anciently, however, the Chinese bridges were much more ingenious as well as magnificent than they are at present. Some of them were so contrived that they could be erected in one day to supply the place of others which might happen to be broken down, or for other purposes. At that time they had bridges which derived their name from their figure; as *resembling the rainbow; draw-bridges, bridges to move with pulleys, compass bridges*, &c. with many others entirely unknown at present. The building of bridges indeed was once a luxurious folly of the emperors; so that they were multiplied from whim or caprice, without any necessity, and without use. Still, however, many of them are extremely beautiful and magnificent. The arches of some are very lofty and acute, with easy stairs on each side, the steps of which are not quite three inches in thickness, for the greater facility of ascending and descending; others have no arches, but are composed of large stones, sometimes 18 feet in length, placed transversely upon piles like planks. Some of these bridges are constructed of stone, marble, or brick; others of wood; and some are formed of a certain number of barks joined together by very strong iron chains. These are known by the name of floating bridges, and several of them are to be seen on the large rivers Kiang and Hoang-ho.

141 Ship-building.

For several centuries the Chinese have made no progress in ship-building. Their vessels have neither mizen, bowsprit, nor top-mast. They have only a main and fore-mast, to which is sometimes added a small top-gallant-mast. The main-mast is placed almost in the same part of the deck as ours; but the fore-mast stands much farther forward. The latter is to the former in the proportion of two to three; and the mainmast is generally two-thirds of the length of the vessel. They use mats for sails, strengthening them with whole bamboos equal in length to the breadth of the sail, and extended across it at the distance of a foot from one another. Two pieces of wood are fixed to the top and bottom of the sail; the upper serves as a sail-yard; and the lower, which is about five or six inches in thickness, keeps the sail stretched when it is necessary to hoist or lower it. This kind of sail may be folded or unfolded like a screen. For caulking their vessels they do not use pitch, but a particular kind of gum mixed with lime, which forms a composition of such excellent quality, that one or two wells in the hold are sufficient to keep the vessel dry. They have not yet adopted the use of pumps, and therefore draw up the water with buckets. Their anchors are made of the hard wood called *iron wood*, which they say is much superior to the metal, because the latter sometimes bend, but the former never do.

The Chinese pretend to have been the first inventors of the mariners compass, but seem to have little inclination to improve such an important instrument; however, they are well acquainted with the art of manœuvring a vessel, and make excellent coasting pilots, though they are bad sailors in an open sea.

CHINA-Root, in the *Materia Medica*, the root of a species of SMILAX, brought both from the East and West Indies; and thence distinguished into oriental and occidental. Both sorts are longish, full of joints, of a pale reddish colour, with no smell, and very little taste. The oriental, which is the most esteemed, is considerably harder, and paler-coloured than the other. Such should be chosen as is fresh, close, heavy, and upon being chewed appears full of a fat unctuous juice. It is generally supposed to promote insensible perspiration and the urinary discharge, and by its unctuous quality to obtund acrimonious juices. China-root was first brought into Europe in the year 1535, and used as a specific against venereal and cutaneous disorders.

disorders. With this view it was made ufe of for fome time; but has long fince given place to more powerful medicines.

CHINA-Ware. See PORCELAIN.

CHINCA, a fea-port town in Peru in South America, fituated in an extenfive valley of the fame name, in W. Long. 76. 0. S. Lat. 13. 0.

CHINCOUGH, a convulfive kind of cough to which children are generally fubject. See MEDICINE *Index.*

CHINESE, in general, denotes any thing belonging to China or its inhabitants.

CHINESE Swanpan. See ABACUS.

CHINKAPIN. See FAGUS, BOTANY *Index.*

CHINNOR, a mufical inftrument among the Hebrews, confifting of 32 chords. Kircher has given a figure of it, which is copied on Plate CXLV.

CHINON, an ancient town of Tourrain in France, remarkable for the death of Henry II. king of England, and for the birth of the famous Rabelais. It is feated on the river Vienne, in a pleafant and fertile country, in E. Long. 0. 18. N. Lat. 47. 2.

CHIO, or CHIOS, an Afiatic ifland lying near the coaft of Natolia, oppofite to the peninfula of Ionia. It was known to the ancients by the name of Ethalia, Macris, Pithyufa, &c. as well as that of Chios. According to Herodotus, the ifland of Chios was peopled originally from Ionia. It was at firft governed by kings: but afterwards the government affumed a republican form, which by the direction of Ifocrates was modelled after that of Athens. They were, however, foon enflaved by tyrants, and afterwards conquered by Cyrus king of Perfia. They joined the other Grecians in the Ionian revolt; but were fhamefully abandoned by the Samians, Lefbians, and others of their allies: fo that they were again reduced under the yoke of the Perfians, who treated them with the utmoft feverity. They continued fubject to them till the battle of Mycale, when they were reftored to their ancient liberty: this they enjoyed till the downfal of the Perfian empire, when they became fubject to the Macedonian princes. In the time of the emperor Vefpafian the ifland was reduced to the form of a Roman province; but the inhabitants were allowed to live according to their own laws under the fuperintendence of a prætor. It is now fubject to the Turks, and is called *Scio.* See that article.

CHICOCCA. See BOTANY *Index.*

CHIONANTHUS, the SNOW-DROP or FRINGE-TREE. See BOTANY *Index.*

CHIONE, in fabulous hiftory, was daughter of Dædalion, of whom Apollo and Mercury became enamoured. To enjoy her company, Mercury lulled her to fleep with his caduceus; and Apollo, in the night under the form of an old woman, obtained the fame favours as Mercury. From this embrace Chione became mother of Philammon and Autolycus; the former of whom, as being fon of Apollo, became an excellent mufician; and the latter was equally notorious for his robberies, of which his father Mercury was the patron. Chione grew fo proud of her commerce with the gods, that fhe even preferred her beauty to that of Juno; for which impiety fhe was killed by the goddefs and changed into a hawk.—Another of the fame name was daughter of Boreas and Orithia, who had Eumolpus by Neptune. She threw her fon into the fea; but he was preferved by his father.

CHIOS. See CHIO and SCIO.

CHIOURLIC, an ancient town of Turkey in Europe, and in Romania, with a fee of a Greek bifhop. It is feated on a river of the fame name, in E. Long. 7. 47. N. Lat. 41. 18.

CHIOZZO, an ancient and handfome town of Italy in the territory of Venice, and in a fmall ifland, near the Lagunes, with a podefta, a bifhop's fee, and a harbour defended by a fort. E. Long. 12. 23. N. Lat. 45. 17.

CHIPPENHAM, a town of Wiltfhire, feated on the river Avon. It is a good thoroughfare town; has a handfome ftone bridge over the river, confifting of arches; and fends two members to parliament. There is here a manufacture of the beft fuperfine woollen cloth in England. W. Long. 2. 12. N. Lat. 51. 25.

CHIPPING, a phrafe ufed by the potters and china men to exprefs that common accident both of our own ftone and earthen ware, and the porcelain of China, the flying off of fmall pieces, or breaking at the edges. Our earthen wares are particularly fubject to this, and are always fpoiled by it before any other flaw appears in them. Our ftone wares efcape it better than thefe; but not fo well as the porcelain of China, which is lefs fubject to it than any other manufacture in the world. The method by which the Chinefe defend their ware from this accident, is this: They carefully burn fome fmall bamboo canes to a fort of charcoal, which is very light, and very black; this they reduce to a fine powder, and then mix it into a thin pafte, with fome of the varnifh which they ufe for their ware; they next take the veffels when dried, and not yet baked, to the wheel; and turning them foftly round, they, with a pencil dipt in this pafte, cover the whole circumference with a thin coat of it; after this, the veffel is again dried; and the border made with this pafte appears of a pale grayifh colour when it is thoroughly dry. They work on it afterwards in the common way, covering both this edge and the reft of the veffel with the common varnifh. When the whole is baked on, the colour given by the afhes difappears, and the edges are as white as any other part; only when the baking has not been fufficient, or the edges have not been covered with the fecond varnifhing, we fometimes find a dufky edge, as in fome of the ordinary thick tea-cups. It may be a great advantage to our Englifh manufacturers to attempt fomething of this kind. The willow is known to make a very light and black charcoal: but the elder, though a thing feldom ufed, greatly exceeds it. The young green fhoots of this fhrub, which are almoft all pith, make the lighteft and the blackeft of all charcoal; this readily mixes with any liquid, and might be eafily ufed in the fame way that the Chinefe ufe the charcoal of the bamboo cane, which is a light hollow vegetable, more refembling the elder fhoots than any other Englifh plant. It is no wonder that the fixed falt and oil contained in this charcoal fhould be able to penetrate the yet raw edges of the ware, and to give them in the fubfequent baking a fomewhat different degree of vitrification from the other parts of the veffel; which, though, if given to the whole, it

it might take off from the true ſemivitrified ſtate of that ware, yet at the edges is not to be regarded, and only ſerves to defend them from common accidents, and keep them entire. The Chineſe uſe two cautions in this application: the firſt in the preparation; the ſecond in the laying it on. They prepare the bamboo canes for burning into charcoal, by peeling off the rind. This might eaſily be done with our elder ſhoots, which are ſo ſucculent, that the bark ſtrips off with a touch. The Chineſe ſay, that if this is not done with their bamboo, the edges touched with the paſte will burſt in the baking: this does not ſeem indeed very probable; but the charcoal will certainly be lighter made from the peeled ſticks, and this is a known advantage. The other caution is, never to touch the veſſel with hands that have any greaſy or fatty ſubſtance about them; for if this is done, they always find the veſſel crack in that place.

CHIROGRAPH, was anciently a deed which, requiring a counterpart, was engroſſed twice on the ſame piece of parchment, counterwiſe; leaving a ſpace between, wherein was written CHIROGRAPH; through the middle whereof the parchment was cut, ſometimes ſtraight, ſometimes indentedly; and a moiety given to each of the parties. This was afterwards called *dividenda*, and *chartæ diviſæ;* and was the ſame with what we now call *charter-party*. See *CHARTER-Party*. The firſt uſe of theſe chirographs, with us, was in the time of Henry III.

CHIROGRAPH was alſo anciently uſed for a fine; and the manner of engroſſing the fines, and cutting the parchment in two pieces, is ſtill retained in the office called the *chirographer's office*.

CHIROGRAPHER *of* FINES, an officer in the common pleas, who engroſſes fines acknowledged in that court into a perpetual record (after they have been examined, and paſſed by other officers), and writes and delivers the indentures thereof to the party. He makes two indentures; one for the buyer, the other for the ſeller; and a third indented piece, containing the effect of the fine, and called *the foot of the fine:* and delivers it to the *cuſtos brevium*.—The ſame officer alſo, or his deputy, proclaims all fines in court every term, and indorſes the proclamations on the backſide of the foot; keeping, withal, the writ of covenant, and the writ of fine.

CHIROMANCY, a ſpecies of divination drawn from the lines and lineaments of a perſon's hand, by which means, it is pretended, the diſpoſitions may be diſcovered. See DIVINATION, N° 9.

CHIRON, a famous perſonage of antiquity; ſtyled by Plutarch, in his dialogue on muſic, "*The wiſe Centaur.*" Sir Iſaac Newton places his birth in the firſt age after Deucalion's deluge, commonly called the *Golden Age*; and adds, that he formed the conſtellations for the uſe of the Argonauts, when he was 88 years old; for he was a practical aſtronomer, as well as his daughter Hippo: he may, therefore, be ſaid to have flouriſhed in the earlieſt ages of Greece, as he preceded the conqueſt of the Golden Fleece, and the Trojan war. He is generally called the ſon of Saturn and Phillyra; and is ſaid to have been born in Theſſaly among the CENTAURS, who were the firſt Greeks that had acquired the art of breaking and riding horſes: whence the poets, painters, and ſculptors, have repreſented them as a compound of man and horſe; and perhaps it was at firſt imagined by the Greeks, as well as the Americans, when they firſt ſaw cavalry, that the horſe and the rider conſtituted the ſame animal.

Chiron was repreſented by the ancients as one of the firſt inventors of medicine, botany, and *chirurgery;* a word which ſome etymologiſts have derived from his name. He inhabited a grotto or cave in the foot of Mount Pelion, which, from his wiſdom and great knowledge of all kinds, became the moſt famous and frequented ſchool throughout Greece. Almoſt all the heroes of his time were fond of receiving his inſtructions; and Xenophon, who enumerates them, names the following illuſtrious perſonages among his diſciples: Cephalus, Æſculapius, Melanion, Neſtor, Amphiaraus, Peleus, Telamon, Meleager, Theſeus, Hippolitus, Palamedes, Ulyſſes, Mneſtheus, Diomedes, Caſtor and Pollux, Machaon and Podalirius, Antilochus, Æneas, and Achilles. From this catalogue it appears, that Chiron frequently inſtructed both fathers and ſons; and Xenophon has given a ſhort eulogium on each, which may be read in his works, and which redounds to the honour of the preceptor. The Greek hiſtorian, however, has omitted naming ſeveral of his ſcholars, ſuch as Bacchus, Phœnix, Cocytus, Aryſtæus, Jaſon, and his ſon Medeus, Ajax, and Proteſilaus. Of theſe we ſhall only take notice of ſuch as intereſt Chiron more particularly. It is pretended that the Grecian Bacchus was the favourite ſcholar of the Centaur; and that he learned of this maſter the revels, orgies, bacchanalia, and other ceremonies of his worſhip. According to Plutarch, it was likewiſe at the ſchool of Chiron that Hercules ſtudied muſic, medicine, and juſtice; though Diodorus Siculus tells us, that Linus was the muſic-maſter of this hero. But among all the heroes who have been diſciples of this Centaur, no one reflected ſo much honour upon him as Achilles, whoſe renown he in ſome meaſure ſhared; and to whoſe education he in a particular manner attended, being his grandfather by the mother's ſide. Apollodorus tells us, that the ſtudy of muſic employed a conſiderable part of the time which he beſtowed upon his young pupil, as an incitement to virtuous actions, and a bridle to the impetuoſity of his temper. One of the beſt remains of antique painting now exiſting, is a picture upon this ſubject, dug out of the ruins of Herculaneum, in which Chiron is teaching the young Achilles to play on the lyre. The death of this philoſophic muſician was occaſioned, at an extreme old age, by an accidental wound in the knee with a poiſoned arrow, ſhot by his ſcholar Hercules at another. He was placed after his death by Muſæus among the conſtellations, through reſpect for his virtues, and in gratitude for the great ſervices which he had rendered the people of Greece. Sir Iſaac Newton ſays *, in proof of the conſtellations being formed by Chiron and Muſæus for the uſe and honour of the Argonauts, that nothing later than the expedition was delineated on the ſphere: according to the ſame author, Chiron lived till after the Argonautic expedition, in which he had two grandſons. The ancients have not failed to attribute to him ſeveral writings; among which, according to Suidas, are *precepts*, *υποθηκας*, in verſe, compoſed for the uſe of Achilles; and a medicinal treatiſe

Burney's Hiſt. of Muſic.

* *Chronol.* p. 151.

tiſe on the *diſeaſes incident to horſes* and other quadrupeds, ἱππιατρικον; the lexicographer even pretends, that it is from this work the Centaur derived his name. Fabricius gives a liſt of the works attributed to Chiron, and diſcuſſes the claims which have been made for others to the ſame writings: and in vol. xiii. he gives him a diſtinguiſhed place in his catalogue of ancient phyſicians.

CHIRONIA. See BOTANY *Index*.

CHIRONOMY, in antiquity, the art of repreſenting any paſt tranſaction by the geſtures of the body, more eſpecially by the motions of the hands: this made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIROTONY, among eccleſiaſtical writers, denotes the impoſition of hands uſed in conferring prieſtly orders. However, it is proper to remark, that chirotony originally was a method of electing magiſtrates, by holding up the hands.

CHIRURGEON, or SURGEON. See SURGEON.

CHIRURGERY. See SURGERY.

CHISLEY-LAND, in *Agriculture*, a ſoil of a middle nature between ſandy and clayey land, with a large admixture of pebbles.

CHISON, KISON, or KISSON, (Judges iv. and v.) a river of Galilee; ſaid to riſe in Mount Tabor, to run by the town of Naim, and to fall into the Mediterranean between Mount Carmel and Ptolemais, (1 Kings xviii. 40.).

CHISSEL, or CHISEL, an inſtrument much uſed in ſculpture, maſonry, joinery, carpentry, &c.

Theſe are chiſſels of different kinds; though their chief difference lies in their different ſize and ſtrength, as being all made of ſteel well ſharpened and tempered: but they have different names, according to the different uſes to which they are applied. The chiſſels uſed in carpentry and joinery are, 1. The former; which is uſed firſt of all before the parting chiſſel, and juſt after the work is ſcribed. 2. The paring chiſſel; which has a fine ſmooth edge, and is uſed to pare off or ſmooth the irregularities which the former makes. This is not ſtruck with a mallet as the former is, but is preſſed with the ſhoulder of the workman. 3. Skewformer: this is uſed for cleanſing acute angles with the point or corner of its narrow edge. 4. The mortiſe-chiſſel; which is narrow, but very thick and ſtrong, to endure hard blows, and it is cut to a very broad baſil. Its uſe is to cut deep ſquare holes in the wood for mortiſes. 5. The gouge, which is a chiſſel with a round edge; one ſide whereof ſerves to prepare the way for an augre, and the other to cut ſuch wood as is to be rounded, hollowed, &c. 6. Socket-chiſſels, which are chiefly uſed by carpenters, &c. have their ſhank made with a hollow ſocket at top; to receive a ſtrong wooden ſprig, fitted into it with a ſhoulder. Theſe chiſſels are diſtinguiſhed, according to the breadth of the blade, into half-inch chiſſels, three quarters of an inch chiſſels, &c. 7. Ripping chiſſels; which is a ſocket-chiſſel of an inch broad, having a blunt edge, with no baſil to it. Its uſe is to rip or tear two pieces of wood aſunder, by forcing in the blunt edge between them.

CHITON, in *Zoology*, a genus of the order of vermes teſtaceæ. The name *chiton* is from χιτων, *lorica*, a coat of mail. The ſhell is plated, and conſiſts of many parts lying upon each other tranſverſely: the inhabitant is a ſpecies of the DORIS. See CONCHOLOGY *Index*.

CHITTIM, in *Ancient Geography*, according to Le Clerc, Calmet, and others, was the ſame with Macedonia, peopled by Kittim the ſon of Javan and grandſon of Noah.

CHITTRICK'S MEDICINE FOR THE STONE. This medicine was ſome years ago kept as a ſecret, and had great reputation as a lithontriptic, which indeed it ſeems in many caſes to deſerve. It was diſcovered by Dr Blackrie to be no more than ſoap-lye; and the following receipt for uſing it was procured by General Dunbar: "Take one tea-ſpoonful of the ſtrongeſt ſoap-lye, mixed in two table-ſpoonfuls of ſweet milk, an hour before breakfaſt, and at going to bed. Before you take the medicine, take a ſup of pure milk, and immediately after you have ſwallowed the medicine take another. If you find this agrees with you for two or three days, you may add half as much more to the doſe."

CHIVALRY, (from *cheval*, "a horſe"); an abſtract term, uſed to expreſs the peculiar privileges, obligations, and turn of mind, with all the other diſtinguiſhing characteriſtics of that order of men who flouriſhed in Europe in the dark ages, during the vigour of the feudal ſyſtems of government, under the name of *Knights* or *Knights Errant*.

1 Definition.

To aſcertain the period at which the order ſprung up, and the circumſtances to which its origin was owing, is no eaſy taſk. In the hiſtory of ſociety, ſuch a multiplicity of collateral facts appear interwoven together, and cauſes and effects run into each other by a gradation ſo imperceptible, that it is exceedingly difficult, even for the niceſt eye, to diſcern cauſes from their immediate effects, or to diſtinguiſh to which among a number of collateral circumſtances the origin of any particular event is to be referred. The age to which we muſt look for the origin of chivalry was ſingularly rude and illiterate. Even the principal events of that period, emigrations, wars, and the eſtabliſhment of ſyſtems of laws and forms of government, have been but imperfectly, and in many inſtances unfaithfully, recorded. But the tranſactions which took place in the ordinary courſe of civil and domeſtic life, and which, though leſs ſtriking, muſt have always prepared the way for the more remakable events, have been generally thought unworthy of tranſmiſſion to poſterity, and have very ſeldom found a hiſtorian. Add to theſe difficulties which oppoſe our reſearches on this ſubject, that the nations of Europe were in that age a mixed multitude, conſiſting of the aborinal inhabitants, who, though either ſubdued by the Roman arms, or at leaſt compelled to retire to the woods and mountains, ſtill obſtinately retained their primitive manners and cuſtoms; Roman colonies, and ſuch of the original inhabitants of the countries in which theſe were eſtabliſhed, as had yielded not only to the arms of the Romans, but alſo to the influence of their laws, arts, and manners; and the barbarians, who proceeding from the northern regions of Aſia and Europe, the wilds of Scythia and Germany, diſſolved the fabric of the Roman empire, and made themſelves lords of Europe. Amid this confuſion of nations, inſtitutions, and

2 Difficulty of tracing the origin of chivalry.

Chivalry.

and cuftoms, it becomes almoft impoffible to trace any regular feries of caufes and effects.

Yet as the hiftory of that period is not entirely unknown to us, and the obfcure and imperfect records in which it is preferved, while they commemorate the more remarkable events, throw a faint light on the cuftoms, manners, and ordinary tranfactions of the age; we can at leaft collect fome circumftances, which, if they did not of themfelves give rife to the inftitution of chivalry, muft certainly have co-operated with others to that end. We may even be allowed, if we proceed with due diffidence and caution, to deduce, from a confideration of the effect, fome inferences concerning the caufe; from thofe particulars of its hiftory which are known to us, we may venture to carry imagination backwards, under a proper reftraint, to thofe which are hid under the darknefs of a rude and illiterate age.

3
Diftinction of ranks an effential part of the mechanifm of fociety.

Diftinction of ranks appears to be effentially neceffary to the exiftence of civil order. Even in the fimpleft and rudeft focial eftablifhments, we find not merely the natural diftinctions of weak and ftrong, young and old, parent and child, hufband and wife; thefe are always accompanied with others which owe their inftitution to the invention of man, and the confent, either tacit or formal, of the fociety among whom they prevail. In peace and in war, fuch diftinctions are equally neceffary; they conftitute an effential and important part of the mechanifm of fociety.

4
The early pre-eminence of the military character.

One of the earlieft artificial diftinctions introduced among mankind, is that which feparates the bold and fkilful warrior from thofe whofe feeblenefs of body and mind renders them unable to excel in dexterity, ftratagem, or valour. Among rude nations, who are but imperfectly acquainted with the advantages of focial order, this diftinction is more remarkably eminent than in any other ftate of fociety. The ferocity of the human character in fuch a period produces almoft continual hoftilities among neighbouring tribes; the elements of nature, and the brute inhabitants of the foreft, are not yet reduced to be fubfervient to the will of man; and thefe, with other concomitant circumftances, render the warrior, who is equally diftinguifhed by cunning and valour, more ufeful and refpectable than any other character.

5
Subordinate diftinctions of rank introduced into fociety.

On the fame principles, as the boundaries of fociety are enlarged, and its form becomes more complex, the claffes into which it is already diftinguifhed are again fubdivided. The invention of arts, and the acquifition of property, are the chief caufes of thefe new diftinctions which now arife among the orders of fociety; and they extend their influence equally through the whole fyftem. Difference of armour, and different modes of military difcipline, produce diftinction of orders among thofe who practife the arts of war; while other circumftances, originating from the fame general caufes, occafion fimilar changes to take place amidft the fcenes of peace.

6
The diftinction introduced into the military order by the ufe of cavalry.

None of the new diftinctions which are introduced among men, with refpect to the difcipline and conduct of war, in confequence of the acquifition of property and the invention of arts, is more remarkable than that occafioned by the ufe of horfes in military expeditions, and the training of them to the evolutions of the military art. Fire-arms, it is true, give to thofe who are acquainted with them a greater fuperiority over thofe to whom their ufe is unknown, than what the horfeman poffeffes over him who fights on foot. But the ufe of fire-arms is of fuch importance in war, and the expence attending it fo inconfiderable, that wherever thefe have been introduced, they have feldom been confined to one particular order in an army; and, therefore, they produced indeed a remarkable, though tranfient, diftinction among different nations, but eftablifh no permanent diftinctions in the armies in any one nation. But to maintain a horfe, to equip him with coftly furniture, to manage him with dexterity and vigour, are circumftances which have invariably produced a ftanding and confpicuous diftinction among the military order, wherever bodies of cavalry have been formed. The Roman *equites*, who, though they became at length a body of ufurers and farmers-general, were originally the only body of cavalry employed by the ftate, occupied a refpectable rank between the fenators and the plebeians; and the elegance and humanity of their manners were fuitable to their rank. In ancient Greece, and in the celebrated monarchies of Afia, the fame diftinction prevailed at a fimilar period.

7
Military diftinctions among the ancient Germans.

Since the circumftances and principles on which this diftinction depends are not fuch as muft be confined in their influence to one particular nation, or one region of the globe, we may hope to trace their effects among the favage warriors of Scythia and Germany, as well as among the Greeks or Romans. From the valuable treatife of Tacitus *de Moribus Germanorum*, we learn that, among the German warriors, a diftinction fomewhat of this nature, *did* actually fubfift; not fo much indeed a diftinction between the warrior who fought on horfeback and thofe who fought on foot, as between thofe whom vigour of body and energy of mind enabled to brave all the dangers of war, and fuch as, from the imbecility of youth, the infirmities of age, or the natural inferiority of their mental and bodily powers, were unequal to fcenes of hardfhip and deeds of valour. The youth was not permitted to take arms and join his warlike countrymen in their military expeditions whenever he himfelf thought proper: there was a certain age before which he could not be invefted with armour. When he had attained that period, if not found deficient in ftrength, activity, or courage, he was formally honoured with the fhield and the lance, called to the duties, and admitted to all the privileges of a warrior.

8
Refpectability of the women among the Germans.

Another fact worthy of notice, refpecting the manners of the barbarians of Germany before they eftablifhed themfelves in the cultivated provinces of the Roman empire, is, that their women, contrary to what we find among many other rude nations, were treated with a high degree of refpect. They did not generally vie with the men in deeds of valour, but they animated them by their exhortations to diftinguifh themfelves in the field; and virgins efpecially were confidered with a facred veneration, as endowed with prophetic powers, capable of forefeeing events hid in the womb of futurity, and even of influencing the will of the deities. Hence, though domeftic duties were their peculiar province, yet they were not harfhly treated nor confined to a ftate of flavery. There appears indeed a ftriking analogy between the condition of the women among

Chivalry.

among the rude ſoldiers of Sparta and the rank which they occupied among the warlike cantons of Germany. Perhaps indeed the German were ſtill more honourable than the Spartan women; as they were taught to wield the magic weapons of ſuperſtition, which in Greece were appropriated to the prieſts.

It appears, therefore, that in the foreſts of Germany at leaſt, if not the more northern regions of Aſia and Europe, the conquerors of the Roman empire, before they penetrated into its provinces, treated their women with a degree of reſpect unknown to moſt of the nations of antiquity; that the character of the warrior was likewiſe highly honourable, being underſtood to unite all thoſe qualities which were in the higheſt eſtimation; and that it was only at a particular age, and with certain forms, that the youth were admitted to bear arms.

9
Changes in the manners of the barbarians after they ſettled in the Roman empire, which gave riſe to chivalry.

When thoſe nations ſallied from their deſerts and foreſts, overran the Roman empire, and eſtabliſhed themſelves in its provinces, the changes which took place in their circumſtances were remarkable; and by a natural influence it could not but produce an equally remarkable change in their habits, cuſtoms, and manners. The great outlines might ſtill remain: but they could not now fail to be filled up in a different manner. Here, however, the records of hiſtory are peculiarly imperfect. We have no Cæſar or Tacitus to ſupply facts or direct our reaſonings; the Gothic nations had not yet learned to read and write; and the Romans were ſo depreſſed under a ſenſe of their own miſeries, as to be negligent of the changes which happened around them. But as ſoon as the light of hiſtory begins again to dawn, we find that the leading features of the barbarian character were not effaced, but only modified in a particular manner, in conſequence of their mixing among a more poliſhed people, becoming acquainted with the luxuries of life, and acquiring extenſive power and property.

Thoſe who fought on horſeback now began to be diſtinguiſhed with peculiar honours. The manners of the warrior too were become more cultivated, and his ſpirit more humane. Leiſure and opulence, with the influence of a poliſhed people, even though in a ſtate of ſlavery, taught thoſe barbarians to aſpire after more refined pleaſures and more ſplendid amuſements than thoſe with which they had been before ſatisfied. The influence of Chriſtianity, too, which, though groſsly corrupted, was ſtill favourable to the ſocial happineſs of mankind, concurred to poliſh their manners and exalt their character. Hence in the end of the tenth and in the beginning of the eleventh century, we ſee knight-errantry, with that romantic gallantry, piety, and humanity, by which it was principally diſtinguiſhed, make its appearance. At the court of every prince, count, or baron, jouſts and tournaments became the favourite amuſements. At thoſe entertainments, ſkill in arms, devotion to the fair, and generous courteſy, were all at once cultivated. About this period began the cruſades; and theſe, to which alone ſome have referred the origin of chivalry, though they could not give riſe to what was already in exiſtence, yet moulded the form and directed the ſpirit of the inſtitution in ſuch a manner, as to raiſe it, by a rapid progreſs from infancy, as it were, to full vigour and maturity. Its character, as it appeared when fully formed, is well deſcribed by an eloquent hiſtorian in the following manner:

Gibbon, vol. vi. p. 26.

"Between the age of Charlemagne and that of the cruſades, a revolution had taken place among the Spaniards, the Normans, and the French, which was gradually extended to the reſt of Europe. The ſervice of the infantry was degraded to the plebeians; the cavalry formed the ſtrength of the armies, and the honourable name of *miles*, or ſoldier, was confined to the gentlemen who ſerved on horſeback, and were inveſted with the character of knighthood. The dukes and counts, who had uſurped the rights of ſovereignty, divided the provinces among their faithful barons: the barons diſtributed among their vaſſals their fiefs or benefices of their juriſdiction; and theſe military tenants, the peers of each other and of their lord, compoſed the noble or equeſtrian order, which diſdained to conceive the peaſant or burgher as of the ſame ſpecies with themſelves. The dignity of their birth was preſerved by pure and equal alliances; their ſons alone who could produce four quarters or lines of anceſtry, without ſpot or reproach, might legally pretend to the honour of knighthood; but a valiant plebeian was ſometimes enriched and ennobled by the ſword, and became the father of a new race. A ſingle knight could impart, according to his judgment, the character which he received; and the warlike ſovereigns of Europe derived more glory from this perſonal diſtinction than from the luſtre of their diadem. This ceremony was in its own origin ſimple and profane; the candidate, after ſome previous trial, was inveſted with his ſword and ſpurs; and his cheek or ſhoulder was touched with a ſlight blow, as an emblem of the laſt affront which it was lawful for him to endure. But ſuperſtition mingled in every public and private action of life: In the holy wars, it ſanctified the profeſſion of arms; and the order of chivalry was aſſimilated in its rights and privileges to the ſacred orders of prieſthood. The bath and white garment of the novice were an indecent copy of the regeneration of baptiſm: his ſword, which he offered on the altar, was bleſſed by the miniſters of religion; his ſolemn reception was preceded by faſts and vigils; and he was created a knight in the name of God, of St George, and of St Michael the archangel. He ſwore to accompliſh the duties of his profeſſion; and education, example, and the public opinion were the inviolable guardians of his oath. As the champion of God and the ladies, he devoted himſelf to ſpeak the truth; to maintain the right, to protect the diſtreſſed; to practiſe *courteſy*, a virtue leſs familiar to the ancients; to purſue the infidels; to deſpiſe the allurements of eaſe and ſafety; and to vindicate in every perilous adventure the honour of his character. The abuſe of the ſame ſpirit provoked the illiterate knight to diſdain the arts of induſtry and peace; to eſteem himſelf the ſole judge and avenger of his own injuries; and proudly to neglect the laws of civil ſociety and military diſcipline. Yet the benefits of this inſtitution, to refine the temper of barbarians, and to infuſe ſome principles of faith, juſtice, and humanity, were ſtrongly felt, and have been often obſerved. The aſperity of national prejudice was ſoftened; and the community of religion and arms ſpread a ſimilar colour and generous emulation over the face of Chriſtendom. Abroad, in enterpriſe and pilgrimage;

Chivalry.

pilgrimage; at home, in martial exercise, the warriors of every country were perpetually associated; and impartial taste must prefer a Gothic tournament to the Olympic games of classic antiquity. Instead of the naked spectacles which corrupted the manners of the Greeks, and banished from the stadium the virgins and matrons, the pompous decoration of the lists was crowned with the presence of the chaste and high-born beauty, from whose hands the conqueror received the prize of his dexterity and courage. The skill and strength that were exerted in wrestling and boxing bear a distant and doubtful relation to the merit of a soldier; but the tournaments, as they were invented in France, and eagerly adopted both in the east and west, presented a lively image of the business of the field. The single combat, the general skirmish, the defence of a pass or castle, were rehearsed as in actual service; and the contest, both in real and mimic war, was decided by the superior management of the horse and lance. The lance was the proper and peculiar weapon of the knight: his horse was of a large and heavy breed; but this charger, till he was roused by the approaching danger, was usually led by an attendant, and he quietly rod a pad or palfrey of a more easy pace. His helmet and sword, his greaves and buckler, it would be superfluous to describe; but I may remark, that at the period of the crusades, the armour was less ponderous than in later times; and that, instead of a massy cuirass, his breast was defended by a hauberk or coat of mail. When their long lances were fixed in the rest, the warriors furiously spurred their horses against the foe; and the light cavalry of the Turks and Arabs could seldom stand against the direct and impetuous weight of their charge. Each knight was attended to the field by his faithful squire, a youth of equal birth and similar hopes; he was followed by his archers and men at arms; and four, or five, or six soldiers, were computed as the furniture of a complete *lance*. In the expeditions to the neighbouring kingdoms or the Holy Land, the duties of the feudal tenure no longer subsisted; the voluntary service of the knights and their followers was either prompted by zeal or attachment, or purchased with rewards and promises; and the numbers of each squadron were measured by the power, the wealth, and the fame of each independent chieftain. They were distinguished by his banner, his armorial coat, and his cry of war: and the most ancient families of Europe must seek in these atchievements the origin and proof of their nobility."

The respectable author of the Letters on Chivalry and Romance, traces, with great ingenuity and erudition, a strong resemblance between the manners of the age of chivalry and those of the old heroic ages delineated by Homer.

10
The resemblance between heroic and Gothic manners.

There is, says he, a remarkable correspondence between the manners of the old heroic times, as painted by their great romancer Homer, and those which are represented to us in the modern books of knight-errantry. A fact of which no good account can be given, but by another not less certain; that the political state of Greece, in the earliest periods of its story, was similar in many respects to that of Europe, as broken by the feudal system into an infinite number of petty independent governments.

Some obvious circumstances of agreement between the heroic and Gothic manners may be worth putting down.

Chivalry.

1. The military enthusiasm of the barons is but of a piece with the fanaticism of the heroes. Hence the same particularity of description in the accounts of battles, wounds, deaths, in the Greek poet as in the Gothic romancers. Hence the minute curiosity in the display of their dresses, arms, accoutrements. The minds of all men being occupied with warlike images and ideas, were much gratified by those details, which appear cold and unaffecting to modern readers.

We hear much of knights errant encountering giants and quelling savages in books of chivalry. These giants were oppressive feudal lords; and every lord was to be met with, like the giant, in his strong-hold or castle. Their dependents of a lower form, who imitated the violence of their superiors, and had not their castles but lurking places, were the savages of romance. The greater lord was called a giant for his power; the less, a savage for his brutality.

2. Another terror of the Gothic ages was monsters, dragons, and serpents. Their stories were received in those days for several reasons: 1. From the vulgar belief of enchantments: 2. From their being reported on the faith of eastern tradition, by adventurers from the Holy Land: 3. In still later times, from the strange things told and believed on the discovery of the new world.

In all these respects, Greek antiquity resembles the Gothic. For what are Homer's Læstrigons and Cyclops, but bands of lawless savages, with each of them a giant of enormous size at their head? And what are the Grecian Bacchus, Hercules, and Theseus, but knights-errant, the exact counterparts of Sir Launcelot and Amadis de Gaul?

3. The oppressions which it was the glory of the knights to avenge, were frequently carried on, as we are told, by the *charms and enchantments of women*. These charms, we may suppose, are often metaphorical; as expressing only the blandishments of the sex. Sometimes they are taken to be real, the ignorance of those ages acquiescing in such conceits. And are not those stories matched by those of Calypso and Circe, the enchantresses of the Greek poet?

4. Robbery and piracy were honourable in both: so far were they from reflecting any discredit on the ancient or modern *redressers of wrongs*. What account can be given of this, but that, in the feudal times, and in the early days of Greece, when government was weak, and unable to redress the injuries of petty sovereigns, it would be glorious for private adventurers to undertake this work; and, if they could accomplish it in no other way, to pay them in kind by downright plunder and rapine?

5. Bastardy was in credit with both. They were extremely watchful over the chastity of their own women; but such as they could seize upon in the enemy's quarter, were lawful prize. Or if, at any time, they transgressed in this sort at home, the fault was covered by an ingenious fiction. The offspring was reputed divine. Their greater heroes were the fruit of goddesses approached by mortals; just as we hear of the doughtiest knights being born of fairies.

6. With the greatest fierceness and savageness of character, the utmost generosity, hospitality, and courtesy,

tefy, were imputed to the heroic ages. Achilles was at once the moft relentlefs, vindictive, implacable, and the friendlieft of men. We have the very fame reprefentation in the Gothic romances. As in thofe lawlefs times, dangers and diftreffes of all kinds abounded, there would be the fame demand for compaffion, gentlenefs, and generous attachment to the unfortunate, thofe efpecially of their own clan, as of refentment, rage, and animofity againft their enemies.

7. Again, the martial games celebrated in ancient Greece, on great and folemn occafions, had the fame origin and the fame purpofe as the tournaments of the Gothic warriors.

8. Laftly, the paffion for adventures fo natural in their fituation, would be as naturally attended with the love of praife and glory. Hence the fame encouragement, in the old Greek and Gothic times, to panegyrifts and poets. In the affairs of religion and gallantry, indeed, the refemblance between the hero and the knight is not fo ftriking. But the religious character of the knight was an accident of the times, and no proper effect of his civil condition. And that his devotion for the fair fex fhould fo far furpafs that of the hero, is a confirmation of the fyftem here advanced. For the confideration had of the females in the feudal conftitution, will of itfelf account for this deference. It made them capable of fucceeding to fiefs, as well as the men. And does not one inftantly perceive what refpect and dependence this privilege would draw upon them?

It was of great confequence who fhould obtain the favour of a rich heirefs. And though, in the ftrict feudal times, fhe was fuppofed to be in the power and at the difpofal of her fuperior lord, yet this rigid ftate of things did not laft long. Hence we find fome diftreffed damfel was the fpring and mover of every knight's adventure. She was to be refcued by his arms, or won by the fame and admiration of his prowefs. The plain meaning of all which was this: That as, in thefe turbulent times, a protector was neceffary to the weaknefs of the fex, fo the courteous and valorous knight was to approve himfelf fully qualified for that purpofe.

It may be obferved, that the two poems of Homer were intended to expofe the mifchiefs and inconveniences arifing from the political ftate of Old Greece: the *Iliad*, the diffenfions that naturally fprung up among independent chiefs; and the *Odyffey*, the infolence of their greater fubjects, more efpecially when unreftrained by the prefence of their fovereign. And can any thing more exactly refemble the condition of the feudal times, when, on occafion of any great enterprife, as that of the crufades, the defigns of the confederate Chriftian ftates were perpetually fruftrated, or interrupted at leaft, by the diffenfions of their leaders; and their affairs at home, as perpetually diftreffed and difordered by the rebellious ufurpations of their greater vaffals? Jerufalem was to the European what Troy had been to the Grecian princes. See the article KNIGHT.

CHIVALRY, in *Law*, is ufed for a tenure of lands by knight's fervice, whereby the knight was bound to perform fervice in war unto the king, or the mefne lord of whom he held by that tenure. And chivalry was either general or fpecial: *general*, when it was only in the feoffment that the tenant held *per fervitium militare*, without any fpecification of fergeantry, efcuage, &c.; *fpecial*, when it was declared particularly by what kind of knight fervice the land was held.

For the better underftanding of this tenure it hath been obferved, that there is no land but is holden mediately or immediately of the crown by fome fervice; and therefore all freeholds that are to us and our heirs, are called *feuda* or *feoda*, "fees;" as proceeding from the king for fome fmall yearly rent, and the performance of fuch fervices as were originally laid upon the land at the donation thereof. For as the king gave to the great nobles, his immediate tenants, large poffeffions for ever, to hold of him for this or that fervice or rent; fo they in time parcelled out to fuch others as they liked the fame lands for rents and fervices as they thought good; and thefe fervices were by Littleton divided into two kinds, *chivalry* and *focage*; the firft whereof was martial and military, the other ruftical. Chivalry, therefore, was a tenure of fervice, whereby the tenant was obliged to perform fome noble or military office unto his lord: and it was of two kinds; either *regal*, that is, held only of the king; or *common*, where held of a common perfon. That which might be held only of the king was called *fervitium*, or *fergentia*; and was again divided into *grand* and *petit* ferjeantry. The grand ferjeantry was where one held lands of the king by fervice, which he ought to do in his own perfon: as, to bear the king's banner or fpear, to lead his hoft, to find men at arms to fight, &c. Petit ferjeantry was when a man held lands of the king, to yield him annually fome fmall thing towards his wars, as a fword, dagger, bow, &c. Chivalry that might be holden of a common perfon was termed *fcutagium*, "efcuage;" that is, fervice of the fhield; which was either uncertain or certain."

Efcuage uncertain, was likewife two-fold: firft, where the tenant was bound to follow his lord, going in perfon to the king's wars, either himfelf, or fending a fufficient man in his place, there to be maintained at his expence, fo long as was agreed upon between the lord and his firft tenant at the granting of the fee; and the days of fuch fervice feem to have been rated by the quantity of land fo holden; as, if it extended to a whole knight's fee, then the tenant was to follow his lord 40 days; and if but to half a knight's fee, then 20 days; if a fourth part, then ten days, &c. The other kind of this efcuage was called *caftle ward*, where the tenant was obliged, by himfelf, or fome other, to defend a caftle as often as it fhould come to his turn. And thefe were called *efcuage uncertain*; becaufe it was uncertain how often a man fhould be called to follow his lord to the wars, or to defend a caftle, and what his charge would be therein.

Efcuage certain, was where the tenure was fet at a certain fum of money to be paid in lieu of fuch fervice; as that a man fhould pay yearly for every knight's fee 20s. for half a knight's fee 10s. or fome like rate; and this fervice, becaufe it is drawn to a certain rent, groweth to be of a mixed nature, not merely focage, and yet focage in effect, being now neither perfonal fervice nor uncertain. The tenure called chivalry had other conditions annexed to it: but there is a great alteration made in thefe things by the ftat. 12 Car. II. c. 24. whereby tenures by knight's fervice of the king, or

or any other person *in capite*, &c. and the fruits and consequences thereof, are taken away and discharged; and all tenures are to be construed and adjudged to be free and common soccage, &c.

Court of CHIVALRY, a court formerly held before the lord high constable and earl marshal of England jointly, and having both civil and criminal jurisdiction; but since the attainder of Stafford duke of Buckingham under Henry VIII. and the consequent extinguishment of the office of lord high constable, it hath usually, with respect to civil matters, been heard before the earl marshal only. This court, by stat. 13. Rich. II. c. 2. hath cognizance of contracts and other matters touching deeds of arms and war, as well out of the realm as in it. And from its sentences lies an immediate appeal to the king in person. This court was in great reputation in the times of pure chivalry; and afterwards during the English connexions with the continent, by the territories which their princes held in France; but it is now grown almost entirely out of use, on account of the feebleness of its jurisdiction, and want of power to enforce its judgments; as it can neither fine nor imprison, not being a court of record.

1. The *civil* jurisdiction of this court of chivalry is principally in two points; the redressing injuries of honour, and correcting encroachments in matters of coat-armour, precedency, and other distinctions of families. As a court of honour, it is to give satisfaction to all such as are aggrieved in that point; a point of a nature so nice and delicate, that its wrongs and injuries escape the notice of the common law, and yet are fit to be redressed somewhere. Such, for instance, as calling a man *coward*, or giving him the lie; for which, as they are productive of no immediate damage to his person or property, no action will lie in the courts at Westminster; and yet they are such injuries as will prompt every man of spirit to demand some honourable amends; which, by the ancient law of the land, was given in the court of chivalry. But modern resolutions have determined, that how much soever a jurisdiction may be expedient, yet no action for words will at present lie therein. And it hath always been most clearly holden, that as this court cannot meddle with any thing determinable by common law, it therefore can give no pecuniary satisfaction or damages; inasmuch as the quantity and determination thereof is ever of common law cognizance. And therefore this court of chivalry can at most order reparation in point of honour; as to compel the defendant *mendacium sibi ipsi imponere*, or to take the lie that he has given upon himself, or to make such other submission as the laws of honour may require. As to the other point of its civil jurisdiction, the redressing of usurpations and encroachments in matters of heraldry and coat-armour; it is the business of this court, according to Sir Matthew Hale, to adjust the right and armorial ensigns, bearings, crests, supporters, pennons, &c.; and also rights of places or precedence, where the king's patent or act of parliament, which cannot be overruled by this court, have not already determined it. The proceedings of this court are by petition in a summary way; and the trial not by a jury of 12 men, but by witnesses, or by combat. But as it cannot imprison, not being a court of record; and as, by the resolutions of the superior courts, it is now confined to so narrow and restrained a jurisdiction, it has fallen into contempt. The marshalling of coat-armour, which was formerly the pride and study of all the best families in the kingdom, is now greatly disregarded; and has fallen into the hands of certain officers and attendants upon this court, called *heralds*, who consider it only as a matter of lucre, and not of justice; whereby such falsity and confusion have crept into their records (which ought to be the standing evidence of families, descents, and coat-armour), that though formerly some credit has been paid to their testimony, now even their common seal will not be received as evidence in any court of justice in the kingdom. But their original visitation books, compiled when progresses were solemnly and regularly made in every part of the kingdom, to inquire into the state of families, and to register such marriages and descents as were verified to them upon oath, are allowed to be good evidence of pedigrees.

2. As a *criminal* court, when held before the lord high constable of England jointly with the earl marshal, it had jurisdiction over pleas of life and member, arising in matters of arms and deeds of war, as well out of the realm as within it. But the criminal as well as civil part of its authority is fallen into entire disuse, there having been no permanent high constable of England (but only *pro hac vice*, at coronations and the like), since the attainder and execution of Stafford duke of Buckingham, in the 13th year of Henry VIII.; the authority and charge, both in war and peace, being deemed too ample for a subject; so ample, that when the chief justice Fineux was asked by King Henry VIII. how far they extended? he declined answering, and said, the decision of that question belonged to the law of arms, and not to the law of England.

CHIVES, or STAMINA, in *Botany*, are slender thread-like substances, generally placed within the blossom, and surrounding the POINTAL, or PISTILLUM. They are formed of the woody substance of the plant.

CHIUM MARMOR, in the natural history of the ancients, the name of a black marble, called also the *lapis obsidianus*. It is very hard, and of a fine black; and, beside the many uses which the ancients put it to, is well known among our goldsmiths by the name of the *touchstone*; most of them being furnished with nothing better for this purpose than a piece of this: though the basaltes, which may be had plentifully enough, is greatly preferable for those uses; any black marble, however, that is tolerably hard, will do. There is a very fine and elegantly smooth marble, of a compact texture, and fine glossy black, but showing no glittering particles when fresh broken, as most of the black marbles do. It is extremely hard, and cuts with difficulty, but is capable of the highest polish of any marble. The ancients had it from Ethiopia and the island of Chios; we have it from Italy.

CHIUM Vinum, *Chian Wine*, or wine of the growth of the island of Chios, now Scio, is commended by Dioscorides as affording good nourishment, fit to drink, less disposed to intoxicate, endued with the virtue of restraining defluxions, and a proper ingredient in ophthalmic

thalmic medicines. Hence Scribonius Largus directs the dry ingredients in collyria for the eyes to be made up with Chian wine.

CHIUN, or CHEVAN, in Hebrew antiquity. We meet with this word in the prophet Amos, cited in the Acts of the Apostles. St Luke reads the passage thus: "Ye took up the tabernacle of Moloch, and the star of your god Remphan, figures which ye made to worship them." The import of the Hebrew is as follows: "Ye have borne the tabernacle of your kings, and the pedestal (the *chiun*) of your images, the star of your gods, which ye made to yourselves." The Septuagint in all probability read *Repham* or *Revan*, instead of *Chiun* or *Chevan*, and took the pedestal for a god.

Some say that the Septuagint, who made their translation in Egypt, changed the word *Chiun* into that of *Remphan*, because they had the same signification. M. Basnage, in his book entitled *Jewish Antiquities*, after having discoursed a good deal upon *Chion*, or *Remphan*, concludes that Moloch was the sun, and *Chion*, *Chiun*, or *Remphan*, the moon.

CHLAMYS, in antiquity, a military habit worn by the ancients over the tunica. It belonged to the patricians, and was the same in the time of war that the toga was in the time of peace. This sort of gown was called *picta*, from the rich embroidery with figures in Phrygian work; and *purpurea*, because the groundwork was purple. The chlamydes of the emperors were all purple, adorned with a golden and embroidered border.

CHLOEIA, in antiquity, a festival celebrated at Athens in honour of Ceres, to whom, under the name Χλοη, *i. e. grass*, they sacrificed a ram.

CHLORA. See BOTANY *Index*.

CHLOROSIS, in *Medicine*, a disease, commonly called the *green sickness*, incident to young girls. See *MEDICINE Index*.

CHOCOLATE, in commerce, a kind of paste or cake prepared of certain ingredients, the basis of which is cacao. See CACAO.

The Indians, in their first making of chocolate, used to roast the cacao in earthen pots; and having afterwards cleared it of the husks, and bruised it between two stones, they made it into cakes with their hands. The Spaniards improved this method. When the cacao is properly roasted and well cleaned, they pound it in a mortar, to reduce it into a coarse mass, which they afterwards grind on a stone till it be of the utmost fineness: the paste being sufficiently ground, is put quite hot into tin moulds, in which it congeals in a very little time. The form of these moulds is arbitrary; the cylindrical ones, holding two or three pounds, are the most proper, because the bigger the cakes are, the longer they will keep. Observe, that these cakes are very liable to take any good or bad scent, and therefore they must be carefully wrapt up in paper, and kept in a dry place. Complaints are made, that the Spaniards mix with the cacao nuts too great a quantity of cloves and cinnamon, besides other drugs without number, as musk, ambergris, &c. The grocers of Paris use few or none of these ingredients; they only choose the best nuts, which are called *caracca*, from the place from whence they are brought; and with these they mix a very small quantity of cinnamon, the freshest vanilla, and the finest sugar, but very seldom any cloves. In England the chocolate is made of the simple cacao, excepting that sometimes sugar and sometimes vanilla is added.

Chocolate ready made, and cacao paste, are prohibited to be imported from any part beyond the seas. If made and sold in Great Britain, it pays inland duty 1s. 6d. per lb. avoirdupoise: it must be inclosed in papers containing one pound each, and produced at the excise office to be stamped. Upon three days notice given to the officer of excise, private families may make chocolate for their own use, provided no less than half an hundred weight of nuts be made at one time.

The chocolate made in Portugal and Spain is not near so well prepared as the English, depending perhaps on the machine employed there, viz. the double cylinder, which seems very well calculated for exact triture. If perfectly prepared, no oil appears on the solution. London chocolate gives up no oil like the foreign; and it also may in some measure depend on the thickness of the preparation. The solution requires more care than is commonly imagined. It is proper to break it down, and dissolve it thoroughly in cold water by milling it with the chocolate stick. If heat is applied, it should be done slowly; for, if suddenly the heat will not only coagulate it, but separate the oil; and therefore much boiling after it is dissolved is hurtful. Chocolate is commonly required by people of weak stomachs; but often rejected for want of proper preparation. When properly prepared, it is easily dissolved; and an excellent food where a liquid nutrient vegetable one is required, and is less flatulent than any of the farinacea.

Mr Henley, an ingenious electrician, has lately discovered that chocolate, fresh from the mill, as it cools in the tin pans into which it is received, becomes strongly electrical; and that it retains this property for some time after it has been turned out of the pans, but soon loses it by handling. The power may be once or twice renewed by melting it again in an iron ladle, and pouring it into the tin pans as at first; but when it becomes dry and powdery, the power is not capable of being revived by simple melting: but if a small quantity of olive-oil be added, and well mixed with the chocolate in the ladle, its electricity will be completely restored by cooling it in the tin-pan as before. From this experiment he conjectures, that there is a great affinity between carbonic acid and the electric fluid, if indeed they be not the same thing.

CHOCOLATE Nut-Tree. See CACAO.

CHOENIX, χοινιξ, an ancient dry measure, containing the 48th part of a *medimnus*, or six bushels.

CHOERILUS, a tragic poet of Athens about the 64th Olympiad. He wrote 150 tragedies, of which 13 had obtained the prize.—An historian of Samos.—Two other poets, one of whom was very intimate with Herodotus. He wrote a poem on the victory which the Athenians had obtained over Xerxes; and on account of the excellence of the composition he received a piece of gold for each verse from the Athenians. The other was one of Alexander's flatterers and friends.

CHOERINÆ, in antiquity, a kind of fea-fhells, with which the ancient Greeks ufed to give their fuffrage, or vote.

CHOIR, that part of the church or cathedral where chorifters fing divine fervice; it is feparated from the chancel where the communion is celebrated, and alfo from the nave of the church where the people are placed: the patron is faid to be obliged to repair the choir of the church. It was in the time of Conftantine that the choir was feparated from the nave. In the 12th century they began to enclofe it with walls; but the ancient balluftrades have been fince reftored, out of a view to the beauty of architecture.

Choir, in nunneries, is a large hall adjoining to the body of the church, feparated by a grate, where the nuns fing the office.

CHOISI, Francis Timoleon de, dean of the cathedral of Bayeux, and one of the forty of the French academy, was born at Paris in 1644. In the early part of his life he was much diftinguifhed by his frivolous manners, and particularly by appearing even at court in a female drefs. In 1685 he was fent with the chevalier de Chaumont to the king of Siam, and was ordained prieft in the Indies by the apoftolical vicar. He wrote a great number of works, in a polite, florid, and eafy ftyle; the principal of which are, 1. Four Dialogues on the Immortality of the Soul, &c. 2. Account of a voyage to Siam. 3. An Ecclefiaftical Hiftory, in 11 vols. 4to. 4. Life of David, with an Interpretation of the Pfalms. 5. Life of Solomon, &c. He died at Paris in 1724.

CHOLEDOCHUS, in *Anatomy*, a term applied to a canal, or duct, called alfo *ductus communis*; formed of the union of the porus biliarus and ductus cyfticus. The word comes from χολη, *choler*: and δεχομαι, *I receive*, or *contain*.

The choledochus ductus, paffing obliquely to the lower end of the duodenum, ferves to convey the bile from the liver to the inteftines. See Anatomy *Index*.

CHOLER. See Bile.

CHOLERA morbus, a fudden eruption or overflowing of the bile or bilious matters both upwards and downwards. See Medicine *Index*.

CHOMER, or Omer. See Corus.

CHONDRILLA. See Botany *Index*.

CHONDROPTERYGII, in *Ichthyology*, a term formerly applied to the order of fifhes now called *amphibia nantes* by Linnæus. See Amphibia.

CHOP-church, or Church-chopper, a name, or rather a nick-name, give to parfons who make a practice of exchanging benefices. See Permutation.

Chop-church occurs in an ancient ftatute as a lawful trade or occupation; and fome of the judges fay it was a good addition. Brook holds, that it was no occupation, but a thing permiffible by law.

CHOPIN, or Chopine, a liquid meafure ufed both in Scotland and France, and equal to half their pint. See Pint and Measure.

Chopine, *Rene*, a famous civilian born at Bailleul in Anjou in 1537. He was advocate in the parliament of Paris, where he pleaded for a long time with great reputation. He at laft fhut himfelf up in his clofet, and compofed many works, which have been collected together, and printed in 6 vols. folio. He died at Paris in 1606.

CHORAL, fignifies any perfon that, by virtue of any of the orders of the clergy, was in ancient times admitted to fit and ferve God in the choir.

Dugdale, in his hiftory of St Paul's church, fays, that there were with the chorus formerly fix vicars choral belonging to that church.

CHORASSAN, or Khorassan, a province of Perfia, adjoining to Ufbec Tartary. This was the ancient Bactria, and the birth-place of Kouli-Khan.

CHORAX, or Charax. See Characene.

CHORAZIM, or Chorazin, (Luke, Matthew), a town of Galilee, whofe wretched incredulity Chrift deplores; now defolate, at two miles diftance from Capernaum.

CHORD, or Cord, primarily denotes a flender rope or cordage*. The word is formed of the Latin, *chorda*, and that from the Greek, χορδη, *a gut*, whereof ftrings may be made.

* See *Cordage*.

Chord, in *Geometry*, a right line drawn from one part of an arch of a circle to another. Hence,

Chord of an Arch, is a right line joining the extremes of that arch.

Chord, in *Mufic*, the union of two or more founds uttered at the fame time, and forming together an entire harmony.

The natural harmony produced by the refonance of a founding body, is compofed of three different founds, without reckoning their octaves; which form among themfelves the moft agreeable and perfect chord that can poffibly be heard: for which reafon they are called, on account of their excellence, *perfect chords*. Hence, in order to render that harmony complete, it is neceffary that each chord fhould at leaft confift of three founds. The trio is likewife found by muficians to include the perfection of harmony; whether becaufe in this all the chords, and each in its full perfection, are ufed; or, becaufe upon fuch occafions as render it improper to ufe them all, and each in its integrity, arts have been fuccefsfully practifed to deceive the ear, and to give it contrary perfuafion, by deluding it with the principal founds of each *chord*, in fuch a manner as to render it forgetful of the other founds neceffary to their completion. Yet the octave of the principal found produces new relations, and new confonances, by the completion of the intervals: they commonly add this octave, to have the affemblage of all the confonances in one and the fame *chord*; (See Consonance). Moreover, the addition of the diffonance (See Discord), producing a fourth found fuperadded to the perfect chord, it becomes indifpenfably neceffary, if we would render the chord full, that we fhould include a fourth part to exprefs this diffonance. Thus, the feries of chords can neither be complete nor connected but by means of four parts.

Chords are divided into perfect and imperfect. The *perfect chord* is that which we have lately defcribed; which is compofed of the fundamental found below, of its third, its fifth, and its octave: they are likewife fubdivided into major and minor, according as the thirds which enter into their compofition are flat or fharp: (See Interval). Some authors likewife give the

the name of *perfect* to all chords, even to diſſonances, whoſe fundamental ſounds are below. Imperfect *chords* are thoſe in which the ſixth, inſtead of the fifth, prevails, and in general all thoſe whoſe loweſt are not their fundamental ſounds. Theſe denominations, which had been given before the fundamental baſs was known, are now moſt unhappily applied: thoſe of chords *direct* and *reverſed* are much more ſuitable in the ſame ſenſe.

Chords are once more divided into conſonances and diſſonances. The chords denominated *conſonances*, are the perfect chord, and its derivatives; every other chord is a *diſſonance*.

A table of both, according to the ſyſtem of M. Rameau, may be ſeen in Rouſſeau's Muſical Dictionary, vol. i. p. 27.

After the table to which our readers have been remitted, Rouſſeau adds the following obſervations, which are at the ſame time ſo juſt and ſo important, that we ſhould be very ſorry if they eſcape the reader's attention.

At the words *harmony*, *fundamental baſs*, *compoſition*, &c. he promiſes to treat concerning the manner of uſing all the chords to form regular harmony; and only adds, in this place, the ſubſequent reflections.

1. It is a capital error to imagine, that the methods of inverting the ſame chord are in all caſes equally eligible for the harmony and for the expreſſion. There is not one of theſe different arrangements but had its proper character. Every one feels the contraſt between the ſoftneſs of the falſe fifth, and the grating ſound of the tritone, though the one of theſe intervals is produced by a method of inverting the other. With the ſeventh diminiſhed, and the ſecond redundant, the caſe is the ſame with the interval of the ſecond in general uſe, and the ſeventh. Who does not feel how much more vocal and ſonorous the fifth appears when compared with the fourth? The *chord* of the great ſixth, and that of the leſſer ſixth minor, are two forms of the ſame fundamental *chord*: but how much leſs is the one harmonious than the other? On the contrary, the *chord* of the leſſer ſixth major is much more pleaſing and cheerful than that of the falſe fifth. And only to mention the moſt ſimple of all *chords*, reflect on the majeſty of the perfect chord, the ſweetneſs of that which is called the chord of the ſixth, and the inſipidity of that which is compoſed of a ſixth and a fourth: all of them, however, compoſed of the ſame ſounds. In general, the redundant intervals, the ſharps on the higher part, are proper by their ſeverity to expreſs violent emotions of mind, ſuch as anger and the rougher paſſions. On the contrary, flats in the higher parts, and diminiſhed intervals, form a plaintive harmony, which melts the heart. There are a multitude of ſimilar obſervations, of which, when a muſician knows how to avail himſelf, he may command at will the affections of thoſe who hear him.

2. The choice of ſimple intervals is ſcarcely of leſs importance than that of the *chords*, with regard to the ſtations in which they ought to be placed. It is, for inſtance, in the lower parts that the fifth and octave ſhould be uſed in preference; in the upper parts, the third and ſixth are more proper. If you tranſpoſe this order, the harmony will be ruined, even though the ſame *chords* are preſerved.

3. In a word, the *chords* are rendered ſtill more harmonious by being approximated and only divided by the ſmalleſt practicable intervals, which are more ſuitable to the capacity of the ear than ſuch as are remote. This is what we call *contracting* the harmony; an art which few compoſers have ſkill and abilities enough to put in practice. The limits in the natural compaſs of voices, afford an additional reaſon for leſſening the diſtance of the intervals, which compoſe the harmony of the chorus, as much as poſſible. We may affirm, that a chorus is improperly compoſed, when the diſtance between the *chords* increaſes; when thoſe who perform the different parts are obliged to ſcream when the voices riſe above their natural extent, and are ſo remotely diſtant one from the other that the perception of harmonical relations between them is loſt.

We ſay likewiſe, that an inſtrument is in *concord* when the intervals between its fixed ſounds are what they ought to be; we ſay in this ſenſe, that the *chords* of an inſtrument are true or falſe, that it preſerves or does not preſerve its *chords*. The ſame form of ſpeaking is uſed for two voices which ſing together, or for two ſounds which are heard at the ſame time, whether in uniſon or in parts.

CHORDS, or *CORDS of Muſical Inſtruments*, are ſtrings, by the vibration of which the ſenſation of ſound is excited, and by the diviſions of which the ſeveral degrees of tone are determined.

CHORDEE, in *Medicine* and *Surgery*, a ſymptom attending a gonorrhœa, conſiſting in a violent pain under the frenum, and along the duct of the urethra, during the erection of the penis, which is incurvated downwards. Theſe erections are frequent and involuntary.

CHOREA SANCTI VITI. See *VITUS's Dance*. MEDICINE *Index*.

CHOREPISCOPUS, an officer in the ancient church, about whoſe function the learned are much divided. The word comes from χωρος, a *region*, or *little country*, and επισκοπος, a *biſhop* or *overſeer*.

The Chorepiſcopi were ſuffragan or local biſhops, holding a middle rank between biſhops and preſbyters, and delegated to exerciſe epiſcopal juriſdiction within certain diſtricts, when the boundaries of particular churches, over which ſeparate biſhops preſided, were conſiderably enlarged. It is not certain when this office was firſt introduced; ſome trace it to the cloſe of the firſt century: others tell us, that chorepiſcopi were not known in the eaſt till the beginning of the fourth century; and in the weſt about the year 439. They ceaſed both in the eaſt and weſt in the tenth century.

CHOREPISCOPUS is alſo the name of a dignity ſtill ſubſiſting in ſome cathedrals, particularly in Germany; ſignifying the ſame with *chori epiſcopus*, or "biſhop of the choir." The word, in this ſenſe, does not come from χωρος, *place*, but χορος, *choir*, &c. In the church of Cologne, &c. the firſt chanter is called *chorepiſcopus*.

CHOREUS, Χορειος, a foot in the ancient poetry, more commonly called *trochæus*. See TROCHEE.

CHORIAMBUS, in ancient poetry, a foot conſiſting

fisting of four syllables, whereof the first and last are long, and the two middle ones are short; or, which is the same thing, it is made up of a trochæus and iambus; such is the word *nobilitas*.

CHORION, in *Anatomy*, the exterior membrane which invests the fœtus in the uterus. See FOETUS.

CHOROBATA, or CHOROBATES, a kind of water-level among the ancients, of the figure of the letter T, according to Vitruvius's description.

CHOROGRAPHY, the art of making a map of any country or province.

Chorography differs from geography, as the description of a particular country differs from that of the whole earth; and from topography, as the description of a country is different from that of a town or district. See the articles GEOGRAPHY, TOPOGRAPHY, and MAP.

CHOROIDES, or CHOROEIDES, in *Anatomy*, a term applied to several parts of the body, bearing some resemblance to the chorion. The word is formed from χοριον, *chorion*, and ειδος, *likeness*.

CHOROIDES is particularly used for the inner membrane which immediately invests the brain; so called as being intermingled with a great number of blood-vessels, like the *chorion*: but more usually denominated the *pia mater* or *mininx tenuis*.

Plexus or *Lacis CHOROIDES*, is a knot of veins and arteries in the anterior ventricle of the brain, woven out of the branches of the carotid.

CHOROIDES is also applied to the inner and posterior tunic of the eye, immediately under the sclerotica. It is soft, thin, and black: and its inner or concave surface is very smooth and polished. It has its name from its being interspersed with vessels.

CHORUS, in dramatic poetry, one or more persons present on the stage during the representation, and supposed to be by-standers without any share in the action.

Tragedy in its origin was no more than a single chorus, who trode the stage alone, and without any actors, singing dithyrambics or hymns in honour of Bacchus. Thespis, to relieve the chorus, added an actor, who rehearsed the adventures of some of their heroes; and Æschylus, finding a single person too dry an entertainment, added a second, at the same time reducing the singing of the chorus, to make more room for the recitation. But when once tragedy began to be formed, the recitative, which at first was intended only as an accessary part to give the chorus a breathing time, became a principal part of the tragedy. At length, however, the chorus became inserted and incorporated into the action: sometimes it was to speak; and then their chief, whom they called *coryphæus*, spoke in behalf of the rest: the singing was performed by the whole company; so that when the coryphæus struck into a song, the chorus immediately joined him.

The chorus sometimes also joined the actors, in the course of the representation, with their plaints and lamentations on account of any unhappy accidents that befel them; but the proper function, and that for which it seemed chiefly retained, was to show the intervals of the acts: while the actors were behind the scenes, the chorus engaged the spectators; their songs usually turned on what was exhibited, and were not to contain any thing but what was suited to the subject, and had a natural connection with it; so that the chorus concurred with the actors for advancing the action. In the modern tragedies the chorus is laid aside, and the fiddles supply its place. M. Dacier looks on this retrenchment as of ill consequence, and thinks it robs tragedy of a great deal of its lustre; he therefore judges it necessary to re-establish it, not only on account of the regularity of the piece, but also to correct, by prudent and virtuous reflections, any extravagancies that might fall from the mouths of the actors when under any violent passion.

M. Dacier observed also, that there was a chorus, or grex, in the ancient comedy: but this is suppressed in the new comedy, because it was used to reprove vices by attacking particular persons; as the chorus of the tragedy was laid aside to give the greater probability to those kinds of intrigue which require secrecy.

CHORUS, in *Music*, is when, at certain periods of a song, the whole company are to join the singer in repeating certain couplets or verses.

CHOSE (*Fr.*), "a thing;" used in the common law with divers epithets; as *chose local*, *chose transitory*, and *chose in action*. Chose local is such a thing as is annexed to a place, as a mill and the like; chose transitory is that thing which is moveable, and may be taken away, or carried from place to place; and chose in action is a thing incorporeal, and only a *right*, as an obligation for debt, annuity, &c. And generally all causes of suit for any debt, duty, or wrong, are to be accounted choses in action: and it seems, chose in action may be also called *chose in suspense*; because it hath no real existence or being, nor can properly be said to be in our possession.

CHOSROES I. the Great, king of Persia after his father Cabades, A. D. 532. He made peace with the Romans; but broke it the third year, and forced Justinian to a disadvantageous peace. Afterwards, he was so swelled with his victories, as to bid the emperor's ambassador follow him for audience to Cæsarea; but Tiberius sent an army under Justinian, who made himself master of the country, and put Chosroes to death in 586.

CHOSROES II. His subjects put his father Hormisdas in prison, and the son upon the throne of Persia. He used his father tenderly at first; but afterwards caused him to be put to death. This, together with his killing some of the nobility, obliged him to fly: he gave his horse the bridle, which carried him into a town of the Romans, where Mauricius the emperor received him kindly, and sent an army under Narses which set him again upon the throne. He took Jerusalem; after this he made himself master of Libya and Egypt, and carried Carthage. Heraclius sued for peace; which was offered him on condition, *That he and his subjects should deny Jesus Christ*: Hereupon Heraclius attacked him with success, and put him to flight. His own son pursued him, and he was starved in prison in 627.

CHOUGH, in *Ornithology*, the trivial name of a species of CORVUS. See ORNITHOLOGY *Index*.

CHOUS, in the eastern military orders, the title of the messengers of the divan Janisaries. There are several degrees of honour in this post. When a

perfon is firft advanced to it, he is called a *kuchuk*, or little *chous;* after this he is advanced to be the *alloy chous*, that is, the meffenger of ceremonies; and from this, having paffed through the office of *petelma*, or procurator of the effects of the body, he is advanced to be the *bas chous*.

CHOWDER-BEER, a provincial phrafe of Devonfhire, denoting a cheap and eafily prepared drink, highly commended for preventing the fcurvy in long voyages, or for the cure of it where it may have been contracted. It is prepared in the following manner: Take twelve gallons of water, in which put three pounds and a half of black fpruce: boil it for three hours, and having taken out the fir or fpruce, mix with the liquor feven pounds of melaffes, and juft boil it up; ftrain it through a fieve, and when milk-warm put to it about four fpoonfuls of yeaft to work it. In two or three days ftop the bung of the cafk: and in five or fix days, when fine, bottle it for drinking. Two gallons of melaffes are fufficient for a hogfhead of liquor; but if melaffes cannot be procured, treacle or coarfe fugar will anfwer the purpofe.

CHREMNITZ, the principal of the mine towns in Upper Hungary, fituated about 68 miles north-eaft of Prefburg, and fubject to the houfe of Auftria. E. Long. 19. N. Lat. 48. 45.

CHRENECRUDA, a term occurring in writers of the middle ages, and expreffing a cuftom of thofe times; but its fignification is doubtful. It is mentioned in *Lege Salica*, tit. 61. which fays, he who kills a man, and hath not wherewithal to fatisfy the law or pay the fine, makes oath that he hath delivered up every thing he was poffeffed of; the truth of which muft be confirmed by the oaths of 12 other perfons. Then he invites his next relations by the father's fide to pay off the remainder of the fine, having firft made over to them all his effects by the following ceremony. He goes into his houfe, and taking in his hand a fmall quantity of duft from each of the four corners, he returns to the door, and with his face inwards throws the duft with his left hand over his fhoulders upon his neareft of kin. Which done, he ftrips to his fhirt; and coming out with a pole in his hand, jumps over the hedge. His relations, whether one or feveral, are upon this obliged to pay off the compofition for the murder. And if thefe (or any one of them) are not able to pay *iterum fuper illum chrenecruda, qui pauperior eft, jactat, et ille totam legem componat.* Whence it appears, that *chrenecruda jactare*, is the fame with throwing the duft gathered from the four corners of the houfe. Goldaftus and Spelman tranflate it *viridem herbam*, "green grafs," from the German *gruen kraut*, or from the Dutch *groen*, "green," and *gruid*, "grafs." Wendelinus is of a contrary opinion, who thinks that by this word *denotari purificationis approbationem*, from *chrein*, "pure, chafte, clean;" and *keuren*, "to prove;" fo that it muft refer to the oaths of the twelve jurors. Be this as it will, King Childebert reformed this law by a decree, chap. 15. both becaufe it favoured of Pagan ceremonies, and becaufe feveral perfons were thereby obliged to make over all their effects: *De chrenecruda lex quam paganorum tempore obfervabant, deinceps nunquam valeat, quia per ipfam cecidet multorum poteftas.*

CHRISM (from χριω, *I anoint*), oil confecrated by the bifhop, and ufed in the Romifh and Greek churches, in the adminiftration of baptifm, confirmation, ordination, and extreme unction, which is prepared on holy Thurfday with much ceremony. In Spain it was anciently the cuftom for the bifhop to take one-third of a fol for the chrifm diftributed to each church, on account of the balfam that entered its compofition.

Du Cange obferves, that there are two kinds of chrifm; the one prepared of oil and balfam, ufed in baptifm, confirmation, and ordination; the other of oil alone, confecrated by the bifhop, ufed anciently for the catechumens, and ftill in extreme unction. The Maronites, before their reconciliation with Rome, befides oil and balfam, ufed mufk, faffron, cinnamon, rofes, white frankincenfe, and feveral other drugs mentioned by Rynaldus, in 1541, with the dofes of each. The Jefuit Dandini, who went to Mount Libanus in quality of the pope's nuncio, ordained, in a fynod held there in 1596, that chrifm for the future fhould be made only of two ingredients, oil and balfam; the one reprefenting the human nature of Jefus Chrift, the other his divine nature. The action of impofing the chrifm is called *chrifmation:* this the generality of the Romifh divines hold to be the next matter of the facrament of confirmation.

The chrifmation in baptifm is performed by the prieft; that in confirmation by the bifhop; that in ordination, &c. is more ufually ftyled *unction*.

CHRISM Pence, *CHRISMATIS Denarii*, or *CHRISMALES Denarii*, a tribute anciently paid to the bifhop by the parifh clergy, for their chrifm, confecrated at Eafter for the enfuing year: this was afterwards condemned as fimoniacal.

CHRISOM, a white garment put upon a child by the prieft immediately after baptifm, accompanied with this devout prayer; "Take this white vefture as a token of the innocency which, by God's grace in this holy facrament of baptifm is given unto thee, and for a fign whereby thou art admonifhed, fo long as thou liveft, to give thyfelf to innocence of living, that after this tranfitory life thou mayeft be partaker of life everlafting. Amen."

From this circumftance the white garment got the name of *chrifom*, which, after being worn a few days, was delivered to the prieft as a facred depofit, to be produced in future as an evidence againft the perfon, fhould he be fo impious as to renounce his baptifmal engagements. This ceremony continued in ufe for a confiderable time after the reformation in the church of England, which required the mother of the child, when churched, to offer the chrifom and other cuftomary oblations. On pronouncing the above mentioned prayer, the prieft anointed the head of the infant, faying, "Almighty God, the father of our Lord Jefus Chrift, who hath regenerated thee by water and the Holy Ghoft, and hath given unto thee the remiffion of all thy fins, vouchfafe to anoint thee with the unction of his Holy Spirit, and bring thee to the inheritance of everlafting life. Amen."

CHRIST, an appellation fynonymous with *Meffiah*, ufually added to Jefus: and, together therewith, denominating the Saviour of the world. See CHRISTIANITY and MESSIAH.

The word χριστος fignifies *anointed*, from χριω, *inungo*, "I anoint." Sometimes the word *Chrift* is ufed fingly,

Chriſt ‖ Chriſtianity.

gly, by way of *antonomaſis*, to denote a perſon ſent from God, as an anointed prophet, king, or prieſt.

Order of CHRIST, a military order, founded by Dionyſius I. king of Portugal, to animate his nobles againſt the Moors. The arms of this order are gules, patriarchal croſs charged with another croſs argent: they had their reſidence at firſt at Caſtromarin: afterwards they removed to the city of Thomar, as being nearer to the Moors of Andaluſia and Eſtremadura.

CHRIST is alſo the name of a military order in Livonia, inſtituted in 1205 by Albert biſhop of Riga. The end of this inſtitution was to defend the new Chriſtians who were converted every day in Livonia, but were perſecuted by the heathens. They wore on their cloaks a ſword with a croſs over it, whence they were alſo denominated *brothers of the ſword.*

CHRIST-*Burgh*, a town of Poland, near the lake Drauſen, and about three Poliſh miles from Marienburgh.

CHRIST-*Church*, a borough town of Hampſhire, 30 miles ſouth-weſt of Wincheſter, near the ſea-coaſt. W. Long. 2. N. Lat. 50. 40. It ſends two members to parliament.

CHRIST-*Thorn*. See RHAMNUS, BOTANY *Index*.

CHRISTIAN. See CHRISTIANITY and CHRISTIANS.

Moſt CHRISTIAN *King*, one of the titles of the former kings of France.

The French antiquarians trace the origin of this appellation up to Gregory the Great, who, writing a letter to Charles Martel, occaſionally gave him that title, which his ſucceſſors retained.

CHRISTIAN *Religion*, that inſtituted by Jeſus Chriſt. See CHRISTIANITY.

1 Origin of the word.

CHRISTIANITY, the religion of Chriſtians. The word is analogically derived, as other abſtracts from their concretes, from the adjective *Chriſtian*. This again is derived from the name Χριϛος, *Chriſtus*, from the word χριω, *I anoint*. Chriſt is called *the anointed*, from a cuſtom which extenſively prevailed in antiquity, and was originally ſaid to be of divine inſtitution, of anointing perſons in the ſacerdotal or regal character, as a public ſignal of their conſecration to their important offices, and as a teſtimony that heaven itſelf was the guarantee of that relation which then commenced between the perſons thus conſecrated and their ſubordinates.

2 By what name the apoſtles were firſt diſtinguiſhed.

The diſciples of Jeſus, after the death of their teacher, had for ſome time been called *Nazarenes*, from Nazareth in Galilee, where he dwelt; which afterwards became the deſignation of a particular ſect. They, who adopted the principles and profeſſed the religion which he taught, were firſt diſtinguiſhed by the name of *Chriſtians* at Antioch. That profeſſion, and thoſe doctrines, we now proceed to delineate with as much perſpicuity as the limits of our plan will admit, yet with the conciſeneſs which a work ſo multiform and extenſive requires.

3 Delineation of Chriſtianity.

When a Chriſtian is interrogated concerning the nature and foundation of his faith and practice, his ultimate reference, his laſt appeal, is to the facts, the doctrines, and the injunctions, contained in the books of the Old and New Teſtament. From theſe, therefore, and from theſe alone, muſt every fair account, or the materials of which it is compoſed, be extracted or reduced. Other formularies, or confeſſions of faith, may, according to the Chriſtian, deſerve more or leſs attention, as they are more or leſs immediately contained or implied in the ſcriptures. But whatever is not actually expreſſed in, or reduced by fair and neceſſary conſequence from, theſe writings, muſt be regarded as merely human; and can have no other title to our aſſent and obſervation than what they derive from their conformity with the ſcriptures, with the dictates and feelings of a reformed and cultivated mind, or with thoſe meaſures which are found expedient and uſeful in human life. But as thoſe books, from whence the Chriſtian inveſtigates his principles of belief and rules of conduct, have been variouſly interpreted by different profeſſors and commentators, theſe diverſities have given birth to a multiplicity of different ſects. It cannot, therefore, be expected, that any one who undertakes to give an account of Chriſtianity, ſhould comprehend all the writings and opinions which have been propagated and exhibited by hiſtorical, ſyſtematical, or polemical authors. Theſe, if at all contained in ſuch a work as this, ſhould be ranged under their proper articles, whether ſcientifical, controverſial, or biographical. It is our preſent buſineſs, if poſſible, to confine ourſelves to a detail of ſuch facts and doctrines as, in the ſtrict and primitive ſenſe of the word, are *catholic*, or, in other expreſſions, to ſuch as uniformly have been, and ſtill are, recognized and admitted by the whole body of Chriſtians.

4 Account of Chriſtianity whence deducible.

We have already ſaid that theſe, or at leaſt the greateſt number of them, appeal to the ſcriptures of the Old and New Teſtament as the ultimate ſtandard, the only infallible rule of faith and manners. If you aſk them, by what authority theſe books claim an abſolute right to determine the conſciences and underſtandings of men with regard to what they ſhould believe and what they ſhould do? They will anſwer you, that all ſcripture, whether for doctrine, correction, or reproof, was given by immediate inſpiration from God.

5 The nature of its evidences.

If again you interrogate them how thoſe books, which they call *Scripture*, are authenticated? they reply, that the evidences by which the Old and New Teſtament are proved to be the Word of God, are either external or internal. The *external* may again be divided into direct or collateral. The direct evidences are ſuch as ariſe from the nature, conſiſtency, and probability, of the facts; and from the ſimplicity, uniformity, competency, and fidelity, of the teſtimonies by which they are ſupported. The collateral events are either the ſame occurrences ſupported by Heathen teſtimonies, or others which concur with and corroborate the hiſtory of Chriſtianity. Its *internal* evidence ariſes either from its exact conformity with the character of God, from its aptitude to the frame and circumſtances of man, or from thoſe ſupernatural convictions and aſſiſtances which are impreſſed on the mind by the immediate operation of the divine Spirit. Theſe can only be mentioned in a curſory manner in a detail ſo conciſe as the preſent.

6 How Chriſtianity is ſupported by facts.

Such facts as are related in the hiſtory of his religion, the Chriſtian aſſerts to be not only conſiſtent each with itſelf, but likewiſe one with another. Hence it is, that, by a ſeries of antecedents and conſequences, they corroborate each other, and form a chain

Chriſtianity.

which cannot be broken but by an abſolute ſubverſion of all hiſtorical authenticity. Nor is this all: for, according to him, the facts on which Chriſtianity is founded, not only conſtitute a ſeries of themſelves, but are likewiſe in ſeveral periods the beſt reſources for ſupplying the chaſms in the hiſtory of our nature, and preſerving the tenor of its annals entire. The facts themſelves are either natural or ſupernatural. By natural facts we mean ſuch occurrences as happen or may happen from the various operations of mechanical powers, or from the interpoſition of natural agents without higher aſſiſtants. Such are all the common occurrences of hiſtory, whether natural, biographical, or civil. By ſupernatural facts, we mean ſuch as could not have been produced without the interpoſition of Deity, or at leaſt of powers ſuperior to the laws of mechaniſm or the agency of embodied ſpirits. Among theſe may be reckoned the immediate change of water into wine, the inſtantaneous cure of diſeaſes without the intervention of medicine, the reſuſcitation of the dead, and others of the ſame kind. In this order of occurrences may likewiſe be numbered the exertions and exhibitions of prophetic power, where the perſons by whom theſe extraordinary talents were diſplayed could neither by penetration nor conjecture unravel the mazes of futurity, and trace the events of which they ſpoke from their primary cauſes to their remote completions. So that they muſt have been the paſſive organs of ſome ſuperior Being, to whom the whole concatenation of cauſes and effects which operate from the origin to the conſummation of nature, was obvious at a glance of thought.

7 Natural facts, what, and how conducive to the elucidation of hiſtory.

It has already been hinted, that the facts which we have called *natural*, not only agree with the analogy of human events, and corroborate each other, but in a great many emergencies nobly illuſtrate the hiſtory of nature in general. For this a Chriſtian might offer one inſtance, of which philoſophy will not perhaps be able to produce any tolerable ſolution, without having recourſe to the facts upon which Chriſtianity is founded. For if mankind were originally deſcended from one pair alone, how ſhould it have happened that long before the date of authentic hiſtory every nation had its own diſtinct language? Or, if it be ſuppoſed, as ſome late philoſophers have maintained, that man is an indigenous animal in every country; or, that he was originally produced in, and created for, each particular ſoil and climate which he inhabits; ſtill it may be demanded, whence the prodigious multiplicity, the immenſe diverſity of languages? Is the language of every nation intuitive, or were they dictated by exigences, and eſtabliſhed by convention? If the laſt of theſe ſuppoſitions be true, what an immenſe period of time muſt have paſſed! How many revolutions of material and intellectual nature muſt have happened! What acceſſions of knowledge, refinement, civilization, muſt human intercourſe have gained before the formation and eſtabliſhment even of the moſt ſimple, imperfect, and barbarous language! Why is a period ſo vaſt obliterated ſo entirely as to eſcape the retroſpect of hiſtory, or tradition, and even of fable itſelf? Why was the acquiſition and improvement of other arts ſo infinitely diſtant from that of language, that the era of the latter is entirely loſt, whilſt we can trace the former from their origin through the various gradations of their progreſs.

8 This obſcurity inexplicable but by the Moſaic account.

Theſe difficulties, inextricable by all the lights of hiſtory or philoſophy, this more than Cimmerian darkneſs, is immediately diſſipated by the Moſaic account of the confuſion of tongues; wiſely intended to ſeparate the tribes of men one from another, to repleniſh the ſurface of the globe, and to give its multiplied inhabitants thoſe opportunities of improvement which might be derived from experiment and induſtry, variouſly exerted, according to the different ſituations in which they were placed, and the different employments which theſe ſituations dictated. Thus the time of nature's exiſtence is limited to a period within the ken of human intellect. Thus whatever has happened might have happened during the preſent mode of things; whereas, if we deduce the origin and diverſity of language from a period ſo remotely diſtant as to be abſolutely loſt, and entirely detached from all the known occurrences and viciſſitudes of time, we muſt admit the preſent forms and arrangements of things to have ſubſiſted perhaps for a much longer duration than any mechanical philoſopher will allow to be poſſible. Other inſtances equally pregnant with conviction might be multiplied; but precluded by the limits of our plan, we proceed to a ſingle obſervation upon the facts which have been termed *ſupernatural*.

9 Miracles, how conducive to prove the truth of Chriſtianity.

Of thoſe changes which happen in ſenſible objects, ſenſation alone can be judge. Reaſon has nothing to do in the matter. She may draw concluſions from the teſtimonies of ſenſe, but can never refute them. If, therefore, our ſenſes inform us that ſnow is white, in vain would the moſt learned and ſubtile philoſopher endeavour to convince us, that it was of a contrary colour. He might confound, but never could perſuade us. Such changes, therefore, as appear to happen in ſenſible objects, muſt either be real or fallacious. If real, the miracle is admitted; if fallacious, there muſt be a cauſe of deception equally unaccountable from the powers of nature, and therefore equally miraculous. If the veracity or competency of the witneſſes be queſtioned, the Chriſtian anſwers, that they muſt be competent, becauſe the facts which they relate are not beyond their capacity to determine. They muſt likewiſe be faithful, becauſe they had no ſecular motives for maintaining, but many for ſuppreſſing or diſguiſing, what they teſtified. Now the Chriſtian appeals to the whole ſeries of hiſtory and experience, whether ſuch a man is or can be found, as will offer a voluntary, ſolemn, and deliberate ſacrifice of truth at the ſhrine of caprice.

10 Prophecy evident by its own nature independent of its vehicles.

But ſuch facts as after a long continuance of time have been found exactly agreeable to predictions formerly emitted, muſt ſuperſede the fidelity of teſtimony, and infallibly prove that the event was known to the Being by whom it was foretold. In vain it has been urged, that prophecies are ambiguous and equivocal. For though they may prefigure ſubordinate events, yet if the grand occurrences to which they ultimately relate, can alone fulfil them in their various circumſtances, and in their utmoſt extent, it is plain, that the Being by whom they were revealed muſt have been actually preſcient of thoſe events, and muſt have had them in view when the predictions were uttered. For this ſee a learned and

Christianity.

and ingenious Dissertation on the Credibility of Gospel-history, by Dr M'Knight; where the evidences urged by the Christian in defence of his tenets, which appear detached and scattered through innumerable volumes, are assembled and arranged in such a manner as to derive strength and lustre from the method in which they are disposed, without diminishing the force of each in particular. See also the works of Dr Hurd: consult likewise those of Newton, Sherlock, Chandler, &c. For the evidences of those preternatural facts which have been termed *miracles*, the reader may peruse a short but elegant and conclusive defence of these astonishing phenomena, in answer to Mr Hume, by the Rev. George Campbell, D. D.

11 Properties common to all religions.

It must be obvious to every reflecting mind, that whether we attempt to form the idea of any religion *à priori*, or contemplate those which have been already exhibited, certain facts, principles, or *data*, must be pre-established, from whence will result a particular frame of mind and course of action suitable to the character and dignity of that being by whom the religion is enjoined, and adapted to the nature and situation of those agents who are commanded to observe it. Hence *Christianity* may be divided into *credenda* or doctrines, and *agenda* or precepts.

12 Christian theology.

As the great foundation of his religion, therefore, the Christian believes the existence and government of one eternal and infinite Essence, which for ever retains in itself the cause of its own existence, and inherently possesses all those perfections which are compatible with its nature; such are, its almighty power, omniscient wisdom, infinite justice, boundless goodness, and universal presence. In this indivisible essence the Christian recognises three distinct subsistences, yet distinguished in such a manner as not to be incompatible with essential unity or simplicity of being. Nor is their essential union compatible with their personal distinction. Each of them possesses the same nature and properties to the same extent. As, therefore, they are constituents of one God, if we may use the expression, there is none of them subordinate, none supreme. The only way by which the Christian can discriminate them is, by their various relations, properties, and offices. Thus the Father is said eternally to beget the Son, the Son to be eternally begotten of the Father, and the Holy Ghost eternally to proceed from both.

This infinite Being, though absolutely independent and for ever sufficient for his own beatitude, was graciously pleased to create an universe replete with inferior intelligences, who might for ever contemplate and enjoy his glory, participate his happiness, and imitate his perfections. But as freedom of will is essential to the nature of moral agents, that they may cooperate with God in their own improvement and happiness, so their natures and powers are necessarily limited, and by that constitution rendered peccable. This degeneracy first took place in a rank of intelligence superior to man. But guilt is never stationary. Impatient in itself, and cursed with its own feelings, it proceeds from bad to worse, whilst the poignancy of its torments increases with the number of its perpetrations. Such was the situation of Satan and his apostate angels. They attempted to transfer their turpitude and misery to man; and were, alas! but too successful. Hence the heterogeneous and irreconcileable principles which operate in his nature. Hence that inexplicable medley of wisdom and folly, of rectitude and error, of benevolence and malignity, of sincerity and fraud, exhibited through his whole conduct. Hence the darkness of his understanding, the depravity of his will, the pollution of his heart, the irregularity of his affections, and the absolute subversion of his whole internal economy. These seeds of perdition soon ripened into overt acts of guilt and horror. All the hostilities of nature were confronted, and the whole sublunary creation became a theatre of disorder and mischief.

Here the Christian once more appeals to fact and experience. If these things are so; if *man* is the vessel of guilt and the victim of misery; he demands how this constitution of things can be accounted for? how can it be supposed, that a being so wicked and unhappy should be the production of an infinitely perfect Creator? He therefore insists, that human nature must have been disarranged and contaminated by some violent shock; and that, of consequence, without the light diffused over the face of things by Christianity, all nature must remain an inscrutable and inexplicable mystery.

To redress these evils, to re-establish the empire of virtue and happiness, to restore the nature of man to its primitive rectitude, to satisfy the remonstrances of infinite justice, to purify every original or contracted stain, to expiate the guilt and destroy the power of vice, the eternal Son of God, the second Person of the sacred Trinity, the Logos or Divine Word, the Redeemer or Saviour of the world, the Immanuel or God with us, from whom Christianity takes its name, and to whom it owes its origin, descended from the bosom of his Father; assumed the human nature; became the representative of man; endured a severe probation in that character; exhibited a pattern of perfect righteousness; and at last ratified his doctrine, and fully accomplished all the ends of his mission, by a cruel, unmerited, and ignominious death. Before he left this world, he delivered the doctrine of human salvation, and the rules of human conduct, to his apostles, whom he empowered to instruct the world in all that concerns their eternal felicity, and whom he invested with miraculous gifts to ascertain the reality of what they taught. To them he likewise promised another comforter, even the Divine Spirit, who should relume the darkness, console the woes, and purify the stains, of human nature. Having remained for a part of three days under the power of death, he rose again from the grave, discovered himself to his disciples, conversed with them for some time, then ascended to heaven; from whence the Christian expects him, according to his promise, to appear as the Sovereign Judge of the living and the dead, from whose awards there is no appeal, and by whose sentence the destiny of the pious and the wicked shall be eternally fixed.

Soon after his departure to the right hand of his Father, where, in his human nature, he sits supreme of all created beings, and invested with the absolute administration of heaven and earth, the Spirit of grace and consolation descended on his apostles with visible signatures of divine power and presence. Nor were his

Christianity.

his salutary operations confined to them, but extended to all the rational world, who did not by obstinate guilt repel his influence, and provoke him to withdraw them. These, indeed, were less conspicuous than at the glorious era when they were visibly exhibited in the persons of the apostles; but though his energy is less observable, it is by no means less effectual to all the purposes of grace and mercy.

The Christian is convinced, that there is and shall continue to be a society upon earth, who worship God as revealed in Jesus Christ; who believe his doctrines; who observe his precepts; and who shall be saved by his death, and by the use of these external means of salvation which he hath appointed.

13
The external means of Christianity, what, and how promotive of their end.

These are few and simple. The sacraments of baptism and the eucharist, the interpretation and application of scripture, the habitual exercise of public and private devotion, are obviously calculated to diffuse and promote the interests of truth and virtue, by superinducing the salutary habits of faith, love, and repentance.

The Christian is firmly persuaded, that at the consummation of things, when the purposes of providence in the various revolutions of progressive nature are accomplished, the whole human race shall once more issue from their graves; some to immortal felicity, from the actual perception and enjoyment of their Creator's presence; others to everlasting shame and misery.

It is worthy of observation, that all who profess to believe the Christian system, do not subscribe to the truth of everlasting misery. They conceive it impossible that a good and merciful being could create innumerable intelligences with a view to make them eternally wretched, else they apprehend that existence would be a curse and not a blessing; and that although man, by being created free, becomes amenable to God for his conduct, yet they contend that this God must have seen from eternity what use man would make of his free agency, and have devised the most effectual means for counteracting the evils resulting from moral depravity, and resolved to bring final and eternal good out of all the evil which now does, or which in future may exist. Finally, they deny that any epithet applied to the miseries of a future state denotes duration without end, and they assert that all the judgements inflicted on nations and individuals here upon earth, are manifestly the chastisements of a father for the recovery of delinquents, in which light they also consider the punishments to be inflicted in the world to come. It is our province to give a candid statement of both sides of a question, leaving it to our readers to form a judgment for themselves.

14
Christian morality.

The two grand principles of action, according to the Christian, are, The love of God, which is the sovereign passion in every perfect mind; and the love of man, which regulates our actions according to the various relations in which we stand, whether to communities or individuals. This sacred connection can never be totally extinguished by any temporary injury. It ought to subsist in some degree even amongst enemies. It requires that we should pardon the offences of others, as we expect pardon for our own; and that we should no farther resist evil than is necessary for the preservation of personal rights and social happiness.

It dictates every relative and reciprocal duty between parents and children, masters and servants, governors and subjects, friends and friends, men and men. Nor does it merely enjoin the observation of equity, but likewise inspires the most sublime and extensive charity, a boundless and disinterested effusion of tenderness for the whole species, which feels their distress and operates for their relief and improvement. These celestial dispositions, and the different duties which are their natural exertions, are the various gradations by which the Christian hopes to attain the perfection of his nature and the most exquisite happiness of which it is susceptible.

15
This system asserted by the Christian, superior in the excellence of its nature, and the evidence of its reality, to all others.

Such are the speculative, and such the practical principles of Christianity. From the former, its votaries contend, that the origin, economy, and revolutions of intelligent nature alone can be rationally explained. From the latter they assert, that the nature of man, whether considered in its individual or social capacity, can alone be conducted to its highest perfection and happiness. With the determined Atheists they scarcely deign to expostulate. For, according to them, philosophers who can deduce the origin and constitution of things from casual rencounters or mechanical necessity, are capable of deducing any conclusion from any premises. Nor can a more glaring instance of absurdity be produced, than the idea of a contingent or self-originated universe. When Deists and other sectarians upbraid them with mysterious or incompatible principles, they without hesitation remit such cavillers to the creed of natural religion. They demand why any reasoner should refuse to believe three distinct substances in one indivisible essence, who admits that a being may be omnipresent without extension; or that he can impress motion upon other things, whilst he himself is necessarily immoveable. They ask the sage, why it should be thought more extraordinary, that the Son of God should be sent to this world, that he should unite the human nature to his own, that he should suffer and die for the relief of his degenerate creatures, than that an existence whose felicity is eternal, inherent, and infinite, should have any motive for creating beings exterior to himself? Is it not, says the Christian, equally worthy of the divine interposition to restore order and happiness where they are lost, as to communicate them where they never have been? Is not infinite goodness equally conspicuous in relieving misery as in diffusing happiness? Is not the existence of what we call evil in the world, under the tuition of an infinitely perfect Being, as inscrutable as the means exhibited by Christianity for its abolition? Vicarious punishment, imputed guilt and righteousness, merit or demerit transferred, are certainly not less reconcileable to human reason, *à priori*, than the existence of vice and punishment in the productions of infinite wisdom, power, and goodness: particularly when it is considered, that the virtues exerted and displayed by a perfect Being in a state of humiliation and suffering, must be meritorious, and may therefore be rewarded by the restored felicity of inferior creatures in proportion to their glory and excellence; and that such merit may apply the blessings which it has deserved, in whatever manner, in whatever degree, and to whomsoever it pleases, without being under any necessity to violate

Christianity.

violate the freedom of moral agents, in recalling them to the paths of virtue and happineſs by a mechanical and irreſiſtible force.

16
Miraculous as poſſible, and perhaps as neceſſary, as natural events.

It will be granted to philoſophy by the Chriſtian, that as no theory of mechanical nature can be formed without preſuppoſing ſacred and eſtabliſhed laws from which ſhe ought rarely if ever to deviate, ſo in fact ſhe tenaciouſly purſues theſe general inſtitutions, and from their conſtant obſervance reſult the order and regularity of things. But he cannot admit, that the important ends of moral and intellectual improvement may be uniformly obtained by the ſame means. He affirms, that if the hand of God ſhould either remain always entirely inviſible, or at leaſt only perceptible in the operation of ſecond cauſes, intelligent beings would be apt in the courſe of time to reſolve the interpoſitions of Deity into the general laws of mechaniſm; to forget his connexion with nature, and conſequently their dependence upon him. Hence, according to the dictates of common ſenſe, and to the unanimous voice of every religion in every age or clime, for the purpoſes of wiſdom and benevolence, God may not only controul, but has actually controuled, the common courſe and general operations of nature. So that, as in the material world the law of *cauſe* and *effect* is generally and ſcrupulouſly obſerved for the purpoſes of natural ſubſiſtence and accommodation: thus ſuſpenſes and changes of that univerſal law are equally neceſſary for the advancement of moral and intellectual perfection.

17
Chriſtianity not only explains the phenomena, but conſoles the miſeries of human nature.

But the diſciple of Jeſus not only contends, that no ſyſtem of religion has ever yet been exhibited ſo conſiſtent with itſelf, ſo congruous to philoſophy and the common ſenſe of mankind, as Chriſtianity; he likewiſe avers that it is infinitely more productive of real and ſenſible conſolation than any other religious or philoſophical tenets, which have ever entered into the ſoul, or been applied to the heart of man. For what is death to that mind which conſiders eternity as the career of its exiſtence? What are the frowns of fortune to him who claims an eternal world as his inheritance? What is the loſs of friends to that heart which feels, with more than natural conviction, that it ſhall quickly rejoin them in a more tender, intimate, and permanent intercourſe than any of which the preſent life is ſuſceptible? What are the fluctuations and viciſſitudes of external things to a mind which ſtrongly and uniformly anticipates a ſtate of endleſs and immutable felicity? What are mortifications, diſappointments, and inſults, to a ſpirit which is conſcious of being the original offspring and adopted child of God; which knows that its omnipotent Father will, in proper time, effectually aſſert the dignity and privileges of its nature? In a word, as earth is but a ſpeck of creation, as time is not an inſtant in proportion to eternity, ſuch are the hopes and proſpects of the Chriſtian in compariſon of every ſublunary misfortune or difficulty. It is therefore, in his judgment, the eternal wonder of angels, and indelible opprobrium of man, that a religion ſo worthy of God, ſo ſuitable to the frame and circumſtances of our nature, ſo conſonant to all the dictates of reaſon, ſo friendly to the dignity and improvement of intelligent beings, pregnant with genuine comfort and delight, ſhould be rejected and deſpiſed. Were there a poſſibility of ſuſpenſe or heſitation between this and any other religion extant, he could freely truſt the determination of a queſtion ſo important to the candid deciſion of real virtue and impartial philoſophy.

It muſt be allowed that the utmoſt extent of human inveſtigation and reſearch into the doctrine of a future life, reached no farther than ſplendid conjecture before the promulgation of Chriſtianity, at which period life and immortality were clearly brought to light. It is therefore a ſingular circumſtance that the deiſt ſhould not perceive the wonderful ſuperiority of the Chriſtian over every other ſyſtem, if it had nothing elſe to boaſt of but this ſingle doctrine, ſo pregnant with unalloyed felicity. If Chriſtianity be falſe, the believer of it has nothing to loſe, ſince it inculcates a mode of conduct which muſt ever be amiable in the eye of infinite goodneſs; but if it be true, he has every thing to gain: while upon this hypotheſis the deiſt has every thing to loſe and nothing to gain. This is a momentous conſideration, and that man muſt be truly infatuated who can treat ſuch an idea with contempt.

18
Mr Gibbon attempts to prove, that the propagation of Chriſtianity was owing to cauſes from the operation of which no arguments can be deduced in proof of its authenticity.

Mr Gibbon, in his Hiſtory of the Decline and Fall of the Roman Empire, mentions five ſecondary cauſes to which he thinks the propagation of Chriſtianity, and all the remarkable circumſtances which attended it, may with good reaſon be aſcribed. He ſeems to inſinuate, that Divine Providence did not act in a ſingular or extraordinary manner in diſſeminating the religion of Jeſus through the world; and that, if every other argument which has been adduced to prove the ſacred authority of this religion can be parried or refuted, nothing can be deduced from this ſource to prevent it from ſharing the ſame fate with other ſyſtems of ſuperſtition. The cauſes of its propagation were in his opinion founded on the principles of human nature and the circumſtances of ſociety. If we aſcribe not the propagation of Mahometiſm, or of the doctrines of Zerduſt, to an extraordinary interpoſition of Divine Providence, operating by an unperceived influence on the diſpoſitions of the human heart, and controuling and confounding the ordinary laws of nature; neither can we, upon any reaſonable grounds, refer the promulgation of Chriſtianity to ſuch an interpoſition.

19
The cauſes.

The ſecondary cauſes to which he aſcribes theſe effects are, 1. The inflexible and intolerant zeal of the Chriſtians; derived from the Jewiſh religion, but purified from the narrow and unſocial ſpirit which, inſtead of inviting, deterred the Gentiles from embracing the law of Moſes. 2. The doctrine of a future life, improved by every additional circumſtance which could give weight and efficacy to that important truth. 3. The miraculous powers aſcribed to the primitive church. 4. The pure and auſtere morals of the Chriſtians. 5. The union and diſcipline of the Chriſtian republic, which gradually formed an independent and increaſing ſtate in the heart of the Roman empire.

Before we enter on the examination of Mr Gibbon's cauſes in the order in which they are here enumerated, we beg leave to remark, that we cannot perceive the propriety of denominating ſome of theſe *ſecondary* cauſes, ſince the miraculous powers aſcribed to the primitive church, if they were real, muſt have conſtituted a primary cauſe, and if fallacious, could have been no cauſe at all, if not of its complete ſubverſion. As little can we conceive how ſuch an elegant and learned author.

author could imagine a zeal ſtrictly and properly inflexible and intolerant, as qualified to produce any other effect than the deſtruction of the ſyſtem which they are allowed to have been anxious to promote. But our ſentiment of theſe cauſes aſſigned by Mr Gibbon will be more fully developed as we proceed in our candid and impartial examination of them.

20 Cauſe I.

In pointing out the connexion between the *firſt* of theſe cauſes and the effects which he repreſents as ariſing from it, this learned and ingenious writer obſerves, that the religion of the Jews does not ſeem to have been intended to be propagated among the Heathens, and that the converſion of proſelytes was rather accidental than conſiſtent with the purport of the general ſpirit of the inſtitutions of Judaiſm. The Jews were, of conſequence, ſtudious to preſerve themſelves a peculiar people. Their zeal for their own religion was intolerant, narrow, and unſocial.

In Chriſtianity, when it made its appearance in the world, all the better part of the predominant ſpirit of Judaiſm was retained; but whatever might have a tendency to confine its influence within narrow limits was laid aſide. Chriſtians were to maintain the doctrines and adhere to the conſtitutions of their religion with ſacred fidelity. They were not to violate their allegiance to Jeſus by entertaining or profeſſing any reverence for Jupiter or any other of the Heathen deities; it was not even neceſſary for them to comply with the poſitive and ceremonial inſtitutions of the law of Moſes,—although theſe were acknowledged to have been of divine origin. The zeal, therefore, which their religion inculcated, was inflexible. It was even intolerant: for they were not to content themſelves with profeſſing Chriſtianity and conforming to its laws; they were to labour with unremitting aſſiduity, and to expoſe themſelves to every difficulty and every danger, in converting others to the ſame faith.

But the ſame circumſtances which rendered it thus intolerant, communicated to it a more liberal and a leſs unſocial ſpirit than that of Judaiſm. The religion of the Jews was intended only for the few tribes; Chriſtianity was to become a catholic religion; its advantages were to be offered to all mankind.

All the different ſects which aroſe among the primitive Chriſtians uniformly maintained the ſame zeal for the propagation of their own religion, and the ſame abhorrence for every other. The orthodox, the Ebionites, the Gnoſtics, were all equally animated with the ſame excluſive zeal, and the ſame abhorrence of idolatry, which had diſtinguiſhed the Jews from other nations.

21 Obſervations in anſwer.

Such is the general purport of what Mr Gibbon advances concerning the influence of the firſt of thoſe ſecondary cauſes in the propagation of Chriſtianity. It would be uncandid to deny, that his ſtatement of facts appears to be, in this inſtance, almoſt fair, and his deductions tolerably logical. The firſt Chriſtians *were* remarkable for their deteſtation of idolatry, and for the generous diſintereſted zeal with which they laboured to convert others to the ſame faith. The firſt of theſe principles, no doubt, contributed to maintain the dignity and purity of Chriſtianity; and the ſecond to diſſeminate it through the world. But the facts which he relates are ſcarce conſiſtent throughout. He ſeems to repreſent the zeal of the firſt Chriſtians as ſo hot and intolerant, that they could have no ſocial intercourſe with thoſe who ſtill adhered to the worſhip of Heathen deities. In this caſe, how could they propagate their religion? Nay, we may even aſk, How could they live? If they could not mingle with the Heathens in the tranſactions either of peace or war; nor witneſs the marriage or the funeral of the deareſt friend, if a heathen; nor practiſe the elegant arts of muſic, painting, eloquence, or poetry; nor venture to uſe freely in converſation the language of Greece or of Rome;—it is not eaſy to ſee what opportunities they could have of diſſeminating their religious ſentiments. If, in ſuch circumſtances, and obſerving rigidly ſuch a tenor of conduct, they were yet able to propagate their religion with ſuch amazing ſucceſs as they are ſaid to have done; they muſt ſurely either have practiſed ſome wondrous arts unknown to us, or have been aſſiſted by the ſupernatural operation of divine power.

But all the hiſtorical records of that period, whether ſacred or profane, concur to prove, that the primitive Chriſtians in general did not retire with ſuch religious horror from all intercourſe with the Heathens. They refuſed not to ſerve in the armies of the Roman empire: they appealed to Heathen magiſtrates, and ſubmitted reſpectfully to their deciſion; the huſband was often a Heathen, and the wife a Chriſtian; or, again, the huſband a Chriſtian, and the wife a Heathen. Theſe are facts ſo univerſally known and believed, that we need not quote authorities in proof of them.

This reſpectable writer appears therefore not to have ſtated the facts which he produces under this head with ſufficient ingenuouſneſs; and he has taken care to exaggerate and improve thoſe which he thinks uſeful to his purpoſe with all the dazzling and deluſive colours of eloquence. But had the zeal of the firſt Chriſtians been ſo intolerant as he repreſents it, it muſt have been highly unfavourable to the propagation of their religion: all their wiſhes to make converts would, in that caſe, have been counteracted by their unwillingneſs to mix in the ordinary intercourſe of life, with thoſe who were to be converted. Their zeal and the liberal ſpirit of their religion, were indeed ſecondary cauſes which contributed to its propagation: but their zeal was by no means ſo ridiculouſly intolerant as this writer would have us believe; if it had, it muſt have produced effects directly oppoſite to thoſe which he aſcribes to it.

22 Cauſe II.

In illuſtrating the influence of the *ſecond* of theſe ſecondary cauſes to which he aſcribes the propagation of Chriſtianity, Mr Gibbon diſplays no leſs ingenuity than in tracing the nature and the effects of the firſt. The doctrine of a future life, improved by every additional circumſtance which can give weight and efficacy to that important truth, makes a conſpicuous figure in the Chriſtian ſyſtem; and it is a doctrine highly flattering to the natural hopes and wiſhes of the human heart.

Though the Heathen philoſophers were not unacquainted with this doctrine; yet to them the ſpirituality of the human ſoul, its capacity of exiſtence in a ſeparate ſtate from the body, its immortality, and its proſpect of laſting happineſs in a future life, rather appeared things poſſible and deſirable, than truths fully eſtabliſhed upon ſolid grounds. Theſe doctrines, Mr Gibbon would perſuade us, had no influence on the

the moral sentiments and general conduct of the Heathens. Even the philosophers, who amused themselves with displaying their eloquence and ingenuity on those splendid themes, did not allow them to influence the tenor of their lives. The great body of the people, who were occupied in pursuits very different from the speculations of philosophy, and were unacquainted with the questions discussed in the schools, were scarce ever at pains to reflect whether they consisted of a material and a spiritual part, or whether their existence was to be prolonged beyond the term of the present life; and they could not regulate their lives by principles which they did not know.

In the popular superstition of the Greeks and Romans, the doctrine of a future state was not omitted. Mankind were not only flattered with the hopes of continuing to exist beyond the term of the present life; but different conditions of existence were promised or threatened, in which retributions for their conduct in human life were to be enjoyed or suffered. Some were exalted to heaven, and associated with the gods; others were rewarded with less illustrious honours, and a more moderate state of happiness, in Elysium; and those, again, who by their conduct in life had not merited rewards, but punishments, were consigned to Tartarus. Such were the ideas of a future state which made a part of the popular superstition of the Greeks and Romans. But they produced only a very faint impression on the minds of those among whom they prevailed. They were not truths supported by evidence; they were not even plausible; they were a tissue of absurdities. They had not therefore a more powerful influence on the morals, than the more refined speculations of the philosophers.

Even the Jews, whose religion and legislature were communicated from heaven, were in general, till within a very short time before the propagation of the gospel, as imperfectly acquainted with the doctrine of a future state as the Greeks and Romans. This doctrine made no part of the law of Moses. It is but darkly and doubtfully insinuated through the other parts of the Old Testament. Those among the Jews who treated the sacred Scriptures with the highest reverence, always denied that such a doctrine could be deduced from any thing which these taught; and maintained that death is the final dissolution of man.

The rude tribes who inhabited ancient Gaul, and some other nations not more civilized than they, entertained ideas of a future life, much clearer than those of the Greeks, the Romans, or the Jews.

Christianity, however, explained and inculcated the truth of this doctrine in all its splendour and all its dignity. It exhibited an alluring, yet not absurd, view of the happiness of a future life. It conferred new horrors on the place of punishment, and added new severity to the tortures to be inflicted, in another world. The authority on which it taught those doctrines, and displayed these views, was such as to silence inquiry and doubt, and to command implicit belief. What added to the influence of the doctrine of a future state of existence, thus explained and inculcated, was, that the first Christians confidently prophesied and sincerely believed that the end of the world, the consummation of all things, was fast approaching, and that the generation then present should live to witness that awful event. Another circumstance which contributed to render the same doctrine so favourable to the propagation of Christianity was that the first Christians dealt damnation without remorse, and almost without making any exceptions, on all who died in the belief of the absurdities of Heathen superstition. Thus taught, and improved with these additional and heightened circumstances, this doctrine, partly by presenting alluring prospects and exciting pleasing hopes, partly by working upon the fears of the human heart with representations of terror, operated in the most powerful manner in extending the influence of the Christian faith.

23 Observations in answer.

Here, too, facts are rather exaggerated, and the inferences scarce fairly deduced. It must be confessed that the speculations of the Heathen philosophers did not fully and undeniably establish the doctrine of the immortality of the human soul; nor can we presume to assert, in contradiction to Mr Gibbon, that their arguments could impress such a conviction of this truth as might influence in a very strong degree the moral sentiments and conduct. They must, however, have produced some influence on these. Some of the most illustrious among the Heathen philosophers appear to have been so strongly impressed with the belief of the soul's immortality, and of a future state of retribution, that their general conduct was constantly and in a high degree influenced by that belief. Plato and Socrates are eminent and well known instances. And if, in such instances as these, the belief of these truths produced such conspicuous effects, it might be fairly inferred, though we had no further evidence, that those characters were far from being singular in this respect. It is a truth acknowledged as unquestionable in the history of arts and sciences, that wherever any one person has cultivated these with extraordinary success, some among his contemporaries will always be found to have rivalled his excellence, and a number of them to have been engaged in the same pursuits. On this occasion we may venture, without hesitation, to reason upon the same principles. When the belief of the immortality of the human soul produced such illustrious patterns of virtue as a Plato and a Socrates, it must certainly have influenced the moral sentiments and conduct of many others, although in an inferior degree. We speculate, we doubt, concerning the truth of many doctrines of Christianity; many who profess that they believe them, make this profession only because they have never considered seriously whether they be true or false. But, notwithstanding this, these truths still exert a powerful influence on the sentiments and manners of society in general. Thus, also, it appears that the doctrines of ancient philosophy concerning a future life, and even the notions concerning Olympus, Elysium, and Tartarus, which made a part of the popular superstition, *did* produce a certain influence on the sentiments and manners of the Heathens in general. That influence was often indeed inconsiderable, and not always happy; but still it was somewhat greater than Mr Gibbon seems willing to allow. Christians have been sometimes at pains to exaggerate the absurdities of Pagan superstition, in order that the advantages of Christianity might acquire new value from being contrasted with it. Here we find one who is rather disposed to be the enemy of Christianity, display-

ing, and even exaggerating, thoſe abſurdities for a very different purpoſe. But the truth may be ſafely admitted; it is only when exaggerated that it can ſerve any purpoſe inimical to the ſacred authority of our holy religion. Mr Gibbon certainly repreſents the religious doctrine of the ancient Gauls, in reſpect to the immortality of the human ſoul and a future ſtate, in too favourable a light. It is only becauſe the whole ſyſtem of ſuperſtition which prevailed among the barbarians is ſo imperfectly known, that it has been imagined to conſiſt of more ſublime doctrines than thoſe of the popular ſuperſtition of the Greeks and Romans. The evidence which Mr Gibbon adduces in proof of what he aſſerts concerning theſe opinions of the ancient Gauls, is partial, and far from ſatisfactory. They *did* indeed aſſert and believe the ſoul to be immortal; but this doctrine was blended among a number of abſurdities much groſſer than thoſe which characterize the popular religion of the Greeks and Romans. The latter was the ſuperſtition of a civilized people, among whom reaſon was unfolded and improved by cultivation, and whoſe manners were poliſhed and liberal; the former was that of barbarians, among whom reaſon was, as it were, in its infancy, and who were ſtrangers to the improvements of civilization. When haſty obſervers found that thoſe barbarians were not abſolutely ſtrangers to the idea of immorality, they were moved to undue admiration; their ſurpriſe at finding what they had not expected, confounded their underſtanding, and led them to miſconceive and miſrepreſent. What we ought to aſcribe to the ſavage ferocity of the character of thoſe rude tribes, has been attributed by miſtake to the influence of their belief of a future ſtate.

In the law of Moſes, it muſt be allowed, that this doctrine is not particularly explained nor earneſtly inculcated. The author of the Divine Legation of Moſes, &c. has founded upon this fact an ingenious theory, which we ſhall elſewhere have occaſion to examine. The reaſons why this doctrine was not more fully explained to the Jews, we cannot pretend to aſſign, at leaſt in this place; yet we cannot help thinking, that it was more generally known among the Jews than Mr Gibbon and the author of the Divine Legation are willing to allow. Though it be not ſtrongly inculcated in their *code of laws*, yet there is ſome reaſon to think that it was known and generally prevalent among them long before the Babyloniſh captivity; even in different paſſages in the writings of Moſes, it is mentioned or alluded to in an unequivocal manner. In the hiſtory of the patriarchs, it appears that this doctrine was known to *them*; it appears to have had a ſtrong influence on the mind of Moſes himſelf. Was David, was Solomon, a ſtranger to this doctrine? We cannot here deſcend to very minute particulars; but ſurely all the efforts of ingenuity muſt be inſufficient to torture the ſacred Scriptures of the Old Teſtament, ſo as to prove that they contain nothing concerning the doctrine of a future ſtate anywhere but in the writings of the later prophets, and that even in theſe it is only darkly inſinuated. Were the Jews, in the earlier part of their hiſtory, ſo totally ſecluded from all intercourſe with other nations, that a doctrine of ſo much importance, more or leſs known to all around, could not be communicated to them? The Phariſees *did* admit traditions, and ſet upon them an undue value; yet they appear to have been conſidered as the moſt orthodox of the different ſects which prevailed among the Jews: the Sadducees were rather regarded as innovators.

But though we are of opinion, that this ingenious writer allows to the doctrine of the Greek and Roman philoſophers, concerning the immortality of the human ſoul, as well as the notices concerning a future ſtate, which made a part of the popular ſuperſtitions of thoſe nations, leſs influence on the moral ſentiments and conduct of mankind than what they really exerted; though we cannot agree with him in allowing the ideas of the immortality of the ſoul and of a future ſtate, which were entertained by the Gauls and ſome other rude nations, to have been much ſuperior in their nature, or much happier in their influence, than thoſe of the Greeks and Romans; and though, in conſequence of reading the Old Teſtament, we are diſpoſed to think that the Jews knew ſomewhat more concerning the immortality of the human ſoul, and concerning the future ſtate in which human beings are deſtined to exiſt, than Mr Gibbon repreſents them to have known: yet ſtill we are very ſenſible, and very well pleaſed to admit, that "life and immortality were brought to light through the goſpel."

The doctrine of a future life, as it was preached by the firſt Chriſtians, was eſtabliſhed on a more ſolid baſis than that on which it had been before maintained; was freed from every abſurdity; and was, in ſhort, ſo much improved, that its influence, which, as it was explained by Heathen poets and philoſophers, muſt be confeſſed to have been in many inſtances doubtful, now became favourable only to the intereſts of piety and virtue, and to them in a very high degree. It undoubtedly contributed to the ſucceſsful propagation of Chriſtianity; for it was calculated to attract and pleaſe both the ſpeculating philoſopher and the ſimple unenlightened votary of the vulgar ſuperſtition. The views which it exhibited were diſtinct; and all was plauſible and rational, and demonſtrated by the fulleſt evidence. But the happineſs which it promiſed was of a leſs ſenſual nature than the enjoyments which the Heathens expected on Olympus or in Elyſium; and would therefore appear leſs alluring to thoſe who were not very capable of refined ideas, or preferred the gratifications of the ſenſes in the preſent life to every other ſpecies of good. If the firſt Chriſtians rejoiced in the hope of beholding all the votaries of Pagan idolatry afflicted with the torments of hell in a future ſtate, and boaſted of theſe hopes with inhuman exultation, they would in all probability rather irritate than alarm thoſe whom they ſought to convert from that ſuperſtition: the Heathens would be moved to regard with indignant ſcorn the preacher who pretended that thoſe whom they venerated as gods, heroes, and wiſe men, were condemned to a ſtate of unſpeakable and laſting torment. Would not every feeling of the heart revolt againſt the idea, that a parent, a child, a huſband, a wife, a friend, a lover, or a miſtreſs, but lately loſt, and ſtill lamented, was conſigned to eternal torments for actions and opinions which they had deemed highly agreeable to ſuperior powers?

We may conclude, then, with reſpect to the influence of this ſecondary cauſe in promoting the propagation of Chriſtianity, that the circumſtances of the

Heathen

Christianity.

Heathen world were lefs favourable to that influence than Mr Gibbon pretends; that the means by which he reprefents the primitive Chriftians, as improving its efficacy, were fome of them not employed, and others rather likely to weaken than to ftrengthen it; and that therefore more is attributed to the operation of this caufe than it could poffibly produce.

24 Caufe III.

The *third caufe*, the miraculous powers of the primitive church, is with good reafon reprefented as having conduced very often to the conviction of infidels. Mr Gibbon's reafonings under this head are, That numerous miraculous works of the moft extraordinary kind were oftentatioufly performed by the firft Chriftians: that, however, from the difficulty of fixing the period at which miraculous powers ceafed to be communicated to the Chriftian church, and from fome other circumftances, there is reafon to fufpect them to have been merely the pretences of impofture; but this (to ufe a phrafe of his own) is only darkly infinuated: and, laftly, that the Heathens having been happily prepared to receive them as real by the many wonders nearly of a fimilar nature to which they were accuftomed in their former fuperftition, the miracles which the firft Chriftians employed to give a fanction to their doctrines, contributed in the moft effectual manner to the propagation of Chriftianity.

25 Obfervations in reply.

In reply to what is here advanced, it may be fuggefted, that the miracles recorded in the New Teftament, as having been performed by the firft Chriftians when engaged in propagating their religion, as well as a number of others recorded by the Fathers, are eftablifhed as true, upon the moft indubitable evidence which human teftimony can afford for any fact. Mr Hume, who was too fond of employing his ingenuity in undermining truths generally received, has endeavoured to prove, that no human teftimony, however ftrong and unexceptionable, can afford fufficient evidence of the reality of a miracle. But his reafonings on this head, which once excited doubt and wonder, have been fince completely refuted; and mankind ftill continue to acknowledge, that though we are all liable to miftakes and capable of deceit, yet human teftimony *may* afford the moft convincing evidence of the moft extraordinary and even fupernatural facts. The reader will not expect us to enter, in this place, into a particular examination of the miracles of our Saviour and his apoftles, and the primitive church. An inquiry into thefe will be a capital object in another part of this work (THEOLOGY.) We may here confider it as an undeniable and a generally acknowledged fact, that a certain part of thofe miracles were real. Such as were real undoubtedly contributed, in a very eminent manner, to the propagation of Chriftianity; but they are not to be ranked among the natural and *fecondary* caufes.

It is difficult to diftinguifh at what period miraculous gifts ceafed to be conferred on the members of the primitive church; yet we *may* diftinguifh, if we take pains to inquire with minute attention, at what period the evidence ceafes to be fatisfactory. We can alfo, by confidering the circumftances of the church through the feveral ftages of its hiftory, form fome judgment concerning the period during which the gifts of prophefying, and fpeaking with tongues, and working miracles, were moft neceffary to Chriftians to enable them to affert the truth and dignity of their religion.

The Heathens were no ftrangers to pretended miracles and prophecies, and other feeming interpofitions of fuperior beings, difturbing the ordinary courfe of nature and of human affairs: but the miracles to which they were familiarized had been fo often detected to be tricks of impofture or pretences of mad enthufiafm, that, inftead of being prepared to witnefs or to receive accounts of new miracles with eafy credulity, they muft have been in general difpofed to view them with jealoufy and fufpicion. Befides, the miracles to which they had been accuftomed, and thofe performed by the apoftles and the firft preachers of Chriftianity, were directly contradictory; and therefore the one could receive no affiftance from the other.

Yet we muft acknowledge, notwithftanding what we have above advanced, that as difagreements with refpect to the principles and inftitutions of their religion very early arofe among Chriftians; fo they likewife fought to extend its influence, at a very early period, by the ufe of *pious frauds*. Pious frauds, too, appear to have fometimes ferved the immediate purpofes for which they were employed, though eventually they have been highly injurious to the caufe of Chriftianity.

We conclude, then, that Chriftianity *was* indebted to the influence of miracles in a confiderable degree for its propagation: but that the real miracles of our Saviour and his apoftles, &c. were not among the *fecondary* caufes of its fuccefs: that the Heathens who were to be converted were not very happily prepared for receiving the miracles of the gofpel with blind credulity: that, as it is poffible to difcern between fufficient and infufficient evidence, fo it is not more difficult to diftinguifh between true and falfe miracles: and, laftly, that falfe miracles were foon employed by Chriftians as engines to fupport and propagate their religion, and perhaps not unfuccefsfully; but were, upon the whole, more injurious than ferviceable to the caufe which they were called in to maintain.

26 Caufe IV.

The *fourth of this feries of fecondary caufes*, which this author thinks to have been adequate to the propagation of Chriftianity, is the virtues of the primitive Chriftians. Thefe he is willing to attribute to other and lefs generous motives, rather than to the pure influence of the doctrines and precepts of their religion.

The firft converts to Chriftianity were moft of them from among the loweft and moft worthlefs characters. The wife, the mighty, and thofe who were diftinguifhed by fpecious virtues, were in general perfectly fatisfied with their prefent circumftances and future profpects. People whofe minds were naturally weak, unenlightened, or oppreffed with the fenfe of atrocious guilt, and who were infamous or outcafts from fociety, were eager to grafp at the hopes which the gofpel held out to them.

When, after enlifting under the banner of Chrift, they began to confider themfelves as "born again to newnefs of life;" remorfe and fear, which eafily prevail over weak minds; felfifh hopes of regaining their reputation, and attaining to the honours and happinefs of thofe manfions which Jefus was faid to have gone to prepare; with a defire to raife the honour and extend the

the influence of the society of which they were become members: all together operated so powerfully as to enable them to display both active and passive virtue in a very extraordinary degree. Their virtues did not flow from the purest and noblest source; yet they attracted the notice and moved the admiration of mankind. Of those who admired, some were eager to imitate; and, in order to that, thought it necessary to adopt the same principles of action.

Their virtues, too, were rather of that species which excite wonder, because uncommon, and not of essential utility in the ordinary intercourse of society; than of those which are indispensably necessary to the existence of social order, and contribute to the ease and convenience of life. Such virtues were well calculated to engage the imitation of those who had failed egregiously in the practice of the more social virtues.

Thus they practised extraordinary, but useless and unsocial virtues, upon no very generous motives; those virtues drew upon them the eyes of the world, and induced numbers to embrace their faith.

27 Observations in answer.

We must, however unwillingly, declare that this is plainly an uncandid account of the virtues of the primitive Christians, and the motives from which they originated. The social virtues are strongly recommended through the gospel. No degree of mortification or self-denial, or seclusion from the ordinary business and amusements of social life, was required of the early converts to Christianity; save what was indispensably necessary to wean them from the irregular habits in which they had before indulged, and which had rendered them nuisances in society, and to form them to new habits equally necessary to their happiness and their usefulness in life. We allow that they practised virtues which in other circumstances would, however splendid, have been unnecessary. But in the difficult circumstances in which the first Christians were placed, the virtues which they practised were in the highest degree social. The most prominent feature in their character was, "their continuing to entertain sentiments of generous benevolence, and to discharge scrupulously all the social duties," towards those who exercised neither charity nor humanity, and frequently not even bare integrity and justice, in their conduct towards them.

It cannot be said with truth, that such a proportion of the primitive Christians were people whose characters had been infamous and their circumstances desperate, as that the character of the religion which they embraced can suffer from this circumstance. Nor were they *only* the weak and illiterate whom the apostles and their immediate successors converted by their preaching. The criminal, to be sure, rejoiced to hear that he might obtain absolution of his crimes; the mourner was willing to receive comfort; minds of refined and generous feelings were deeply affected with that goodness which had induced the Son of God to submit to the punishment due to sinners: but the simplicity, the rationality, and the beauty of the Christian system, likewise prevailed in numerous instances over the pride and prejudices of the great and the wise: in so many instances, as are sufficient to vindicate the Christian church from the aspersions by which it has been represented as being in the first period of its existence merely a body of *criminals and idiots*.

The principles, too, from which the virtues of the first Christians originated, were not peculiarly mean and selfish; nay, they seem to have been uncommonly sublime and disinterested. Remorse in the guilty mind is a natural and reasonable sentiment; the desire of happiness in every human breast is equally so. It is uncandid to cavil against the first Christians for being, like the rest of mankind, influenced by these sentiments: And when we behold them overlooking temporary possessions and enjoyments, extending their views to futurity, and "living by faith;" when we observe them "doing good to those who hated them, blessing those who cursed them, and praying for those by whom they were despitefully used:" can we deny their virtues to have been of the most generous and disinterested kind.

We allow then that the virtues of the first Christians must have contributed to the propagation of their religion: but it is with pain that we observe this respectable writer studiously labouring to misrepresent the principles from which those virtues arose; and not only the principles from which they arose, but also their importance in society.

28 Cause V. with observations.

The *fifth cause* was the mode of church government adopted by the first Christians, by which they were knit together in one society; who preferred the church and its interests to their country and civil concerns. We wish not to deny, that the mutual attachment of the primitive Christians contributed to spread the influence of their religion; and the order which they maintained, in consequence of being animated with this spirit of brotherly love, and with such ardent zeal for the glory of God, must no doubt have produced no less happy effects among them than order and regularity produce on every other occasion on which they are strictly observed. But whether the form of church-government, which was gradually established in the Christian church, was actually the happiest that could possibly have been adopted; or whether, by establishing a distinct society, with separate interests, within the Roman empire, it contributed to the dissolution of that mighty fabric, we cannot here pretend to inquire. These are subjects of discussion, with respect to which we may with more propriety endeavour to satisfy our readers elsewhere.

29 General conclusion concerning the influence of the five causes.

From the whole of this review of what Mr Gibbon has so speciously advanced concerning the influence of these five secondary causes in the propagation of the gospel, we think ourselves warranted to conclude, That the zeal of the first Christians was not, as he represents it, intolerant: That the doctrine of the immortality of the human soul was somewhat better understood in the Heathen world, particularly among the Greeks and Romans, and the Jews, than he represents it to have been; and had an influence somewhat happier than what he ascribes to it: That the additional circumstances by which, he tells us, the first preachers of Christianity improved the effects of this doctrine, were far from being calculated to allure converts: That the heathens, therefore, were not quite so well prepared for an eager reception of this doctrine as he would persuade us they were; and, of consequence, could not be influenced by it in so considerable a degree in their conversion: That real, unquestionable miracles, performed by our Saviour, by his apostles, and by

by their ſucceſſors, *did* contribute ſignally to the propagation of Chriſtianity; but are not to be ranked among the ſecondary cauſes: That weakneſs and blind zeal did at times employ pretended miracles for the ſame purpoſe not altogether ineffectually: That though theſe deſpicable and wicked means might be in ſome inſtances ſucceſsful; yet they were, upon the whole, much more injurious than beneficial: That the virtues of the primitive Chriſtians aroſe from the moſt generous and noble motives, and were in their nature and tendency highly favourable to ſocial order, and to the comfort of mankind in the ſocial ſtate: And, laſtly, That the order and regularity of church-government, which were gradually eſtabliſhed among the firſt Chriſtians, contributed greatly to maintain the dignity and ſpread the influence of their religion; but do not appear to have disjoined them from their fellow-ſubjects, or to have rendered them inimical to the welfare of the ſtate of which they were members.

Upon the whole, then, we do not ſee that theſe ſecondary cauſes were equal to the effects that have been aſcribed to them; and it ſeems undeniable, that others of a ſuperior kind co-operated with them. We earneſtly recommend to the peruſal of the reader a valuable performance of Lord Hailes's, in which he inquires into Mr Gibbon's aſſertions and reaſonings, concerning the influence of theſe five cauſes, with the utmoſt accuracy of information, ſtrength, and clearneſs of reaſoning, and elegant ſimplicity of ſtyle, and without virulence or paſſion.

CHRISTIANS, thoſe who profeſs the religion of Chriſt: See CHRISTIANITY and MESSIAH.—The name *Chriſtian* was firſt given at Antioch, in the year 42, to ſuch as believed in Chriſt, as we read in the Acts: till that time they were called *diſciples*.

The firſt Chriſtians diſtinguiſhed themſelves in the moſt remarkable manner by their conduct and their virtues. The faithful, whom the preaching of St Peter had converted, hearkened attentively to the exhortations of the Apoſtles, who failed not carefully to inſtruct them, as perſons who were entering upon an entirely new life. They went every day to the temple with one heart and one mind, and continued in prayers; doing nothing different from the other Jews, becauſe it was yet not time to ſeparate from them. But they made a ſtill greater progreſs in virtue; for they ſold all that they poſſeſſed, and diſtributed their goods in proportion to the wants of their brethren. They *ate their meat with gladneſs and ſingleneſs of heart, praiſing God, and having favour with all the people.* St Chryſoſtom, examining from what ſource the eminent virtue of the firſt Chriſtians flowed, aſcribes it principally to their diveſting themſelves of their poſſeſſions: "For (ſays the father) perſons from whom "all that they have is taken away, are not ſubject to "ſin: whereas, whoever has large poſſeſſions, wants "not a devil or a tempter to draw him into hell by a "thouſand ways."

The Jews were the firſt and the moſt inveterate enemies the Chriſtians had. They put them to death as often as they had it in their power: and when they revolted againſt the Romans in the time of the emperor Adrian, Barcochebas, the head of that revolt, employed againſt the Chriſtians the moſt rigorous puniſhments to compel them to blaſpheme and renounce Jeſus Chriſt. And we find that, even in the third century, they endeavoured to get into their hands Chriſtian women, in order to ſcourge and ſtone them in their ſynagogues. They curſed the Chriſtians ſolemnly three times a-day in their ſynagogues, and their rabbins would not ſuffer them to converſe with Chriſtians upon any occaſion. Nor were they contented to hate and deteſt them; but they deſpatched emiſſaries all over the world to defame the Chriſtians, and ſpread all ſorts of calumnies againſt them. They accuſed them, among other things, of worſhipping the ſun and the head of an aſs. They reproached them with idleneſs, and being an uſeleſs race of people. They charged them with treaſon, and endeavouring to erect a new monarchy againſt that of the Romans. They affirmed, that, in celebrating their myſteries, they uſed to kill a child and eat its fleſh. They accuſed them of the moſt ſhocking inceſts, and of intemperance in their feaſts of charity. But the lives and behaviour of the firſt Chriſtians were ſufficient to refute all that was ſaid againſt them, and evidently demonſtrated that theſe accuſations were mere calumny, and the effect of inveterate malice.

Pliny the younger, who was governor of Pontus and Bithynia between the years 103 and 105, gives a very particular account of the Chriſtians in that province, in a letter which he wrote to the emperor Trajan, of which the following is an extract: "I take "the liberty, Sir, to give you an account of every "difficulty which ariſes to me. I have never been "preſent at the examination of the Chriſtians; for "which reaſon I know not what queſtions have been "put to them, nor in what manner they have been "puniſhed. My behaviour towards thoſe who have "been accuſed to me has been this: I have interro"gated them, in order to know whether they were "really Chriſtians. When they have confeſſed it, I "have repeated the ſame queſtion two or three times, "threatening them with death if they did not re"nounce this religion. Thoſe who have perſiſted "in their confeſſion, have been, by my order, led to "puniſhment. I have even met with ſome Roman "citizens guilty of this phrenſy, whom, in regard to "their quality, I have ſet apart from the reſt, in or"der to ſend them to Rome. Theſe perſons de"clare, that their whole crime, if they are guilty, "conſiſts in this; that, on certain days, they aſſem"ble before ſunriſe, to ſing alternately the praiſes "of Chriſt, as of a god, and to oblige themſelves, "by the performance of their religious rites, not to "be guilty of theft, or adultery, to obſerve inviolably "their word, and to be true to their truſt. This "depoſition has obliged me to endeavour to inform "myſelf ſtill farther of this matter, by putting to the "torture two of their women-ſervants, whom they "call *deaconeſſes*; but I could learn nothing more "from them than that the ſuperſtition of theſe peo"ple is as ridiculous as their attachment to it is aſto"niſhing."

There is extant a juſtification, or rather panegyric, of the Chriſtians, pronounced by the mouth of a Pagan prince. It is a letter of the emperor Antoninus, written in the year 152, in anſwer to the States of Aſia, who had accuſed the Chriſtians of being the cauſe of ſome earthquakes which had happened in that

that part of the world. The emperor adviſes them to "take care, leſt, in torturing and puniſhing thoſe whom they accuſed of Atheiſm (meaning the Chriſtians), they ſhould render them more obſtinate, inſtead of prevailing upon them to change their opinion; ſince their religion taught them to ſuffer with pleaſure for the ſake of God." As to the earthquakes which had happened, he put them in mind, "that they themſelves are always diſcouraged, and ſink under ſuch misfortunes; whereas the Chriſtians never diſcovered more cheerfulneſs and confidence in God than upon ſuch occaſions." He tells them, that "they pay no regard to religion, and neglect the worſhip of the Eternal; and, becauſe the Chriſtians honour and adore Him, therefore they are jealous of them, and perſecute them even to death." He concludes: "Many of the governors of provinces have formerly written to my father concerning them; and his anſwer always was, that they ſhould not be moleſted or diſturbed, provided they quietly ſubmitted to the authority of the government. Many perſons have likewiſe conſulted me upon this affair, and I have returned the ſame anſwer to them all; namely, that if any one accuſes a Chriſtian merely on account of his religion, the accuſed perſon ſhall be acquitted, and the accuſer himſelf puniſhed." This ordinance, according to Euſebius, was publicly fixed up at Epheſus in an aſſembly of the ſtates.

It is no difficult matter to diſcover the cauſes of the many perſecutions to which the Chriſtians were expoſed during the three firſt centuries. The purity of the Chriſtian morality, directly oppoſite to the corruption of the Pagans, was doubtleſs one of the moſt powerful motives of the public averſion. To this may be added, the many calumnies unjuſtly ſpread about concerning them by their enemies, particularly the Jews. And this occaſioned ſo ſtrong a prejudice againſt them, that the Pagans condemned them without inquiring into their doctrine, or permitting them to defend themſelves. Beſides, their worſhipping Jeſus Chriſt as God, was contrary to one of the moſt ancient laws of the Roman empire, which expreſsly forbade the acknowledging of any God which had not been approved by the ſenate.

But notwithſtanding the violent oppoſition made to the eſtabliſhment of the Chriſtian religion, it gained ground daily, and very ſoon made a ſurpriſing progreſs in the Roman empire. In the third century, there were Chriſtians in the camp, in the ſenate, in the palace: in ſhort everywhere, but in the temples and the theatres: they filled the towns, the country, the iſlands. Men and women of all ages and conditions, and even thoſe of the firſt dignities, embraced the faith; inſomuch that the Pagans complained that the revenues of their temples were ruined. They were in ſuch great numbers in the empire, that (as Tertullian expreſſes it) were they to have retired into another country, they would have left the Romans only a frightful ſolitude.

The primitive Chriſtians were not only remarkable for the practice of every virtue; they were alſo very eminently diſtinguiſhed by the many miraculous gifts and graces beſtowed by God upon them. "Some of the Chriſtians (ſays Irenæus) drive out devils, not in appearance only, but ſo as that they never return: whence it often happens, that thoſe who are diſpoſſeſſed of evil ſpirits embrace the faith and are received into the church. Others know what is to come, ſee viſions, and deliver oracles as prophets. Others heal the ſick by laying their hands on them, and reſtore them to perfect health: and we find ſome who even raiſe the dead.—It is impoſſible to reckon up the gifts and graces which the church has received from God—what they have freely received they as freely beſtow. They obtain theſe gifts by prayer alone, and invocation of the name of Jeſus Chriſt, without any mixture of enchantment or ſuperſtition."

We ſhall here ſubjoin the remarkable ſtory, atteſted by Pagan authors themſelves, concerning the *Chriſtian Legion* in the army of the emperor Marcus Aurelius. That prince having led his forces againſt the Quadi, a people on the other ſide of the Danube, was ſurrounded and hemmed in by the enemy in a diſadvantageous place, and where they could find no water. The Romans were greatly embarraſſed, and, being preſſed by the enemy, were obliged to continue under arms, expoſed to the violent heat of the ſun, and almoſt dead with thirſt; when, on a ſudden, the clouds gathered, and the rain fell in great abundance. The ſoldiers received the water in their bucklers and helmets, and ſatisfied both their own thirſt and that of their horſes. The enemy, preſently after, attacked them; and ſo great was the advantage they had over them, that the Romans muſt have been overthrown, had not Heaven again interpoſed by a violent ſtorm of hail, mixed with lightning, which fell on the enemy, and obliged them to retreat. It was found afterwards, that one of the legions, which conſiſted of Chriſtians, had by their prayers, which they offered upon their knees before the battle, obtained this favour from heaven: and from this event that legion was ſurnamed *The Thundering Legion*. See, however, the criticiſm of Mr Moyle on this ſtory in his *Works*, vol. ii. p. 81—390. See alſo *Moſheim's Church Hiſtory*, vol. i. p. 124.

Such were the primitive Chriſtians, whoſe religion has by degrees ſpread itſelf over all parts of the world, though not with equal purity in all. And though, by the providence of God, Mahometans and Idolaters have been ſuffered to poſſeſs themſelves of thoſe places in Greece, Aſia, and Africa, where the Chriſtian religion formerly moſt flouriſhed; yet there are ſtill ſuch remains of the Chriſtian religion among them as to give them opportunity ſufficient to be converted. For, in the dominions of the Turk in Europe, the Chriſtians make two third parts at leaſt of the inhabitants; and in Conſtantinople itſelf there are above twenty Chriſtian churches, and above thirty in Theſſalonica. Philadelphia, now called *Ala-ſhahir*, has no fewer than twelve Chriſtian churches. The whole iſland of Chio is governed by Chriſtians; and ſome iſlands of the Archipelago are inhabited by Chriſtians only. In Africa, beſides the Chriſtians living in Egypt, and in the kingdom of Congo and Angola, the iſlands upon the weſtern coaſts are inhabited by Chriſtians; and the vaſt kingdom of Abyſſinia, ſuppoſed to be as big as Germany, France, Spain, and Italy, put together, is poſſeſſed by Chriſtians. In Aſia, moſt part of the empire of Ruſſia, the countries of Circaſſia and Mingrelia, Georgia, and Mount Libanus, are inhabited

habited only by Christians. In America, it is notorious that the Christians are very numerous, and spread over most parts of that vast continent.

CHRISTIANS of St John, a sect of Christians very numerous in Balsara and the neighbouring towns: they formerly inhabited along the river Jordan, where St John baptized, and it was from thence they had their name. They hold an anniversary feast of five days; during which they all go to the bishop, who baptizes them with the baptism of St John. Their baptism is also performed in rivers, and that only on Sundays: they have no notion of the third person in the Trinity; nor have they any canonical book, but abundance full of charms, &c. Their bishoprics descend by inheritance, as our estates do, though they have the ceremony of an election.

CHRISTIANS of St Thomas, a sort of Christians in a peninsula of India on this side of the gulf: they inhabit chiefly at Cranganor, and the neighbouring country: these admit of no images; and receive only the cross, to which they pay a great veneration: they affirm, that the souls of the saints do not see God till after the day of judgment: they acknowledge but three sacraments, viz. baptism, orders, and the eucharist; they make no use of holy oils in the administration of baptism; but, after the ceremony, anoint the infant with an unction composed of oil and walnuts, without any benediction. In the eucharist, they consecrate with little cakes made of oil and salt, and instead of wine make use of water in which raisins have been infused.

CHRISTIANA, a town of Norway, in the province of Aggerhuys, situated in a bay of the sea. E. Long. 10. 20. N. Lat. 59. 30.

CHRISTIANOPLE, a port-town of Sweden, situated on the Baltic sea, in the territory of Bleckingen, and province of South Gothland. E. Long. 15. 47. N. Lat. 57°.

CHRISTIANSTADT, a strong fortified town of Sweden; situated in the territory of Bleckingen and province of South Gothland. It was built in 1614 by Christian IV. king of Denmark, when this province belonged to the Danes; and finally ceded to the Swedes by the peace of Roskild in 1658. The town is small but neatly built, and is esteemed the strongest fortress in Sweden. The houses are all of brick, and mostly stuccoed white. It stands in a marshy plain close to the river Helgeia, which flows into the Baltic at Ahus, about the distance of 20 miles, and is navigable only for small craft of seven tons burden. English vessels annually resort to this port for alum, pitch, and tar. The inhabitants have manufactures of cloth and silken stuffs, and carry on a small degree of commerce. E. Long. 14. 40. N. Lat. 56. 30.

CHRISTINA, daughter of Gustavus Adolphus king of Sweden, was born in 1626; and succeeded to the crown in 1633, when only seven years of age. This princess discovered, even in her infancy, what she afterwards expressed in her memoirs, an invincible antipathy for the employments and conversation of women; and she had the natural aukwardness of a man with respect to all the little works which generally fall to their share. She was, on the contrary, fond of violent exercises, and such amusements as consist in feats of strength and activity. She had also both ability and taste for abstracted speculations; and amused herself with language and the sciences, particularly that of legislation and government. She derived her knowledge of ancient history from its source; and Polybius and Thucydides were her favourite authors. As she was the sovereign of a powerful kingdom, it is not strange that almost all the princes in Europe aspired to her bed. Among others, were the prince of Denmark, the elector Palatine, the elector of Brandenburg, the king of Spain, the king of the Romans, Don John of Austria, Sigismund of Rockocci, count and general of Cassovia; Stanislaus king of Poland; John Cassimir his brother; and Charles Gustavus duke of Deux Ponts, of the Bavarian Palatinate family, son of her father the great Gustavus's sister, and consequently her first cousin. To this nobleman, as well as to all his competitors, she constantly refused her hand; but she caused him to be appointed her successor by the states. Political interests, differences of religion, and contrariety of manners, furnished Christina with pretences for rejecting all her suitors; but her true motives were the love of independence, and a strong aversion she had conceived, even in her infancy, from the marriage yoke. "Do not force me to marry (said she to the states); for if I should have a son, it is not more probable that he should be an Augustus than a Nero."

An accident happened in the beginning of her reign, which gave her a remarkable opportunity of displaying the strength and equanimity of her mind. As she was at the chapel of the castle of Stockholm, assisting at divine service with the principal lords of her court, a poor wretch, who was disordered in his mind, came to the place with a design to assassinate her. This man, who was preceptor of the college, and in the full vigour of his age, chose, for the execution of his design, the moment in which the assembly was performing what in the Swedish church is called an *act of recollection;* a silent and separate act of devotion, performed by each individual kneeling and hiding the face with the hand. Taking this opportunity, he rushed through the crowd, and mounted a ballustrade within which the queen was upon her knees. The Baron Braki, chief justice of Sweden, was alarmed, and cried out; and the guards crossed their partisans, to prevent his coming further: but he struck them furiously on one side; leaped over the barrier; and, being then close to the queen, made a blow at her with a knife which he had concealed without a sheath in his sleeve. The queen avoided the blow, and pushed the captain of her guards, who instantly threw himself upon the assassin, and seized him by the hair. All this happened in less than a moment of time. The man was known to be mad, and therefore nobody supposed he had any accomplices: they therefore contented themselves with locking him up; and the queen returned to her devotion without the least emotion that could be perceived by the people, who were much more frightened than herself.

One of the great affairs that employed Christina while she was upon the throne, was the peace of Westphalia, in which many clashing interests were to be reconciled, and many claims to be ascertained. It was concluded in the month of October 1648. The success of the Swedish arms rendered Christina the arbitress

bitress of this treaty; at least as to the affairs of Sweden, to which this peace confirmed the possession of many important countries. No public event of importance took place during the rest of Christina's reign; for there were neither wars abroad, nor troubles at home. This quiet might be the effect of chance; but it might also be the effect of a good administration, and the great reputation of the queen; and the love her people had for her ought to lead us to this determination. Her reign was that of learning and genius. She drew about her, wherever she was, all the distinguished characters of her time: Grotius, Paschal, Bochart, Descartes, Gassendi, Saumaise, Naude, Vossius, Heinsius, Meibom, Scudery, Menage, Lucas, Holstentius, Lambecius, Bayle, Madame Dacier, Filicaia, and many others. The arts never fail to immortalize the prince who protects them; and almost all these illustrious persons have celebrated Christina, either in poems, letters, or literary productions of some other kind, the greater part of which are now forgotten. They form, however, a general cry of praise, and a mass of testimonials which may be considered as a solid basis of reputation. Christina, however, may be justly reproached with want of taste, in not properly assigning the rank of all these persons, whose merits, though acknowledged, were yet unequal; particularly for not having been sufficiently sensible of the superiority of Descartes, whom she disgusted, and at last wholly neglected. The rapid fortune which the adventurer Michon, known by the name of *Bourdelot*, acquired by her countenance and liberality, was also a great scandal to literature. He had no pretensions to learning; and though sprightly was yet indecent. He was brought to court by the learned Saumaise; and, for a time, drove literary merit out of it, making learning the object of his ridicule, and exacting from Christina an exorbitant tribute to the weakness and inconstancy of her sex; for even Christina, with respect to this man, showed herself to be weak and inconstant. At last she was compelled, by the public indignation, to banish this unworthy minion: and he was no sooner gone than her regard for him was at an end. She was ashamed of the favour she had shown him; and, in a short time, thought of him with hatred or contempt. This Bourdelot, during his ascendency over the queen, had supplanted Count Magnus de la Gardie, son of the constable of Sweden, who was a relation, a favourite, and perhaps the lover of Christina. M. de Mottville, who had seen him ambassador in France, says, in his memoirs, that he spoke of his queen in terms so passionate and respectful, that every one concluded his attachment to her to be more ardent and tender than a mere sense of duty can produce. This nobleman fell into disgrace because he showed an inclination to govern; while M. Bourdelot seemed to aim at nothing more than to amuse; and concealed, under the unsuspected character of a droll, the real ascendency which he exercised over the queen's mind.

About this time, an accident happened to Christina which brought her into still greater danger than that which has been related already. Having given orders for some ships of war to be built at the port of Stockholm, she went to see them when they were finished; and as she was going on board of them, cross a narrow plank, with Admiral Fleming, his foot slipping, he fell, and drew the queen with him into the sea, which in that place was near 90 feet deep. Anthony Steinberg, the queen's first equerry, instantly threw himself into the water, laid hold of her robe, and, with such assistance as was given him, got the queen ashore: during this accident, her recollection was such, that the moment her lips were above water, she cried out, "Take care of the admiral." When she was got out of the water, she discovered no emotion either by her gesture or countenance; and she dined the same day in public, where she gave a humorous account of her adventure.

But though at first she was fond of the power and splendour of royalty, yet she began at length to feel that it embarrassed her; and the same love of independency and liberty which had determined her against marriage, at last made her weary of the crown. As, after her first disgust, it grew more and more irksome to her, she resolved to abdicate; and, in 1652, communicated her resolution to the senate. The senate zealously remonstrated against it; and was joined by the people; and even by Charles Gustavus himself, who was to succeed her: she yielded to their importunities, and continued to sacrifice her own pleasure to the will of the public till the year 1654, and then she carried her design into execution. It appears by one of her letters to M. Canut, in whom she put great confidence, that she had meditated this project for more than eight years; and that she had communicated it to him five years before it took place.

The ceremony of her abdication was a mournful solemnity, a mixture of pomp and sadness, in which scarce any eyes but her own were dry. She continued firm and composed through the whole; and, as soon as it was over, prepared to remove into a country more favourable to science than Sweden was. Concerning the merit of this action, the world has always been divided in opinion; it has been condemned alike both by the ignorant and the learned, the trifler and the sage. It was admired, however, by the great Conde: "How great was the magnanimity of this princess (said he), who could so easily give up that for which the rest of mankind are continually destroying each other, and which so many throughout their whole lives pursue without attaining!" It appears, by the works of St Evremond, that the abdication of Christina was at that time the universal topic of speculation and debate in France. Christina, besides abdicating her crown, abjured her religion: but this act was universally approved by one party and censured by another; the Papists triumphed, and the Protestants were offended. No prince, after a long imprisonment, ever showed so much joy upon being restored to his kingdom, as Christina did in quitting hers. When she came to a little brook, which separates Sweden from Denmark, she got out of her carriage; and leaping on the other side, cried out in a transport of joy, "At last I am free, and out of Sweden, whither, I hope, I shall never return." She dismissed her women, and laid by the habit of her sex: "I would become a man (said she); yet I do not love men because they are men, but because they are not women." She made her abjuration at Brussels; where she saw the great Conde, who, after his

his defection, made that city his asylum. "Cousin, (said she), who would have thought, ten years ago, that we should have met at this distance from our countries?"

The inconstancy of Christina's temper appeared in her going continually from place to place: from Brussels she went to Rome; from Rome to France, and from France she returned to Rome again; after this she went to Sweden, where she was not very well received; from Sweden she went to Hamburgh, where she continued a year, and then went again to Rome; from Rome she returned to Hamburgh; and again to Sweden, where she was still worse received than before; upon which she went back to Hamburgh, and from Hamburgh again to Rome. She intended another journey to Sweden; but it did not take place, any more than an expedition to England, where Cromwell did not seem well disposed to receive her; and after many wanderings, and many purposes of wandering still more, she at last died at Rome in 1689.

It must be acknowledged, that her journeys to Sweden had a motive of necessity; for her appointments were very ill paid, though the states often confirmed them after her abdication: but to other places she was led merely by a roving disposition; and, what is more to her discredit, she always disturbed the quiet of every place she came into, by exacting greater deference to her rank as queen than she had a right to expect, by her total non-conformity to the customs of the place, and by continually exciting and fomenting intrigues of state. She was indeed always too busy, even when she was upon the throne; for there was no event in Europe in which she was not ambitious of acting a principal part. During the troubles in France by the faction called the *Fronde*, she wrote with great eagerness to all the interested parties, officiously offering her mediation to reconcile their interests, and calm their passions, the secret springs of which it was impossible she should know. This was first thought a dangerous, and afterwards a ridiculous behaviour. During her residence in France she gave universal disgust, not only by violating all the customs of the country, but by practising others directly opposite. She treated the ladies of the court with the greatest rudeness and contempt: when they came to embrace her, she, being in man's habit, cried out, "What a strange eagerness have these women to kiss me! is it because I look like a man?"

But though she ridiculed the manners of the French court, she was very solicitous to enter into its intrigues. Louis XIV. then very young, was enamoured of Mademoiselle de Mancini, niece to Cardinal Mazarine; Christina flattered their passion, and offered her service. "I would fain be your confidant (said she); if you love, you must marry."

The murder of Monaldechi is, to this hour, an inscrutable mystery. It is, however, of a piece with the expressions constantly used by Christina in her letters, with respect to those with whom she was offended; for she scarce ever signified her displeasure without threatening the life of the offender. "If you fail in your duty, (said she to her secretary, whom she sent to Stockholm after her abdication), not all the power of the king of Sweden shall save your life, though you should take shelter in his arms." A musician having quitted her service for that of the duke of Savoy, she was so transported with rage as to disgrace herself by these words, in a letter written with her own hand: "He lives only for me: and if he does not sing for me, he shall not sing long for any body."

Bayle was also threatened for having said that the letter which Christina wrote, upon the revocation of the edict of Nantes, was "a remain of Protestantism;" but he made his peace by apologies and submission. See the article BAYLE.

Upon the whole, she appears to have been an uncommon mixture of faults and great qualities; which, however it might excite fear and respect, was by no means amiable. She had wit, taste, parts, and learning: she was indefatigable upon the throne; great in private life; firm in misfortunes; impatient of contradiction; and, except in her love letters, inconstant in her inclinations. The most remarkable instance of this ficklenefs is, That after she had abdicated the crown of Sweden, she intrigued for that of Poland. She was, in every action and pursuit, violent and ardent in the highest degree; impetuous in her desires, dreadful in her resentment, and fickle in her conduct.

She says of herself, that, "she was mistrustful, ambitious, passionate, haughty, impatient, contemptuous, satirical, incredulous, undevout, of an ardent and violent temper, and extremely amorous;" a disposition, however, to which, if she may be believed, her pride and her virtue were always superior. In general, her failings were those of her sex, and her virtues the virtues of ours.

Santa CHRISTINA, one of the MARQUESAS *Islands*.

CHRISTMAS DAY, a festival of the Christian church; observed on the 25th of December, in memory of the *nativity* or birth of Jesus Christ. As to the antiquity of this festival, the first footsteps we find of it are in the second century, about the time of the emperor Commodus. The decretal epistles indeed carry it up a little higher; and say that Telesphorus, who lived in the reign of Antoninus Pius, ordered divine service to be celebrated, and an angelical hymn to be sung the night before the nativity of our Saviour. However, that it was kept before the times of Constantine, we have a melancholy proof: for whilst the persecution raged under Dioclesian, who then kept his court at Nicomedia, that prince, among other acts of cruelty, finding multitudes of Christians assembled together to celebrate Christ's nativity, commanded the church doors where they were met to be shut, and fire to be put to it, which, in a short time, reduced them and the church to ashes.

CHRISTOPHER'S, ST, one of the Caribbee islands, in America, lying on the north-west of Nevis, and about 60 miles west of Antigua. It was formerly inhabited by the French and English; but, in 1713, it was ceded entirely to the latter. In 1782, it was taken by the French, but restored to Britain at the peace. It is about 20 miles in breadth, and seven in length; and has high mountains in the middle, whence rivulets run down. Between the mountains are dreadful rocks, horrid precipices, and thick woods; and in the south-west part of the island, hot sulphureous springs at the foot of them. The air is good; the soil light,

Christopher's || Chromatic.

light, sandy, and fruitful; but the island is subject to hurricanes. The produce is chiefly sugar, cotton, ginger, indigo, and the tropical fruits. W. Long. 62. 32. N. Lat. 17. 30.

CHROASTACES, an old term in *Natural History*, applied to gems, and comprehending all those of variable colours, as viewed in different lights and in different positions; of which kinds are the *opal* and the *asteria* or cat's eye.

CHROMATIC, a kind of music which proceeds by several semitones in succession. The word is derived from the Greek χρωμα, which signifies *colour*. For this denomination several causes are assigned, of which none appear certain, and all equally unsatisfactory. Instead, therefore, of fixing upon any, we shall offer a conjecture of our own; which, however, we do not impose upon the reader as more worthy of his attention than any of the former. Χρωμα may perhaps not only signify a *colour*, but that of a shade of a colour by which it melts into another, or what the French call *nuance*. If this interpretation be admitted, it will be highly applicable to semitones; which being the smallest interval allowed in the diatonic scale, will most easily run one into another. To find the reasons assigned by the ancients for this denomination, and their various divisions of the chromatic species, the reader may have recourse to the same article in Rousseau's Musical Dictionary. At present, that species consists in giving such a procedure to the fundamental bass, that the parts in the harmony, or at least some of them, may proceed by semitones, as well in rising as descending; which is most frequently found in the minor mode, from the alterations to which the sixth and seventh note are subjected, by the nature of the mode itself.

The successive semitones used in the *chromatic* species are rarely of the same kind; but alternately major and minor, that is to say, *chromatic* and *diatonic*: for the interval of a minor tone contains a minor or chromatic semitone, and another which is major or diatonic; a measure which temperament renders common to all tones: so that we cannot proceed by two minor semitones which are conjunctive in succession, without entering into the enharmonic species; but two major semitones twice follow each other in the *chromatic* order of the scale.

Chromatic.

The most certain procedure of the fundamental bass to generate the chromatic elements in ascent, is alternately to descend by thirds, and rise by fourths, whilst all the chords carry the third major. If the fundamental bass proceeds from dominant to dominant by perfect cadences avoided, it produces the *chromatic* in descending. To produce both at once, you interweave the perfect and broken cadences, but at the same time avoid them.

As at every note in the *chromatic* species one must change the tone, that succession ought to be regulated and limited for fear of deviation. For this purpose, it will be proper to recollect, that the space most suitable to *chromatic* movements, is between the extremes of the dominant and the tonic in ascending, and between the tonic and the dominant in descending. In the major mode, one may also chromatically descend from the dominant upon the second note. This transition is very common in Italy; and, notwithstanding its beauty, begins to be a little too common amongst us.

The chromatic species is admirably fitted to express grief and affliction; these sounds boldly struck in ascending tear the soul. Their power is no less magical in descending; it is then that the ear seems to be pierced with real groans. Attended with its proper harmony, this species appears proper to express every thing; but its completion, by concealing the melody, sacrifices a part of its expression; and for this disadvantage, arising from the fulness of the harmony, it can only be compensated by the nature and genius of the movement. We may add, that in proportion to the energy of this species, the composer ought to use it with greater caution and parsimony; like those elegant viands, which, when profusely administered, immediately surfeit us with their abundance; as much as they delight us when enjoyed with temperance, so much do they disgust when devoured with prodigality.

CHROMATIC, *Enharmonic*. See ENHARMONIC.

CHROMATICS;

THAT part of optics which explains the several properties of the colours of light, and of natural bodies.

1 Different hypotheses concerning colours.

Before the time of Sir Isaac Newton, we find no hypothesis concerning colours of any consequence. The opinions of the old philosophers, however, we shall briefly mention, in order to gratify the curiosity of our readers. The Pythagoreans called colour the superfices of body. Plato said that it was a flame issuing from them. According to Zeno, it is the first configuration of matter; and Aristotle said, it was that which moved bodies actually transparent. Des Cartes asserted, that colour is a modification of light; but he imagined, that the difference of colour proceeds from the prevalence of the direct or rotatory motion of the particles of light. Father Grimaldi, Dechales, and many others, thought the difference of colour depended upon the quick or slow vibrations of a certain elastic medium filling the whole universe. Rohault imagined that the different colours were made by the rays of light entering the eye at different angles with respect to the optic axis; and from the phenomena of the rainbow, he pretended to calculate the precise quantity of the angle that constituted each particular colour. Lastly, Dr Hooke, the rival of Newton, imagined that colour is caused by the sensation of the oblique or uneven pulse of light; and this being capable of no more than two varieties, he concluded there could be no more than two primary colours.

2 This subject investigated by Sir Isaac Newton.

In the year 1666, Sir Isaac Newton began to investigate this subject; and finding the coloured image of the sun, formed by a glass prism, to be of an oblong, and

and not of a circular form, as, according to the laws of refraction, it ought to be, he began to conjecture that light is not *homogeneal;* but that it confifts of rays, fome of which are much more refrangible than others. See this difcovery fully explained and afcertained under the article OPTICS.

This method of accounting for the different colours of bodies, from their reflecting this or that kind of rays moft copioufly, is fo eafy and natural, that Sir Ifaac's fyftem quickly overcame all objections, and to this day continues to be almoft univerfally believed. It is now acknowledged, that the light of the fun which to us feems perfectly homogeneal and white, is compofed of no fewer than feven different colours, viz. red, orange, yellow, green, blue, purple, and violet or indigo. A body which appears of a red colour hath the property of reflecting the red rays more powerfully than any of the others; and fo of the orange, yellow, green, &c. A body which is of a black colour, inftead of reflecting, *abforbs* all or the greateft part of the rays that fall upon it; and, on the contrary, a body which appears white reflects the greateft part of the rays indifcriminately, without feparating the one from the other.

The foundation of a rational theory of colours being thus laid, it next became natural to inquire, by what peculiar mechanifm in the ftructure of each particular body it was fitted to reflect one kind of rays more than another? This Sir Ifaac Newton attributes to the denfity of thefe bodies. Dr Hooke had remarked, that thin tranfparent fubftances, particularly water and foap blown into bubbles, exhibited various colours according to their thinnefs; though, when they have a confiderable degree of thicknefs, they appear colourlefs; and Sir Ifaac himfelf had obferved, that as he was compreffing two prifms hard together, in order to make their fides (which happened to be a little convex) to touch one another, in the place of contact they were both perfectly tranfparent, as if they had been but one continued piece of glafs. Round the point of contact, where the glaffes were a little feparated from each other, rings of different colours appeared. To obferve more nicely the order of the colours produced in this manner, he took two object-glaffes; one of them a plano-convex one belonging to a 14 feet refracting telefcope, and the other a large double convex one for a telefcope of about 50 feet; and laying the former of them upon the latter, with its plain fide downwards, he preffed them flowly together; by which means the colours very foon emerged, and appeared diftinct to a confiderable diftance. Next to the pellucid centrical fpot, made by the contact of the glaffes, fucceeded blue, white, yellow, and red. The blue was very little in quantity, nor could he difcern any violet in it; but the yellow and red were very copious, extending about as far as the white, and four or five times as far as the blue. The next circuit immediately furrounding thefe, confifted of violet, blue, green, yellow, and red: all thefe were copious and vivid, except the green, which was very little in quantity, and feemed more faint and dilute than the other colours. Of the other four the violet was the leaft in extent; and the blue lefs than the yellow or red. The third circle of colours was purple, blue, green, yellow, and red. In this the purple feemed more reddifh than the violet in the former circuit, and the green was more confpicuous; being as brifk and copious as any of the other colours, except the yellow; but the red began to be a little faded, inclining much to purple. The fourth circle confifted of green and red; and of thefe the green was very copious and lively, inclining on the one fide to blue, and on the other to yellow; but in this fourth circle there was neither violet, blue, nor yellow, and the red was very imperfect and dirty. All the fucceeding colours grew more and more imperfect and dilute, till after three or four revolutions they ended in perfect whitenefs.

3 Colours appearing between two glafs plates.

4 Suppofed to arife from denfity.

As the colours were thus found to vary according to the different diftances of the glafs plates from each other; our author thought that they proceeded from the different thicknefs of the plate of air intercepted between the glaffes; this plate of air being, by the mere circumftance of thinnefs or thicknefs, difpofed to reflect or tranfmit this or that particular colour. From this he concluded, as already obferved, that the colours of all natural bodies depended on their denfity, or the bignefs of their component particles. He alfo conftructed a table, wherein the thicknefs of a plate neceffary to reflect any particular colour was expreffed in parts of an inch divided into 1,000,000 parts.

5 Colours by reflection.

Sir Ifaac Newton, purfuing his difcoveries concerning the colours of thin fubftances, found that the fame were alfo produced by plates of a confiderable thicknefs. There is no glafs or fpeculum, he obferves, how well polifhed foever, but, befides the light which it refracts or reflects regularly, fcatters every way irregularly a faint light; by means of which the polifhed furface, when illuminated in a dark room by a beam of the fun's light, may eafily be feen in all pofitions of the eye. It was with this fcattered light that the colours in the following experiments were produced.

The fun fhining into his darkened chamber through a hole in the fhutter one inch wide, he let the beam of light fall perpendicularly upon a glafs fpeculum concave on one fide and convex on the other, ground to a fphere of five feet eleven inches radius, and quickfilvered over on the convex fide. Then, holding a quire of white paper at the centre of the fphere to which the fpeculums were ground, in fuch a manner as that the beam of light might pafs through a little hole made in the middle of the paper, to the fpeculum, and thence be refracted back to the fame hole, he obferved on the paper four or five concentric rings of colours like rainbows, furrounding the hole, very much like thofe which appeared in the thin plates above mentioned, but larger and fainter. Thefe rings, as they grew larger and larger, became more dilute, fo that the fifth was hardly vifible; and yet fometimes, when the fun fhone very clear, there appeared faint traces of a fixth and feventh.

6 Colours by refraction and reflection enumerated.

We have already taken notice, that the thin plates made ufe of in the former experiments reflected fome kinds of rays in particular parts, and tranfmitted others in the fame parts. Hence the coloured rings appeared varioufly difpofed, according as they were viewed by tranfmitted or reflected light; that is, according as the plates were held up between the light and the eye, or not. For the better underftanding of which

which we ſubjoin the following table, wherein on one ſide are mentioned the colours appearing on the plates by reflected light, and on the other thoſe which were oppoſite to them, and which became viſible when the glaſſes were held up between the eye and the window. We have already obſerved, that the centre, when the glaſſes were in full contact, was perfectly tranſparent. This ſpot, therefore, when viewed by reflected light, appeared black, becauſe it tranſmitted all the rays; and for the ſame reaſon it appeared white when viewed by tranſmitted light.

Colours by Reflected Light.	*Colours by Tranſmitted Light.*
Black	White
Blue	Yellowiſh-red
White	Black
Yellow	Violet
Red	Blue
Violet	White
Blue	Yellow
Green	Red
Yellow	Violet
Red	Blue
Purple	Green
Blue	Yellow
Green	Red
Yellow } Red }	Bluiſh-green
Green	Red
Red	Bluiſh-green
Greeniſh-blue	Red
Red	

The colours of the rings produced from reflection by the thick plates, followed the order of thoſe produced by tranſmiſſion through the thin ones; and by the analogy of their phenomena with thoſe produced from the thin plates, Sir Iſaac Newton concluded that they were produced in a ſimilar manner. For he found, that if the quickſilver was rubbed off from the back of the ſpeculum, the glaſs alone would produce the ſame rings, but much more faint than before; ſo that the phenomenon did not depend upon the quickſilver, except in as far as, by increaſing the reflection at the back of the glaſs, it increaſed the light of the coloured rings. He alſo found that a ſpeculum of metal only, produced none of theſe rings; which made him conclude, that they did not ariſe from one ſurface only, but depended on the two ſurfaces of the plate of glaſs of which the ſpeculum was made, and upon the thickneſs of the glaſs between them.

7
General theory of colours by Sir Iſaac Newton.

From theſe experiments and obſervations, it will be eaſy to underſtand the Newtonian theory of colours. Every ſubſtance in nature ſeems to be tranſparent, provided it is made ſufficiently thin. Gold, the moſt denſe ſubſtance we know, when reduced into thin leaves, tranſmits a bluiſh-green light through it. If, therefore, we ſuppoſe any body, gold, for inſtance, to be divided into a vaſt number of plates, ſo thin as to be almoſt perfectly tranſparent, it is evident that all or greateſt part of the rays will paſs through the upper plates, and when they loſe their force will be reflected from the under ones. They will then have the ſame number of plates to paſs through which they had penetrated before; and thus, according to the number of thoſe plates through which they are obliged to paſs, the object appears of this or that colour, juſt as the rings of colours appeared different in the experiment of the two plates, according to their diſtance from one another, or the thickneſs of the plate of air between them.

8
Mr Delaval's experiments in confirmation of it.

This theory is adopted by Edward Huſſey Delaval, in his Experimental Inquiry into the cauſe of the changes of colours in opaque and coloured bodies. He endeavours to confirm it by a number of experiments on the infuſions of flowers of different colours; but his ſtrongeſt arguments ſeem to be thoſe derived from the different tinges given to glaſs by metallic ſubſtances. Here he obſerves, that each metal gives a tinge according to its ſpecific denſity: The more denſe metals producing the leſs refrangible colours, and the lighter ones thoſe colours which are more eaſily refrangible. Gold, which is the denſeſt of all metals, imparts a red colour to glaſs, whenever it can be divided into particles ſo minute, that it is capable of being mixed with the materials of which glaſs is made. It ſeems indifferent by what means it is reduced to this ſtate, nor can it by any means be made to produce another colour. If it is mixed in large maſſes without being minutely divided, it imparts no colour to the glaſs, but remains in its metallic form. Lead, the metal whoſe denſity is next in order to that of gold, affords a glaſs of the colour of the hyacinth; a gem whoſe diſtinguiſhing characteriſtic is, that it is red with an admixture of yellow, the ſame colour which is uſually called *orange*. Glaſs of lead is mentioned by ſeveral authors as a compoſition proper, without the addition of any other ingredient, for imitating the hyacinth. Silver, next in denſity to lead, can only be made to communicate a yellow colour to glaſs. If the metal is calcined with ſulphur, it readily communicates this colour. Leaf-ſilver laid upon red hot glaſs, likewiſe tinges it yellow. When we meet with authors who mention a blue or greeniſh colour communicated by ſilver, the cauſe muſt have been, that the ſilver uſed in ſuch proceſſes was mixed with copper. Mr Delaval aſſures us, from his own experience, that ſilver purified by the teſt retains ſo much copper, that, when melted ſeveral times with nitre and borax, it always imparted a green colour at the firſt and ſecond melting: though afterwards no ſuch colour was obtainable from it. The only colour produced by copper is green. It is indifferent in what manner the copper is prepared in order to tinge the glaſs, provided it is expoſed without any other ingredient to a ſufficient degree of heat. If a quantity of ſalts is added in the preparation, they will, by attenuating the mixture, make the glaſs incline to blue, the colour next in order: but this happens only when the fire is moderate; for, in a greater degree of heat, the redundant ſalts, even thoſe of the moſt fixed nature, are expelled. It is true, that copper is mentioned by ſome writers as an ingredient in red glaſs and enamel: but the *red*, which is the colour of the metal not diſſolved or mixed with the glaſs, remains only while the compoſition is expoſed to ſuch a degree of heat as is too ſmall to melt and incorporate it; for if it be ſuffered to remain in the furnace a few minutes after the copper is added, the maſs will turn out green inſtead of red. Iron, the metal next in denſity to copper, is apt to

to be calcined, or reduced to a ruddy crocus, fimilar to that ruft which it contracts fpontaneoufly in the air. In this ftate it requires a confiderable degree of heat to diffolve and incorporate it with glafs: till that heat is applied, it retains its ruddy colour: by increafing the heat, it paffes through the intermediate colours, till it arrives at its permanent one, which is blue; this being effected in the greateft degree of heat the glafs will bear, without lofing all colour whatever. Iron vitrified *per fe* is converted into a blue glafs. In fhort, it is indubitable, that iron is the only metal which will, without any addition, impart to the glafs a blue colour: for copper will not communicate that colour without the addition, of a confiderable quantity of falts, or fome other matter that attenuates it; and the other metals cannot by any means be made to produce it at all.

9
Sir Ifaac's theory defended by Dr Prieftley.

Thefe are the principal of Mr Delaval's arguments in favour of Sir Ifaac Newton's theory of colours being formed by denfity. Dr Prieftley too hath mentioned fome which deferve attention. "It was a difcovery of Sir Ifaac Newton (fays he), that the colours of bodies depend upon the thicknefs of the fine plates which compofe their furfaces. He hath fhown, that a change of the thicknefs of thefe plates occafions a change in the colour of the body; rays of a different colour being thereby difpofed to be tranfmitted through it; and confequently rays of a different colour reflected at the fame place, fo as to reprefent an image of a different colour to the eye. A variation in the denfity occafions a variation in the colour: but ftill a medium of any denfity will exhibit all the colours according to the thicknefs of it. Thefe obfervations he confirmed by experiments on plates of air, water, and glafs. He likewife mentions the colours which arife on polifhed fteel by heating it, as likewife on bell-metal, and fome other metalline fubftances, when melted and poured on the ground, where they may cool in the open air; and he afcribes them to the fcoriæ or vitrified parts of the metal, which, he fays, moft metals, when heated or melted, do continually protrude and fend out to their furfaces, covering them in the form of a thin glaffy fkin. This great difcovery concerning the colours of bodies depending on the thicknefs of the fine plates which compofe their furfaces, of whatever denfity thefe plates may be, I have been fo happy as to hit upon a method of illuftrating and confirming by means of electrical explofions.

10
His experiments.

A number of thefe being received on the furface of any piece of metal, change the colour of it to a confiderable diftance from the fpot on which they were difcharged; fo that the whole circular fpace is divided into a number of concentric rings, each of which confifts of all the prifmatic colours, and perhaps as vivid as they can be produced in any method whatever.

11
Mr Canton's experiments.

Upon fhowing thefe coloured rings to Mr Canton, I was agreeably furprifed to find, that he had likewife produced all the prifmatic colours from all the metals, but by a different operation. He extended fine wires of all the different metals along the furface of pieces of glafs, ivory, wood, &c.; and when the wire was exploded, he always found them tinged with all the colours. They are not difpofed in fo regular and beautiful a manner as in the rings I produced, but they equally demonftrated that none of the metals thus exploded difcovers the leaft preference to one colour more than to another. In what manner thefe colours are formed it may not be eafy to conjecture. In Mr Canton's method of producing them, the metal, or the calcined and vitrified parts of it, feem to be difperfed in all directions from the plate of explofion, in the form of fpheres of a very great variety of fizes, tinged with all the variety of colours, and fome of them fmaller than can be diftinctly feen by any magnifier. In my method of making thefe colours, they feem to be produced in a manner fimilar to the production of colours on fteel and other metals by heat; i. e. the furface is affected without the parts of it being removed from their places, certain plates or laminæ being formed of a thicknefs proper to exhibit the refpective colours."

12
Newtonian theory impugned by Dr Prieftley.

But, however well fupported this doctrine of the formation of colours by denfity may be, we find the fame author (Dr Prieftley), whom we have juft now feen arguing for it in his hiftory of electricity, arguing againft it in his hiftory of vifion. "There are (fays he) no optical experiments with which Sir Ifaac Newton feems to have taken more pains than thofe relating to the rings of colours which appear in thin plates; and in all his obfervations and inveftigations concerning them, he difcovers the greateft fagacity both as a philofopher and mathematician; and yet in no object to which he gave his attention, does he feem to have overlooked more important circumftances in the appearances he obferved, or to have been more miftaken with regard to their caufes. The former will be evident from the obfervations of thofe who fucceeded him in thefe inquiries, particularly thofe of the Abbé Mazeas.

13
Curious experiments by the Abbé Mazeas.

This gentleman, endeavouring to give a very high polifh to the flat fide of an object glafs, happened to be rubbing it againft another piece of flat and fmooth glafs; when he was furprifed to find, that after this friction, they adhered very firmly together, till at laft he could not move the one above the other. But he was much more furprifed to obferve the fame colours between thefe plane glaffes that Newton obferved between the convex object-glafs of a telefcope and another that is plane. Thefe colours between the plane glaffes, the Abbé obferves, were in proportion to their adhefion. The refemblance between them and the colours produced by Newton, induced him to give a very particular attention to them; and his obfervations and experiments were as follows:

"If the furfaces of the pieces of glafs are tranfparent, and well polifhed, fuch as are ufed for mirrors, and the preffure be as equal as poffible on every part of the two furfaces, a refiftance, he fays, will foon be perceived when one of them is made to flide over the other; fometimes towards the middle, and fometimes towards the edges; but wherever the refiftance is felt, two or three very fine curve lines will be perceived, fome of a pale red, and others of a faint green. Continuing the friction, thefe red and green lines increafe in number at the place of contact, the colours being fometimes mixed without any order, and fometimes difpofed in a regular manner. In the laft cafe, the coloured lines are generally concentric circles, or ellipfes, or rather ovals, more or lefs elongated as the furfaces

ſurfaces are more or leſs united. Theſe figures will not fail to appear, if the glaſſes are well wiped and warmed before the friction.

“ When the colours are formed, the glaſſes adhere with conſiderable force, and would always continue ſo without any change in the colours. In the centre of all thoſe ovals, the longer diameter of which generally exceeds ten lines, there appears a ſmall plate of the ſame figure, exactly like a plate of gold interpoſed between the glaſſes; and in the centre of it there is often a dark ſpot, which abſorbs all the rays of light except the violet: for this colour appears very vivid through a priſm.

“ If the glaſſes are ſeparated ſuddenly, either by ſliding them horizontally over one another, or by the action of fire, as will be explained hereafter, the colours will appear immediately upon their being put together again, without the leaſt friction.

“ Beginning by the ſlighteſt touch, and increaſing the preſſure by inſenſible degrees, there firſt appears an oval plate of a faint red, and in the midſt of it a ſpot of light green, which enlarges by the preſſure, and becomes a green oval, with a red ſpot in the centre; and this, enlarging in its turn, diſcovers a green ſpot in its centre. Thus the red and the green ſucceed one another in turns, aſſuming different ſhades, and having other colours mixed with them, which will be diſtinguiſhed preſently.

“ The greateſt difference between theſe colours exhibited between plane ſurfaces and thoſe formed by curve ones is, that in the former caſe preſſure alone will not produce them, except in the caſe above mentioned. With whatever force he compreſſed them, his attempts to produce the colours were in vain without previous friction. But the reaſon of this plainly was, that with ſliding one of the glaſſes over the other, they could not be brought to approach near enough for the purpoſe.

“ Having made theſe obſervations with plates of glaſs whoſe ſides were nearly parallel, he got two priſms with very ſmall refracting angles; and rubbing them together, when they were joined ſo as to form a parallelopiped, the colours appeared with a ſurpriſing luſtre at the places of contact, owing, he did not doubt, to the ſeparation of the rays of light by the priſm. In this caſe, differently coloured ovals appeared, but the plate of gold in them was much whiter, and only appeared yellow about its edges. The plate having a black ſpot in its centre, was bordered by a deep purple. He could not perceive any violet by his naked eye, but it might be perceived by the help of a lens with a weak light. It appeared in a very ſmall quantity at the confines of the purple and the blue, and ſeemed to him to be only a mixture of theſe two colours. It was very viſible in each of the coloured rings by inclining the glaſſes to the light of the moon. Next to the purple and violet appeared blue, orange, red tinged with purple, light green, and faint purple. The other rings appeared to the naked eye to conſiſt of nothing but faint reds and greens; and they were ſo ſhaded that it was not eaſy to mark their terminations. That the order of theſe may be compared with Newton's, he gives a view of both in the following table:

	Order of the Colours in the Plane Glaſſes.	*Order of the Colours in Newt. Object Glaſſes.*
Order I.	Black ſpot	Black
	Whitiſh oval	Blue
	Yellow border	White
	Deep purple	Yellow
		Red
Order II.	Blue	Violet
	Orange	Blue
	Purple	Green
Order III.	Greeniſh blue	Yellow
	Yellow green	Red
	Purple red	Purple
		Blue
		Green
Order IV.	Green	Yellow
	Red	Red
Order. V.	Faint green	Green
	Faint red	Red
Order VI.	Weak green	Greeniſh blue
	Light red	Red
Order VII.	Very faint green	Greeniſh blue
	Very faint red	Red
		Greeniſh blue
		Pale red.

“ When theſe coloured glaſſes were ſuſpended over the flame of a candle, the colours diſappeared ſuddenly, though the glaſſes ſtill continued to adhere to one another, when they were parallel to the horizon. When they were ſuffered to cool, the colours returned by degrees to their former places, in the order of the preceding table.

“ After this the Abbé took two plates much thicker than the former, in order to obſerve at his leiſure the action of fire upon the matter which he ſuppoſed to produce the colours; and obſerved, that as they grew warm, the colours retired to the edges of the glaſſes, and there became narrower and narrower till they were reduced to imperceptible lines. Withdrawing the flame, they returned to their place. This experiment he continued till the glaſſes were bent by the violence of the heat. It was pleaſant, he ſays, to obſerve theſe colours glide over the ſurface of the glaſs as they were purſued by the flame.

“ At the firſt our author had no doubt but that theſe colours were owing to a thin plate of air between the glaſſes, to which Newton has aſcribed them: but the remarkable difference in the circumſtances attending thoſe produced by the flat pieces, and thoſe produced by the object-glaſſes of Newton, convinced him that the air was not the cauſe of this appearance. The colours of the flat plates vaniſhed at the approach of flame, but thoſe of the object-glaſſes did not. He even heated the latter till that which was next the flame was cracked by the heat, before he could obſerve the leaſt dilatation of the coloured rings. This difference was not owing to the plane glaſſes being leſs compreſſed than the convex ones; for though the former were compreſſed ever ſo much by a pair of forceps, it did not in the leaſt hinder the effect of the flame.

“ Afterwards he put both the plane glaſſes and the convex ones into the receiver of an air pump, ſuſpending the former by a thread, and keeping the latter compreſſed

preffed by two ftrings; but he obferved no change in the colours of either of them in the moft perfect vacuum he could make.

" Notwithftanding thefe experiments feemed to be conclufive againft the hypothefis of thefe colours being formed by a plate of air, the Abbé frankly acknowledges, that the air may adhere fo obftinately to the furface of the glaffes as not to be feparated from them by the force of the pump; which, indeed, is agreeable to other appearances: but the following experiments of our author make it ftill more improbable that the air fhould be the caufe of thefe colours.

" To try the utmoft effect of heat upon thefe coloured plates, after warming them gradually, he laid them upon burning coals; but though they were nearly red, yet when he rubbed them together by means of an iron rod, he obferved the fame coloured circles and ovals as before. When he ceafed to prefs upon them, the colours feemed to vanifh; but when he repeated the friction, they returned, and continued till the pieces of glafs began to be red hot, and their furfaces to be united by fufion.

" When the outward furface of one of his plates of glafs was quickfilvered, none of thefe colours were vifible, though the glaffes continued to adhere with the fame force. This he afcribed to the ftronger impreffion made on the eye by the greater quantity of light reflected from the quickfilver.

" Judging from the refemblance between his experiments and thofe of Sir Ifaac Newton, that the colours were owing to the thicknefs of fome matter, whatever that was, interpofed between the glaffes, the Abbé, in order to verify his hypothefis, tried the experiment on thicker fubftances. He put between his glaffes a little ball of fuet, about a fourth of a line in diameter, and preffed it between the two furfaces, warming them at the fame time, in order to difperfe the fuet; but though he rubbed them together as before, and ufed other foft fubftances befides fuet, his endeavours to produce the colours had no effect. But, rubbing them with more violence in a circular manner, he was furprifed on looking at a candle through them, to fee it furrounded with two or three concentric rings, very broad, and with very lively delicate colours; namely, a red inclining to a yellow, and a green inclining to that of an emerald. At that time he obferved only thefe two colours; but continuing the friction, the rings affumed the colours of blue, yellow, and violet, efpecially when he looked through the glaffes on bodies directly oppofed to the fun. If, after having rubbed the glaffes, the thicknefs was confiderably diminifhed, the colours grew weaker by tranfmitted light, but they feemed to be much ftronger by reflection, and to gain on one fide what they loft on the other.

14
Newtonian hypothefis oppofed.

" Our author was confirmed in his opinion, that there muft be fome error in Newton's hypothefis, by confidering, that, according to his meafures, the colours of the plates varied with the difference of a millionth part of an inch; whereas he was fatisfied that there muft have been much greater differences in the diftance between his glaffes, when the colours remained unchanged.

" If the colour depended upon the thicknefs only, he thought that the matter interpofed between the glaffes ought to have given the fame colour when it was reduced to a thin plate by fimple fufion as well as by friction, and that, in rubbing two plates together, warming them at different times, and compreffing them with a confiderable force, other colours would have appeared befides thofe above mentioned.

" Thefe circumftances made him fufpect, that the different thickneffes of the fubftance interpofed between the glaffes ferved only to make them more or lefs tranfparent; which was an effential condition in the experiment; and he imagined that the friction diffufed over the furface of the thin fubftance a kind of matter on which the colours are formed by reflected light; for when he held the plates (which gave the colours when the fuet was between them) over the flame of a fmall candle, the colours fled with great precipitation, and returned to their place without his being able to perceive the leaft alteration in the fuet.

" He was confirmed in his conjectures, by frequently obferving, that when the glaffes were feparated, at the moment the colours difappeared, they were covered with the fame greafy matter, and that it feemed to be in the very fame ftate as when they were feparated without warming. Befides, having often repeated the fame experiment with different kinds of matter, he found that the degree of heat that difperfed the colours was not always fufficient to melt it; which difference was more fenfible in proportion as the matter interpofed was made thinner.

" Inftead of the fuet, he fometimes made ufe of Spanifh wax, refin, common wax, and the fediment of urine. He began with Spanifh wax, on account of its remarkable tranfparency in Mr Haukfbee's electrical experiments; but he had much difficulty in making it fufficiently thin by friction, being often obliged to warm his glaffes, to feize the moment of fufion, which continued but a fhort time, and to hazard the burning of his fingers.

" The experiment at length fucceeding, the Spanifh wax appeared with its opacity and natural colour when it reflected the light, but they both difappeared in the tranfmitted light. He obferved the fame rings in it as in the fuet; and indeed he could perceive but little difference between the colour of fuet, Spanifh wax, common wax, or refin; except that this laft fubftance did not make the colours fo vivid, on account of the too great tranfparency of its particles.

" The fediment of urine had fomething more particular in its appearance, as its colours were more lively. Holding it above the flame, its colour difappeared; and keeping it in that fituation, there were formed, upon its furface, ramifications, like thofe of the hoar froft, which difappeared as the glaffes grew cold. There were the fame ramifications both upon the fuet and the wax, but they were not fo confiderable. The glaffes which had Spanifh wax and refin between them adhered with fo much force, that they could not be feparated without the help of fire; and when they began to grow warm, they feparated with a noife like that of glafs breaking in the fire, though the glaffes were not broken, and the matter between them was not melted.

" Separating the glaffes which he firft ufed very fuddenly,

ſuddenly, he obſerved upon their ſurface very thin vapours, which formed different colours, but preſently vaniſhed altogether.

"To try the effect of vapour, he breathed upon one of his plates of glaſs, and obſerved that the vapours which adhered to the glaſſes ſometimes formed, before they were entirely diſperſed, a ſurpriſing variety of colours. This experiment, he obſerves, does not always ſucceed at the firſt trial. The glaſs muſt be breathed upon ſeveral times, and care muſt be taken to wipe it every time with one's hand, both to take off the moiſture, and alſo to make upon the glaſs a kind of furrows, which contribute very much to the variety of colours, by making inequalities in the thickneſſes of the vapours. It is neceſſary alſo, that the glaſſes on which theſe experiments are made have no quickſilver upon them.

"When the particles of water which formed this vapour were too thick to exhibit theſe colours, he ſtruck them ſeveral times with his pencil, in order to attenuate them; and then he ſaw an infinity of ſmall coloured threads which ſucceeded one another with great rapidity.

"Putting a drop of water between two pieces of common glaſs, he obſerved that the compreſſion of them produced no colour; but if, while they were compreſſed, the water was made to paſs from one place to another, it left behind it large ſpots, red, yellow, green, purple, &c. and the ſpots aſſumed different colours with a ſurpriſing rapidity, and preſented to the eye a moſt beautiful variety of ſhades.

"In order to determine with greater certainty whether they were vapours that cauſed the colours in his firſt obſervations, he firſt breathed upon one of his plates of glaſs, and then rubbed them againſt one another, when the colours appeared in the ſame order as before, but darker, and diſperſed in confuſion in the places occupied by the vapours: but when he made uſe of fire, to diſſipate the watery particles, the colours reſumed their luſtre.

"Newton, having introduced a drop of water between his two object-glaſſes, obſerved, that in proportion as the water inſinuated itſelf between the glaſſes, the colours grew fainter, and the rings were contracted: and aſcribing theſe colours to the thickneſs of the plate of water, as he aſcribed the former to that of the plate of air, he meaſured the diameters of the coloured rings made by the plate of water, and concluded that the intervals between the glaſſes at the ſimilar rings of theſe two mediums were nearly as three to four; and thence he inferred, that in all caſes, theſe intervals would be as the ſines of the refractions of theſe mediums.

"The Abbé Mazeas, in order to aſſure himſelf whether, agreeable to this rule, the coloured rings of his glaſſes depended upon the thickneſs of the water only, dipped one of the edges of his coloured glaſſes in a veſſel of water, having taken care to wipe and warm them well, before he produced his colours by friction. The water was a conſiderable time in riſing as high as the glaſſes; and in proportion as it aſcended, he perceived a very thin plate of water, which ſeemed to paſs over the matter which he thought produced the colours, without mixing with it; for beyond this plate of water, he ſtill perceived the colours in the ſame place and order, but deeper and darker; and holding the glaſſes above the flame of a candle, he ſaw the colours go and come ſeveral times as he moved them nearer to or farther from the flame. He then moiſtened both the glaſſes more than before; and rubbing them as uſual, he always ſaw the ſame appearance; and ſeizing the moment when the colours had diſappeared to ſeparate the glaſſes, he always found that they were wet. On this account, he thought that it could not be the water on which the colour depended, but ſome ſubſtance much more ſenſible to heat. He alſo thought that theſe coloured rings could not be owing to the compreſſion of the glaſſes; or that, if this circumſtance did contribute any thing to them, it ſerved rather to modify than to generate them.

15 M. du Tour's obſervations.

"M. du Tour gave particular attention to the preceding obſervations of the Abbé Mazeas. He repeated the experiments with ſome variation of circumſtances, particularly comparing them with thoſe of Sir Iſaac Newton. He is ſo far from ſuppoſing a plate of air to be neceſſary to the formation of theſe coloured rings, that he thinks the reaſon of their not appearing between the flat plates of glaſs is the adhering of the air to their ſurfaces; and that mere preſſure is not ſufficient to expel it; except, as the Abbé Mazeas obſerved, the rings had before been made in the ſame place; in which caſe, ſimple appoſition without friction is ſufficient; the air, probably, not having had time to apply itſelf ſo cloſely to the ſurface of the glaſs. The contact of ſome other ſubſtances, M. du Tour obſerves, is not ſo prejudicial in this experiment as that of air; for he found, that, if he only gave the plates a ſlight coating of any kind of greaſe, the rings would appear without friction. Alſo dipping them ſlightly in water, or wiping them with his finger, would anſwer the ſame purpoſe. He verified his conjectures by means of the air-pump: for, dipping two pieces of glaſs in water, one of which had been wiped, and the other not, the former appeared to have no bubbles adhering to it when the air was exhauſted, whereas the other had.

"When one of the glaſſes is convex, our author obſerves, that the particles of air may more eaſily make their eſcape by preſſure only; whereas their retreat is in a manner cut off when they are compreſſed between two flat ſurfaces. The air-pump, he found, was not able to detach theſe particles of air from the ſurfaces to which they adhere; leaving theſe flat plates for a conſiderable time in an exhauſted receiver, was not ſufficient to prepare them ſo well for the experiment as wiping them.

16 Experiments on colours by reflection.

"Beſides the obſervations on the colours of thin plates, it has been ſeen that Sir Iſaac Newton imagined he could account for the colours exhibited by thick ones in ſome caſes in a ſimilar manner; particularly in thoſe curious experiments in which he admitted a beam of light through a hole in a piece of paſteboard, and obſerved the rings of colours reflected back upon it by a concave glaſs mirror of equal thickneſs in all places. Theſe experiments were reſumed, and happily purſued by the Duke de Chaulnes, who aſcribed theſe colours to the inflection of light*. Chance led the duke to obſerve, that when the nearer ſurface of the glaſs mirror was clouded by breathing upon it,

* See Optics.

ſo

ſo as lightly to tarniſh it, a white diffuſed and vivid light was ſeen upon the paſteboard, and all the colours of the rings became much ſtronger, and more diſtinct. This appearance he made conſtant by moiſtening the ſurface of the mirror with a little milk and water, and ſuffering it to dry upon it.

"In all his experiments upon this ſubject, he found, that when the rays fell converging on the ſurface of the mirror, the rings were hardly viſible; when they fell parallel upon it, as they muſt have done in all the experiments of Newton, they appeared ſufficiently diſtinct; but when, by means of a convex lens placed in the hole of the window, they were made to diverge from the centre of the ſphere to which the mirror was ground, ſo that they fell perpendicularly on the ſurface of the mirror, the colours were as vivid as he could make them. In this caſe he could remove the reflected image to a great diſtance from the hole, without making the rings diſappear; and he could plainly perceive them to ariſe from their central ſpots, which changed their colours ſeveral times.

"The effect of tarniſhing the mirror convinced him, that theſe coloured rings depended on the firſt ſurface of the mirror; and that the ſecond ſurface, or that which reflected them after they had paſſed the firſt, only ſerved to collect them and throw them upon the paſteboard in a quantity ſufficient to make them viſible; and he was confirmed in his ſuppoſition by the following experiments.

"He took a plano-convex object-glaſs, of ſix feet focus, and placed it ſix feet from the paſteboard with its convex ſide towards it. By this means the rays which fell upon that ſurface, after being refracted there, were tranſmitted through the thickneſs of the glaſs, parallel to one another, and fell perpendicularly on the plane ſurface that reflected them, and, in their return, would be collected upon the paſteboard. In theſe circumſtances the rings appeared very diſtinct after he had tarniſhed the convex ſurface, which in this poſition was next to the light.

"Turning the ſame glaſs the contrary way, ſo that the plane ſurface was towards the paſteboard, he could perceive none of the rings at the diſtance of ſix feet; but they were viſible at the diſtance of three feet; becauſe at that diſtance the ſecond ſurface reflected the rays by its concavity directly towards the paſteboard.

"Theſe two experiments demonſtrate the uſe of the ſecond ſurface of the mirror, and ſhow the manner of placing it to moſt advantage. Thoſe that follow ſhow the uſe of the firſt ſurface with reſpect to theſe rings; and he was led to make them by the caſual obſervation above mentioned.

"Newton, he obſerves, had remarked, that when he made uſe of a mirror of the ſame focus with the firſt he had uſed, but of twice the thickneſs, he found the diameter of the rings much ſmaller than before. This obſervation the duke thought favourable to his own concluſions; for if theſe rings depend upon the firſt ſurface, the nearer it is to the ſecond, which only reflects the ray tranſmitted from it, the larger they ought to appear upon the paſteboard.

"To aſcertain this fact, he thought of making uſe of two moveable ſurfaces; and to make uſe of a micrometer to meaſure the diſtance between them with exactneſs. For this purpoſe he took a metallic mirror belonging to a reflecting teleſcope, being part of a ſphere of ten feet radius; and he fixed it firm upon a foot in which was a groove that carried a light frame, to which was faſtened a thin piece of talk tarniſhed with milk and water. The frame that ſupported the piece of talk could either be brought into contact with the mirror, or be removed to the diſtance of eight or nine inches from it, and the micrometer ſhowed to the utmoſt exactneſs the leaſt motion of the frame.

"Having placed this mirror ten feet from the paſteboard, that is, at the diſtance of the radius of its own ſphere, he obſerved the rings to appear very diſtinct: the form of his mirror being very true: but the diameter of the rings upon the paſteboard varied with the diſtance of the talk from the mirror: ſo that they were very large when the talk was near the mirror, and very ſmall when it was placed at the diſtance of ſeven or eight inches.

"Theſe experiments proved that the rings were formed by the firſt ſurface, and reflected by the ſecond; but it ſtill remained to be determined in what manner they were formed. He imagined that the ſmall pencils of rays that were tranſmitted through the pores of the glaſs, or any other tranſparent ſubſtance, might ſuffer a kind of inflection, which might change the cylinder which they formed into a truncated cone, either by means of their different degrees of inflexibility, or by the different diſtances at which they paſs by the edges of the ſmall hole, through which they are tranſmitted. Purſuing this idea, he thought of making uſe of ſome body, the pores of which were of a known and determined ſhape. Inſtead, therefore, of the piece of talk, he placed a piece of fine linen in the above-mentioned frame, ſtretching it as even as poſſible, to make the pores formed by the threads more exact, and more permeable by the light; and he ſoon found, with great pleaſure, that his conjecture was verified; for inſtead of the circular rings which he had before, they were now manifeſtly ſquare, though their angles were a little rounded; and they were coloured as the others, though the light was not very vivid, on account of the quantity that was ſtopped by the muſlin.

"When, inſtead of the muſlin, he ſtretched acroſs his frame fine ſilver wires exactly parallel, at the diſtance of about three quarters of a line, or a whole line from one another, without any other wires acroſs them; inſtead of the rings which he had ſeen before, there was nothing upon the paſteboard but a gleam of white light, divided by many ſmall ſtreaks, coloured in a very vivid manner, and in the ſame manner as the rings."

17
Another theory of colours.

Thus we have another hypotheſis of the formation of colours, namely, by the inflection of light in its paſſage out from between the ſolid and impenetrable particles of which bodies are compoſed. It is, however, very difficult, upon the hypotheſis either of Sir Iſaac Newton, or that of the duke de Chaulnes, to give a reaſon why bodies that are not entirely white, ſhould not appear variouſly coloured. For it appears from Sir Iſaac Newton's experiments, that plates of different denſity are capable of exhibiting the ſame colours; and that where a plate is continually varying in denſity, it will produce all the colours. Now it is evident,

evident, that the plates of which we ſuppoſe all natural bodies to be compoſed, muſt be ſimilar to one that is perpetually varying in its thickneſs; for ſuppoſing the plates of which any ſubſtance is compoſed to be of any determinate thickneſs, 9 millionth parts of an inch for inſtance; ſuch of the rays as are reflected from this plate will be red. But if any of them penetrate to the depth of $11\frac{1}{6}$ of theſe parts, they will be reflected by a violet colour, &c. and thus muſt alloy and obſcure the red; and ſo of others. If we ſuppoſe the colours to be produced by inflection, it will be equally difficult to account for ſome particular rays being inflected and others not; ſeeing we obſerve that all of them are capable of being inflected by every ſubſtance whatever, when they paſs very near it. In ſome caſes, too, colours are produced when the light is neither refracted nor inflected, as far as we can judge; and this ſeems to obſcure the theory of chromatics more than any thing we have yet mentioned.

As the experiments we are now about to mention are of the greateſt importance, and in direct terms contradict one of Sir Iſaac Newton's, we ſhall give a full account of them, from Prieſtley's Hiſtory of Viſion, &c. with his remarks thereon.

18
One of Sir Iſaac Newton's experiments found to be erroneous.

The experiment in queſtion is the eighth of Newton's ſecond book of Optics: "He (Sir Iſaac Newton) found, he ſays, that when light goes out of air through ſeveral contiguous refracting mediums, as through water and glaſs, and thence goes out again into air, whether the refracting ſurfaces be parallel or inclined to one another, that light, as often as, by contrary refractions, it is ſo corrected, that it emerges in lines parallel to thoſe in which it was incident, continues ever after to be white; but if the emergent rays be inclined to the incident, the whiteneſs of the emerging light will, by degrees, in paſſing on from the place of emergence, become tinged at its edges with colours. This he tried by refracting light with priſms of glaſs, placed within a priſmatic veſſel of water.

"By theorems, deduced from this experiment, he infers, that the refraction of the rays of every ſort, made out of any medium into air, are known by having the refraction of the rays of any one ſort; and alſo, that the refraction out of one medium into another is found as often as we have the refractions out of them both into any third medium.

"On the contrary, a Swediſh philoſopher (M. Klingenſtierna) obſerves *, that in this experiment, the rays of light, after paſſing through the water and the glaſs, though they come out parallel to the incident rays, will be coloured; but that the ſmaller the glaſs priſm is, the nearer will the reſult of it approach to Newton's deſcription.

* *Swed. Abhand.* vol. xvi. p. 300.

"This paper of M. Klingenſtierna, being communicated to Mr Dollond by M. Mallet, made him entertain doubts concerning Newton's report of the reſult of his experiment, and determined him to have recourſe to experiments of his own.

"He therefore cemented together two plates of parallel glaſs, at their edges, ſo as to form a priſmatic veſſel when ſtopped at the ends or baſes; and the edge being turned downwards, he placed in it a glaſs priſm with one of its edges upwards, and filled up the vacancy with clear water; ſo that the refraction of the priſm was contrived to be contrary to that of the water, in order that a ray of light, tranſmitted through both theſe refracted mediums, might be effected by the difference only between the two refractions. As he found the water to refract more or leſs than the glaſs priſm, he diminiſhed or increaſed the angle between the glaſs plates, till he found the two contrary refractions to be equal, which he diſcovered by viewing an object through this double priſm. For when it appeared neither raiſed nor depreſſed, he was ſatisfied that the refractions were equal, and that the emergent rays were parallel to the incident.

"Now, according to the prevailing opinion, he obſerves, that the object ſhould have appeared through this double priſm in its natural colour; for if the difference of refrangibility had been in all reſpects equal, in the two equal refractions, they would have rectified each other. But this experiment fully proved the fallacy of the received opinion, by ſhowing the divergency of the light by the glaſs priſm to be almoſt double of that by the water; for the image of the object, though not at all refracted, was yet as much infected with priſmatic colours as though it had been ſeen through a glaſs wedge only whoſe angle was near 30 degrees.

19
Colours produced without refraction or reflection.

"This experiment is the very ſame with that of Sir Iſaac Newton above mentioned, notwithſtanding the reſult was ſo remarkably different: but Mr Dollond aſſures us, that he uſed all poſſible precaution and care in his proceſs; and he kept his apparatus by him, that he might evince the truth of what he wrote, whenever he ſhould be properly required to do it.

"He plainly ſaw, however, that if the refracting angle of the water-veſſel could have admitted of a ſufficient increaſe, the divergency of the coloured rays would have been greatly diminiſhed, or entirely rectified; and that there would have been a very great refraction without colour, as he had already produced a great diſcolouring without refraction; but the inconveniency of ſo large an angle as that of the priſmatic veſſel muſt have been, to bring the light to an equal divergency with that of the glaſs priſm, whoſe angle was about 60°, made it neceſſary to try ſome experiments of the ſame kind with ſmaller angles.

"Accordingly he got a wedge of plate-glaſs, the angle of which was only nine degrees; and, uſing it in the ſame circumſtances, he increaſed the angle of the water-wedge, in which it was placed, till the divergency of the light by the water was equal to that by the glaſs; that is, till the image of the object, though conſiderably refracted by the exceſs of the refraction of the water, appeared nevertheleſs quite free from any colours proceeding from the different refrangibility of the light.

20
Defences of Sir Iſaac.

"Notwithſtanding it evidently appeared, I may ſay to almoſt all philoſophers, that Mr Dollond had made a real diſcovery of ſomething not comprehended in the optical principles of Sir Iſaac Newton, it did not appear to ſo ſenſible a man, and ſo good a mathematician as Mr Murdoch is univerſally acknowledged to be. Upon this occaſion he interpoſed in the defence, as he imagined, of Sir Iſaac Newton; maintaining, that Mr Dollond's poſitions, which he ſays, he knows not by what miſhap have been deemed paradoxes in Sir

Sir Iſaac's theory of light, are really the neceſſary conſequences of it. He alſo endeavours to ſhow, that Sir Iſaac might not be miſtaken in his account of the experiment above mentioned. But admitting all that he advances in this part of his defence, Newton muſt have made uſe of a priſm with a much ſmaller refracting angle than, from his own account of his experiments, we have any reaſon to believe he ever did make uſe of.

"The fact probably was, that Sir Iſaac deceived himſelf in this caſe, by attending to what he imagined to be the clear conſequences of his other experiments; and though the light he ſaw was certainly tinged with colours, and he muſt have ſeen it to be ſo, yet he might imagine that this circumſtance aroſe from ſome imperfection in his priſms, or in the diſpoſition of them, which he did not think it worth his while to examine. It is alſo obſervable, that Sir Iſaac is not ſo particular in his deſcription of his priſms, and other parts of his apparatus, in his account of this experiment, as he generally is in other caſes, and therefore probably wrote his account of it from his memory only.

P. 804. "Much has been ſaid on this experiment; and it is thought very extraordinary, that a man of Sir Iſaac's accurate attention ſhould have overlooked a circumſtance, the effect of which now appears to be ſo conſiderable. But it has happily occurred to Mr Mitchel, that, as Sir Iſaac Newton obſerves, he uſed to put ſaccharum ſaturni into his water to increaſe its refractive power, the lead, even in this form, might increaſe the diſſipative refraction, as it does in the compoſition of glaſs; and if ſo, that this would account for Newton's not finding his diſſipative power of water leſs than that of the glaſs priſms, which he otherwiſe ought to have done, if he had tried the experiment as he ſaid he did.

"Accordingly he included a priſm of glaſs in water, as highly impregnated with ſaccharum ſaturni as it would bear, the proportion of ſaccharum to water being about as 5 to 11. When the image, ſeen through the water (ſo impregnated) and a glaſs priſm, was in its natural place, it ſtill was coloured, though very little: he thought not more than a fourth part as much as when ſeen through the plain water, and the priſm in its natural place; ſo that he had no doubt, but that, if his priſm had had a little leſs of the diſperſing power, its errors would have been perfectly corrected."

21 Mr Delaval's experiments on the colours of opaque bodies.

Beſides the experiments of Mr Delaval above related, and which were made on the colours of tranſparent bodies, he has lately publiſhed an account of ſome made upon the permanent colours of opaque ſubſtances; the diſcovery of which muſt be of the utmoſt conſequence in the arts of colour-making and dyeing. Theſe arts, he obſerves, were in very remote ages carried to the utmoſt height of perfection in the countries of Phœnicia, Egypt, Paleſtine, India, &c. and that the inhabitants of theſe countries alſo excelled in the art of imitating gems, and tinging glaſs and enamel of various colours. The colours uſed in very ancient paintings were as various as thoſe now in uſe, and greatly ſuperior both in beauty and durability. The paints uſed by Apelles were ſo bright, that he was obliged to glaze his pictures with a dark coloured varniſh, leſt the eye ſhould be offended by their exceſſive brightneſs; and even theſe were inferior to what had been uſed among the ancient Egyptians. Pliny complains that the art of painting was greatly decayed in his time; and the moderns were not furniſhed with any means of retrieving the art, until they began to avail themſelves of experimental obſervations.

22 Theſe colours depend chiefly on the diviſion of the colouring particles.

The changes of colour in permanently coloured bodies, our author obſerves, are produced by the ſame laws which take place in tranſparent colourleſs ſubſtances; and the experiments by which they can be inveſtigated conſiſt chiefly of various methods of uniting the colouring particles into larger, or dividing them into ſmaller maſſes. Sir Iſaac Newton made his experiments chiefly on tranſparent ſubſtances; and in the few places where he treats of others, acknowledges his deficiency of experiments. He makes the following remark, however, on thoſe bodies which reflect one kind of light and tranſmit another, viz. that "If theſe glaſſes or liquors were ſo thick and maſſy that no light could get through them, he queſtioned whether they would not, like other opaque bodies, appear of one and the ſame colour in all poſitions of the eye; though he could not yet affirm it from experience." It was the opinion of this great philoſopher, that all coloured matter reflects the rays of light, ſome reflecting the more refrangible, and others the leſs refrangible rays more copiouſly; and that this is not only a true reaſon of theſe colours, but likewiſe the only reaſon. He was likewiſe of opinion, that opaque bodies reflect the light from their interior ſurface by ſome power of the body evenly diffuſed over and external to it. With regard to tranſparent-coloured liquors, he expreſſes himſelf in the following manner: "A tranſparent body, which looks of any colour by tranſmitted light, may alſo look of the ſame colour by reflected light; the light of that colour being reflected by the farther ſurface of that body, or by the air beyond it: and then the reflected colour will be diminiſhed, and perhaps ceaſe, by making the body very thick, and pitching it on the back ſide to diminiſh the reflection of its farther ſurface, ſo that the light reflected from the tinging particles may predominate. In ſuch caſes, the colour of the reflected light will be apt to vary from that of the light tranſmitted."

To inveſtigate the truth of theſe opinions, Mr Delaval entered upon a courſe of experiments with tranſparent coloured liquors and glaſſes, as well as with opaque and ſemi-tranſparent bodies. From theſe he diſcovered ſeveral remarkable properties of the colouring matter; particularly, that in tranſparent coloured ſubſtances it does not reflect any light; and when, by intercepting the light which was tranſmitted, it is hindered from paſſing through ſuch ſubſtances, they do not vary from their former colour to any other, but become entirely black (A).

This incapacity of the colouring particles of tranſparent

(A) Here our author obſerves, that he makes uſe of the word *colour* only to expreſs thoſe called *primary*; ſuch

23
No light reflected by the colouring particles.

parent bodies to reflect light, being deduced from very numerous experiments, may therefore be held as a general law. It will appear the more extensive, if we consider, that, for the most part, the tinging particles of liquors or other transparent substances are extracted from opaque bodies; that the opaque bodies owe their colours to those particles, in like manner as the transparent substances do; and that by the loss of them they are deprived of their colours.

24
Apparatus for making those experiments.

For making his experiments, Mr Delaval used small phials of flint-glass, whose form was a parallelopiped, and their height, exclusive of the neck, about two inches, the base about an inch square, and the neck two inches in length. The bottom and three sides of each of these phials were covered with a black varnish; the cylindrical neck, and the anterior side, except at its edges, being left uncovered. He was careful to avoid any crevices in the varnish, that no light might be admitted except through the neck or anterior side of the phials.

In these experiments it is of importance to have the phials perfectly clean; and as many of the liquors are apt to deposit a sediment, they ought to be put into the phials only at the time the experiments are to be made. The uncovered side of the phials should not be placed opposite to the window through which the light is admitted; because in that situation the light would be reflected from the farther side of the phial; and our author observes, that smooth black substances reflect light very powerfully. But as it is a principal object in the experiment, that no light be transmitted through the liquor, this is best accomplished by placing the uncovered side of the phial in such a situation that it may form a right angle with the window.

25
The colouring matter only shows itself by transmitted light.

With these precautions, our author viewed a great number of solutions, both of coloured metallic salts and of the tinging matter of vegetables; universally observing, that the colour by reflection was black, whatever it might be when viewed by transmitted light. If these liquors, however, are spread thin upon any white ground, they appear of the same colour as when viewed by transmitted light; but on a black ground they afford no colour, unless the black body be polished; in which case the reflection of the light through it produces the same effect as transmission.

The experiments with tinged glasses were in many respects analogous to those with transparent-coloured liquors. For these he made several parcels of colourless glasses, principally using one composed of equal parts of borax and white sand. The glass was reduced to powder, and afterwards ground, together with the ingredients by which the colours were imparted. "This method (says he) of incorporating the tinging particles is greatly preferable to mixing them with the raw materials; and the glasses thus composed excel most others in hardness, being scarcely inferior in lustre to real gems."

The result of all the experiments made in this manner was, that when matter is of such thinness, and the tinge so diluted, that light can be transmitted through it, the glasses then appear vividly coloured; but when they are in larger masses, and the tinging matter is more densely diffused through them, they appear black; for these, as well as the transparent-coloured liquors, show their colour by transmission. The following experiments were made with a view to determine the proportion of tinging matter which produces colour or blackness.

26
Experiments to determine the proportion of tinging matter.

1. Glass was tinged green by adding to it $\frac{1}{60}$th of its weight of copper; and that whether the latter was used in its metallic or calcined state.

2. A blue glass was made by the addition of zaffre, a purple one by manganese, a red glass by gold, and yellow glasses by silver and calcined iron. A yellow glass resembling a topaz was likewise made by the addition of a small quantity of charcoal in powder. The same colour was likewise procured by the addition of wheat-flour, rosin, and several other inflammable matters. Small pieces of each of these glasses being ground by a lapidary, resembled gems of their different colours.

3. Having formed pieces of such glasses about two inches thick, he inclosed them in black cloth on all sides, except their farther and anterior surfaces. In this situation each of them showed a vivid colour when light was transmitted through them; but when the posterior surface was likewise covered with the cloth to prevent this transmission, no other colour than black was exhibited by any of them.

4. When plates of transparent-coloured glass, somewhat thicker than common window-glass, were made use of, they always exhibited their colours by transmitted light.

5. On intercepting the light transmitted through these coloured plates, they as constantly appeared black when placed in such a direction as to form a right angle with the window.

From these phenomena Mr Delaval deduced the following observations: 1. That the colouring particles do not reflect any light. 2. That a medium, such as Sir Isaac Newton has described, is diffused over both the anterior and farther surfaces of the plates, whereby objects are equally and regularly reflected as by a mirror. Hence, when it is said that light is reflected by the surface of any substance, it should be understood from this expression, that the reflection is effected by the medium diffused over its surface.

27
On the reflection of the light of a candle by coloured glasses.

6. When a lighted candle is placed near one of those coloured plates, the flame is reflected by the medium which is diffused over the anterior surface. The image thus reflected entirely resembles the flame in size and colour; being scarcely diminished, and not in the least tinged by the coloured glass.

7. If the plate be not so intensely coloured, or so massy, as to hinder the transmission of the light of the candle, there appears a secondary image of the flame, which is reflected by the medium contiguous to the farther surface of the glass; and as the light thus reflected passes through the coloured glass, it is tinged very vividly.

8. When

---

such a mixture of them as does not compose whiteness, or any of the gradations between white and black; such as are called by Sir Isaac Newton, gray, dun, or russet brown.

8. When the glafs ufed in this experiment is of a green colour, the image of the flame is always of a bright green; and when glaffes of other colours are ufed, that of the fecondary flame is always the fame with that of the glafs.

9. The fecondary image is lefs than that reflected from the anterior furface. This diminution is occafioned by the lofs of that part of the light which is abforbed in paffing through the coloured glafs. For whenever any medium tranfmits one fort of rays more copioufly than the reft, it ftops a great part of the differently coloured rays. Much more light alfo is loft in paffing through coloured than tranfparent fubftances. In making thefe obfervations, it is proper to choofe coloured plates of glafs which are not in every part of an equal thicknefs, that the fecondary image may not coincide with that reflected from the anterior furface, and be intercepted by it.

10. When the plates are fo thick, and fo copioufly coloured, that the light cannot penetrate to their farther furface, they appear intenfely black in whatever direction they are viewed, and afford no fecondary image, but only reflect, from their anterior furface, the flame, or any other objects that are oppofed to them. Thefe objects are reprefented in their own proper colours, and are as free from tinge as thofe reflected from quickfilvered glafs, or fpecula made of white metals.

Hence again it is manifeft, that the colouring particles do not poffefs any fhare of reflective power; for if they had any fhare in this reflection, they would certainly impart fome fhare of colour to the light they reflected. Hence alfo it appears, that tranfparent coloured bodies, in a folid ftate, poffefs no more reflective power than thofe in a fluid ftate.

28 Experiments on the pure colouring particles.

Our author next confiders the colouring particles themfelves, pure, and unmixed with other media. In order to procure maffes made up of fuch particles, feveral tranfparent coloured liquors were reduced to a folid confiftence by evaporation. By employing a gentle heat, the colouring matter may thus remain unimpaired; and is capable of having its particles again feparated by water or other liquids, and tinging them as before.

In this ftate the colouring particles reflect no light, and therefore appear uniformly black, whatever fubftance they have been extracted from. In the courfe of his experiments, Mr Delaval made ufe of the infufions of brazil wood, logwood, fuftic, turmeric, red faunders, alkanet, fap-green, kermes, and all the other tranfparent coloured liquors he had tried before, among which were infufions of red and yellow flowers, without obferving the leaft variation in the refult.

Some liquors are apt to become totally opaque by evaporation; the reafon of which may be the cryftallization of faline matters, or the coalefcence of the particles into maffes, differing confiderably in denfity from the menftrua in which they were diffolved. When this opacity takes place, our author has conftantly obferved, that they became incapable of entering the pores of wool, filk, or other matters of that kind, or of adhering to their furface; and confequently unfit for the purpofes of dyeing. This he fuppofes to arife from their increafed bulk; for the attractive force by which the particles cohere together is weakened in proportion as their bulk increafes; fo that the degree of magnitude of the colouring particles, which is effential to the capacity of liquors, is inconfiftent with the minutenefs requifite for dyeing. An inftance of this is given in an infufion of fuftic. Having infufed fome of this wood in fuch a quantity of water, that the latter was faturated with the colouring particles, he evaporated the liquor to a folid confiftence with an uninterrupted, but very gentle heat. During every part of the procefs the liquor continued tranfparent, and the folid extract yielded by it tranfmitted a yellow colour when fpread thin, but appeared black when thicker maffes were viewed. Having prepared another pint of this liquor, he evaporated half the water, and allowed the remainder to become cold. In this ftate it became turbid and opaque; on filtering, a tranfparent tincture paffed through, an opaque fecula remaining on the paper. This fecula did not adhere to the paper, but was eafily feparable from it: on being dried, it appeared white with a flight tinge of yellow; but was neverthelefs foluble in water, and by folution gave a liquid in all refpects fimilar to the original infufion. "From thefe circumftances (fays he) it appears that a given proportion of water, or a fufficient degree of heat, is requifite to the folution of the colouring particles of fuftic. And experience evinces that thofe particles which are too grofs to pafs through filtering paper, are incapable of entering the pores, or firmly cohering to the furface of bodies. Many ingredients, fuch as the colouring particles of logwood, kermes, and various other matters, are foluble in water in every proportion; and therefore their infufions are not fubject to become opaque or turbid during their evaporation. The folid extracts obtained by evaporation reflect no colour, but are black."

Our author alfo formed folid maffes by mixing a fmall quantity of drying oil with pigments which confift chiefly of colouring matter; as Pruffian blue, indigo, and fap green. Thefe paints likewife exhibit their refpective colours only by tranfmitted light, appearing entirely black when viewed by reflection. Inftances of blacknefs arifing from this denfity of the colouring matter, may be obferved in feveral kinds of fruits, as black currants, cherries, &c. for the juices of thefe appear red when fpread thin on a white ground, or otherwife viewed by tranfmitted light.

Mr Delaval's next attempt was to confider the action and properties of the colouring particles of opaque bodies themfelves, and the means by which thefe colours are produced. Here our author endeavours to prove, that thefe colours of opaque bodies appear on the fame principles as thofe already mentioned, which feem black when very denfe, but fhow their proper tinge when fpread thin upon a white ground. On this fubject the following experiments were made:

1. Grafs, and other green leaves of plants, were digefted in rectified fpirit of wine; by which means a tranfparent green tincture was obtained. One of the vials formerly mentioned being filled with this liquid, it was obferved to tranfmit a vivid green colour; but the other part of the tincture, which was contiguous to the uncovered fide of the vial, reflected no light, and therefore appeared black.

2. Having poured fome of the tincture into a China cup, the bottom was thereby made to look green, exactly

actly resembling the colour which had been extracted from the leaves.

3. After the colour had been totally extracted by the vinous spirit, the leaves remained apparently unaltered, either as to figure or texture; but were entirely white, or had their whiteness slightly tinged with brown.

4. Red, purple, and blue flowers, were also digested in spirit of wine, all of which yielded their colouring matter to the spirit, and became white by being deprived of it. From most of these flowers, however, the spirit acquired either no tinge at all, or only a very faint one; but when acidulated, it became red, and by the addition of an alkali appeared blue, purple, or green, according to the quantity of alkali, and the nature of the infusion. In these states, all of them, when viewed by transmitted light, or poured upon a white ground, showed their colours, but universally appeared black by reflection.

5. Red, purple, and blue flowers, were digested in water slightly acidulated with nitrous acid. Thus, red infusions were obtained, which, by saturation with sea-salt, might be preserved for many years.

6. The same liquors were changed green, blue, or purple, by the addition of an alkali: but here the case was the same as before; all of them yielding vivid colours by transmission, but none by reflection. In making this experiment, care must be taken to add the alkali very gradually; for if too much is put in at once to the red liquor, the immediate colours between the red and the green will be wanting. To half an ounce of the red infusion it is proper to add, at once, only the smallest quantity that can be taken upon the point of a pen; repeating this addition slowly, until each of the colours be produced.

7. The flowers, after having been repeatedly macerated in acidulated water, lost their colouring matter, and became white.

8. Yellow flowers also communicated their colours to water and to spirit of wine. The infusion and tinctures of these flowers were subjected to the same experiments as had been employed in the examination of the liquors already mentioned; and appeared yellow by transmitted light, but did not reflect any colour.

9. White paper, linen, &c. may be tinged of any of these colours, by dipping them in the infusions; and the consideration of the manner in which the colours are imparted to the linen, affords much insight into the manner in which natural colours are produced. It has already been observed, that, when the colouring matter of plants is extracted from them, the solid fibrous parts, thus divested of their covering, display their natural whiteness. White linen, paper, &c. are formed of such fibrous vegetable matter; which is bleached by dissolving and detaching the heterogeneous colouring particles. When these are dyed or painted with vegetable colours, it is evident that they do not differ in their manner of acting on the rays of light from natural vegetable bodies; both yielding their colours by transmitting, through the transparent coloured matter, the light which is reflected from the white ground. This white matter frequently exists, without any considerable mixture, in plants, while they are in a state of vegetation; as cotton, white flowers, the pith, wood, seeds, roots, and other parts of several kinds of vegetables. When decayed trees, &c. have been long exposed to the atmosphere, their coloured juices are sometimes so perfectly extracted, that the fibres appear white. This white matter is not distinct from the vegetable earth to which plants are reduced to burning. Mr Delaval has rendered ashes intensely white, by carefully calcining them, and afterwards grinding with a small proportion of nitre, and exposing them to such a degree of heat as would cause the nitre deflagrate with the remaining quantity of phlogiston. Lastly, the ashes were digested with muriatic acid, in order to dissolve the ferruginous matter diffused through them, and repeatedly washing the remainder in water. Mixing ashes thus purified with borax, and applying a vitrifying heat, an opaque enamel is obtained, remarkable for its whiteness.

29 How ashes may be made intensely white.

Hence it appears, that the earth which forms the substance of plants is white, and separable from that substance which gives to earth its peculiar colour; that whenever it is pure and unmixed, or diffused through colourless media, it shows its native whiteness; and is the only vegetable matter endowed with a reflective power. It may be discovered, however, by other means than that of burning: thus, roses may be whitened by exposing them to the vapour of burning sulphur: an effect which cannot be attributed to the sulphuric acid, but to the phlogiston contained in that vapour. This was proved to be the case, by exposing several kinds of red and purple flowers to the phlogistic vapour issuing from hepar sulphuris; and by this every one of them was whitened; their colour being afterwards restored by the addition of an acid either mineral or vegetable.

30 White earth of plants, the only substance in them that reflects the light.

"Thus (says Mr Delaval) it appears, that the colouring matter of the flowers is not discharged or removed, but only dissolved by carbonic acid; and thereby divided into particles too minute to exhibit any colour. In this state, together with the vegetable juice in which they are diffused, they form a colourless transparent covering, through which the white matter of the flowers is seen untinged. The colouring particles of plants consist principally of inflammable matter, and their solubility in carbonic acid, and union with it, are analogous to the action of other inflammable bodies upon each other. Thus, æther dissolves all essential and expressed oils, animal empyreumatic oils, and resins. Sulphur, camphor, and almost all substances abounding in phlogiston, are soluble in oils, ardent spirits, or other inflammable menstrua. The manner in which the red colour of vegetable flowers is restored, appears to be explicable from known chemical laws. When acids are applied to the whitened flowers, they unite with the phlogiston which the sulphur had communicated, and disengage it from the colouring particles; which, being thus extricated, resume their original magnitude and hue. A change of the same kind is also produced by fixed alkali, which, like the acids, has a strong attraction for phlogiston, always changes the whitened flowers to a blue, purple, or green colour.

31 Colouring matter dissolved by carbonic acid.

"In like manner, the action of the rays of light operates upon coloured bodies. Thus, dyed silk, or other substances of that kind, when exposed to the sun's

32 Colours destroyed by the light of the sun.

ſun's light, are deprived of their colour in every part on which the rays are allowed to act; whilſt thoſe preſerve their colour which are defended from the light by the folds of the cloth, or intervention of any opaque body. The colours thus impaired, may be reſtored, if acids are implied while the injury is recent; but they are afterwards apt to fly off, on account of that volatility which is conſtantly imparted by inflammable matter to any other with which it is united."

Our author now proceeds, at conſiderable length, to prove the identity of the ſolar light and carbonic acid; but as recent experiments have ſhown that theſe two are eſſentially diſtinct, we omit his argumentation upon this head. The error of his theory in this reſpect, however, does not in the leaſt affect the doctrine concerning colours above laid down: on the contrary, the lateſt experiments have determined, that carbonic acid in its groſſeſt form, viz. that of common charcoal, manifeſts a ſurpriſing power of whitening various ſubſtances; which, according to Mr Delaval's theory, proceeds from the power it has of diſſolving the colouring matter with which they are impregnated. This ſolvent power, according to our author, is manifeſt in many other inſtances beſides thoſe already mentioned. Silk is whitened by the carbonated vapours of ſulphur; and this operation does not appear to differ from the change effected on flowers by the ſame vapour. The light of the ſun is found to be a neceſſary and eſſential agent in bleaching linen, wax, and various other ſubſtances; ſome part of the colouring matter which impairs the whiteneſs of theſe bodies not yielding to any other ſolvent. Red flowers are whitened by the electric ſpark, of whoſe inflammable nature we cannot entertain the leaſt doubt; for the ſpark itſelf is a bright flame, and yields the ſame ſmell which all other carbonated matters impart. The electric ſpark, in like manner, changes the blue infuſion of turnſole to red (B). The effects which it produces on the turnſole, and on red flowers, do not differ from each other, except in degree only. For when vegetable matter is diſſolved, it is changed from blue to red; and, when farther diſſolved, it is divided into particles too minute to exhibit any colour.

33
How to diſtinguiſh the ſolutions made by carbone from thoſe made by acids.

Solutions effected by means of phlogiſton frequently are wrongly attributed to the operation of ſuppoſed acid menſtrua, as ſeveral kinds of ſubſtances are capable of being diſſolved indiſcriminately both by acids and phlogiſton. For the purpoſe of diſtinguiſhing, therefore, in any caſe between the action of the acid ſolvents and that of the inflammable menſtrua, it is proper to examine the nature of the matter by which either of theſe principles are furniſhed. It appears from various chemical proceſſes, that alkalies are rendered mild, and capable of cryſtallization, in proportion as they are united to carbone. The carbonated alkaline lixivium, when ſaturated, is perfectly mild; and by a ſlight evaporation is reduced to a concrete cryſtalline maſs, which does not deliqueſce or imbibe the leaſt moiſture from the air, and no longer retains any alkaline property. M. Beaume, by an elegant and ingenious experiment, has proved the preſence of carbone in mild alkalies, and has ſhown that their power of cryſtallizing depends on their union with that principle. He heated in a ſilver veſſel a lixivium of mild alkali, which imparted to the ſilver a covering or coating of inflammable matter, by which its ſurface was tarniſhed and became black. The lixivium was ſeveral times poured out of the ſilver veſſel, and after the ſurface of the metal had been freed from the tarniſh, the lixivium was replaced in it, and again heated, by which the tarniſh was renewed; and this was repeated till the lixivium no longer communicated any ſtain to the ſilver. The cauſticity of the lixivium was increaſed in proportion as it imparted its carbone to the ſilver; and at the end of the proceſs the alkali became perfectly cauſtic and incapable of cryſtallizing.

"From the preceding experiments (ſays he) it appears, that the colouring particles of flowers and leaves are ſoluble in acid, alkaline, and carbonated menſtrua. The other parts of vegetables conſiſt of materials ſimilar to thoſe which are contained in their flowers and leaves, and undergo the ſame changes from the ſame cauſes. Having extracted from logwood its colouring particles by repeatedly boiling it in water, the wood was thus deprived of its yellow colour, and aſſumed a brown hue ſimilar to that of oak wood. Some pieces of it thus deprived of its colour were then macerated in nitric acid; and after they had undergone the action of that acid, they were waſhed in a ſufficient quantity of water. The wood was thus reduced to whiteneſs."

34
Logwood affords only a yellow tincture with water.

Here our author obſerves, that though moſt authors who treat of colouring ſubſtances deſcribe logwood as of a red colour, he was never able to procure any other colour from it than yellow. It imparts yellow and orange colours to diſtilled water. Other waters extract a red tinge from it by means of the alkali which they contain. Theſe obſervations are alſo applicable to the other dyeing woods, kermes, and various other articles of the materia tinctoria. By a ſimilar treatment, fuſtic wood alſo loſt its colouring matter, and became white.

The reſults of all the experiments above related are, that the colouring matter of plants does not exhibit any colour by reflection, but by tranſmiſſion only; that their ſolid earthy ſubſtance is a white matter; and that it is the only part of vegetables which is endowed with a reflective power; that the colours of vegetables are produced by the light reflected from this white matter, and tranſmitted from thence through the coloured coat or covering which is formed on its ſurface by the colouring particles; that whenever the colouring matter is either diſcharged or divided by ſolution into particles too minute to exhibit any colour, the ſolid earthy ſubſtance is expoſed to view, and diſplays that whiteneſs which is its diſtinguiſhing characteriſtic.

35
Colouring matter of animal ſubſtances.

Mr Delaval next proceeds to examine the coloured parts of animal ſubſtances, and finds them exactly ſimilar, with regard to the manner in which the colour is

(B) This effect of the electric ſpark is now known to be produced, not by its carbonated nature, but by the generation of an acid.

is produced, to the vegetable bodies already treated of. The tinctures and infusions of cochineal and of kermes yield their colours when light is tranfmitted through them, but fhow none by reflection. On diluting frefh ox-gall with water, and examining it in the phials already mentioned, that part of it which was in the neck of the phial, and viewed by tranfmitted light, was yellow; but the anterior furface was black, and reflected no colour. Flefh derives its colour entirely from the blood, and when deprived of it, the fibres and veffels are perfectly white; as are likewife the membranes, finews, and bones, when freed from their aqueous and volatile parts; in which cafe they are a mere earth, unalterable by fire, and capable of imparting an opaque whitenefs to glafs.

36 Of the colour of blood.

On examining blood diluted with water in one of the phials formerly defcribed, it tranfmitted a red colour, and the anterior furface was almoft, but not entirely, black; for it received a flight hue of brown from fome coagulated particles that were fufpended in the liquor. In order to procure blood fufficiently diluted, and at the fame time equably and perfectly diffolved, he mixed as much cruor with fpirit of fal ammoniac as imparted a bright colour to it. The liquor being then viewed in the phial, that part which was contained in the neck, and tranfmitted the light, appeared of a fine red; but the anterior part reflecting no light, was intenfely black. Hence it appears, that the florid red colour of the flefh arifes from the light which is reflected from the white fibrous fubftance, and tranfmitted back through the red tranfparent covering which the blood forms on every part of it.

Blood, when recently drawn, does not affume the appearance common to tranfparent coloured liquors; for thefe, when too maffy to tranfmit light from their farther furfaces, always appear black; but blood, when recently drawn, always fhows a fine red colour, in whatever way it be viewed. This is occafioned by a white matter diffufed through the blood; and which is eafily feparated from the cruor, by dividing it after coagulation into a number of thin pieces, and wafhing in a fufficient quantity of pure water. Thus the water acquires a red colour, and ought to be changed daily. In a few days it will acquire no more tinge; and the remaining maffes of the cruor are no longer red, but white.

37 Of the fhells of lobfters.

In like manner, the red colour of the fhells of lobfters, after boiling, is no more than a mere fuperficial covering fpread over the white calcareous earth of which the fhells are compofed, and may be eafily removed from the furface by fcraping or filing. Before the application of heat, this fuperficial covering is much denfer, infomuch that, in fome parts of the fhell, it appears quite black, being too thick to admit the paffage of the light to the fhell and back again; but where this tranfparent blue colour of the unboiled lobfter is thinner, it conftantly appears like a blue film. In like manner, the colours of the eggs of certain birds are entirely fuperficial, and may be fcraped off, leaving the white calcareous earth expofed to view.

38 Of feathers.

The cafe is the fame with feathers, which owe their colours entirely to a very thin layer of fome tranfparent matter upon a white ground. Our author afcertained this by fcraping off the fuperficial colours from certain feathers which were ftrong enough to bear the operation; and thus feparated the coloured layers from the white ground on which they had been naturally fpread. The lateral fibres of the feathers cannot indeed have their furfaces feparated in this manner; but their texture, when viewed by a microfcope, feems to indicate, that the colours are produced upon them by no other means than thofe already related. In the examination of fome animal fubjects, where the colouring matter could not be feparated by chemical means, our author had recourfe to mechanical divifion; but this can only be employed when the principal part of the white fubftance is unmixed with the coloured coat or covering which is fpread upon its furface. All of them, however, by whatever means their colours could be feparated, fhowed that they were produced in the fame manner, namely, by the tranfmiffion of light from a white ground through a tranfparent coloured medium.

39 Of the colours of mineral fubftances.

The coloured fubftances of the mineral kingdom are very numerous, and belong principally to two claffes, viz. earths and metals. The former, when pure, are all perfectly white, and their colours arife from carbonic or metallic mixtures. Calcareous earths, when indurated, conftitute marble, and may be tinged with various colours by means of metallic folutions: all which are fimilar in their nature to the dyes put upon filk, cotton, or linen, and invariably proceed from the fame caufe, viz. the tranfmiffion of light through a very thin and tranfparent coloured medium. Flints are formed from filiceous earths, and owe their colour to carbone. When fufficiently heated, they are rendered white by the lofs of the inflammable matter which produced their colour. When impregnated with metals, they form agates, cornelians, jafper, and coloured cryftals. The coloured gems alfo receive their different hues from metals: and all of them may be imitated by glaffes tinged with fuch carbonic or metallic matters as enter into the compofition of the original fubftances.

40 Of metals.

Thus our author concludes, that the coloured earths, gems, &c. exhibit their various tints in the fame manner with other fubftances; viz. by the tranfmiffion of light reflected from a white ground. Our author, however, proceeds farther; and afferts, that even the colours of metals themfelves are produced in the fame manner.

"Gold (fays he) exhibits a white light, which is tinged with yellow. I have ufed this expreffion, becaufe it appears from experiment that gold reflects a white light, and that its yellow colour is a tinge fuperadded to its whitenefs. The experiment is thus fet forth by Sir Ifaac Newton. Gold in this light (that is, a beam of white light) appears of the fame yellow colour as in day light, but by intercepting at the lens a due quantity of the yellow-making rays, it will appear white like filver, as I have tried; which fhows, that its yellownefs arifes from the excefs of the intercepted rays, tinging that whitenefs with their colour when they are let pafs.

"I have already fhown, by numerous experiments, in what manner coloured tinges are produced; and it uniformly appears, from all thefe experiments, that colours do not arife from reflection, but from tranfmiffion only. A folution of filver is pellucid and colourlefs. A folution of gold tranfmits yellow, but reflects

flects no colour. This metal also, when united with glass, yields no colour by reflection, but by transmission only. All these circumstances seem to indicate, that the yellow colour of gold arises from a yellow transparent matter, which is a constituent part of that metal; that it is equally mixed with the white particles of the gold, and transmits the light which is reflected by them, in like manner as when silver is gilt, or foils are made by covering white metals with transparent colours. But these factitious coverings are only superficial; whereas the yellow matter of gold is diffused throughout the whole substance of the metal, and appears to envelope and cover each of the white particles. In whatsoever manner the yellow matter of gold is united to its white substance, it exists in a rare state; for it bears only the same proportion to the white particles of the gold as that of the yellow-making rays which were intercepted bear to all the other rays comprised in the white light of the sun.

"Sir Isaac Newton has shown, that when spaces or interstices of bodies are replenished with media of different densities, the bodies are opaque; that those superfices of transparent bodies reflect the greatest quantity of light which intercede media that differ most in their refractive densities; and that the reflections of very thin transparent substances are considerably stronger than those made by the same substances of a greater thickness. Hence the minute portions of air, or of the rarer medium which occupies spaces void of other matter, reflect a vivid white light whenever their surfaces are contiguous to media whose densities differ considerably from their own; so that every small mass of air, or of the rarer medium which fills the pores or interstices of dense bodies, is a minute white substance. This is manifest in the whiteness of froth, and of all pellucid colourless bodies; such as glass, crystal or salts, reduced to powder, or otherwise flawed: for in all these instances a white light is reflected from the air or rarer medium which intercede the particles of the denser substances whose interstices they occupy."

From these principles our author takes occasion to explain the reason why the particles of metals, which yield no colour by incident light when suspended in their solvents, are disposed to exhibit colours when separated from them. Hence also we see why opaque white substances are rendered pellucid by being reduced to uniform masses, whose component parts are every where nearly of the same density; for as all pellucid substances are rendered opaque and white by the admixture of pellucid colourless media of considerably different densities, they are again deprived of their opacity by extricating these media which kept their particles at a distance from each other: thus froth or snow, when resolved into water, lose their whiteness, and assume their former pellucid appearance. In like manner, by proper fluxes, the opaque white earths are reduced to pellucid colourless glasses; because all reflections are made at the surfaces of bodies differing in density from the ambient medium, and in the confines of equally dense media there is no reflection.

As the oxides of metals are enabled to reflect their colours by the intervention of the particles of air; so, when mixed with oil in the making of paint, they always assume a darker colour, because the excess of the density of oil over that of air forms a sensible difference when comparatively considered with respect to the specific gravity of the rarer metals. From this cause perceptibly less light is reflected from the moleculæ of oil than from those of air, and consequently the mass appears darker. The case, however, is different with such paints as are formed of the denser metals; as vermilion, minium, &c. for though oil differs very considerably from air in its specific density, yet it also differs very much in this respect from the denser metallic powders: and the moleculæ of oil which divide their particles, act upon the light so strongly, that the reflection occasioned by them cannot be distinguished from those which are caused by rarer media. Hence though we mix vermilion or minium with oil, the colour is not less sensibly altered.

41 Objections to his theory of metallic colours.

This part of our author's theory, however, seems liable to objection; for though it be true that the oxides of some metals are denser than others, yet that is, comparatively speaking, but in a very small proportion; nor is even the difference of density between oil and the oxides of the heavier metals at all comparable to that between the density of air and oil. Thus, though the oxide of iron may be 10 or 11 times more dense than oil; yet, as the latter is between 500 or 600 times denser than air, the small difference between the oil and metallic oxide ought to be imperceptible. In this respect, indeed, there are considerable differences with regard to the oils employed, which cannot be supposed to arise from the mere circumstance of density. Thus the colour of vermilion, when mixed with turpentine-varnish, is much brighter than with linseed oil; and yet the difference between the densities of linseed oil and turpentine-varnish is very trifling. The mere action of heat likewise has a surprising effect in this case. Thus the red oxide of iron, called *scarlet-oker*, by being only heated a certain degree, appears of a very dark purple, resuming its red colour when cold; and this variation may be induced as often as we please by only heating it over the fire in a shovel. In like manner, by gradually heating red lead, it may be made to assume a most beautiful crimson colour; which growing gradually darker, becomes at last almost quite black. On cooling, if the heat has not been raised too high, it gradually returns through the same shades of colour, until at last it fixes in its original hue. These immense differences in colour cannot by any means be attributed either to the expulsion of air, or to an alteration in density. The fire indeed does certainly expand these oxides as well as other bodies; but as the medium interspersed between their particles is thus also expanded, the colour ought at least to remain the same, if not to become lighter, on account of the superior expansion of air to that of metal by the same degree of heat. It would seem, therefore, that the action of the element of fire itself has a considerable share in the production of colours; and indeed its share in the operations of nature is so great, that we might well think it strange if it should be entirely excluded from this.

42 Of the colours of semipellucid substances.

With regard to semipellucid substances, which appear of one colour by incident, and another by transmitted light, our author likewise endeavours to show that no reflection is made by the coloured matter, but only

only by the white or colourlefs particles. They confift of pellucid media, throughout which white or colourlefs opaque particles are difperfed. The latter are difpofed at fuch diftances from each other, that fome of the incident rays of light are capable of paffing through the intervals which intercede them, and thus are tranfmitted through the femipellucid mafs. Some forts of rays penetrate through fuch maffes, while others, which differ from them in their refrangibility, are reflected by the light or colourlefs particles; and from thence are tranfmitted through the pellucid part of the medium which intervenes between the reflecting particles and the anterior furface of the mafs. On the fame principle our author explains the blue colour of the fky, the green colour of the fea, and other natural phenomena: and from his numerous experiments on this fubject at laft concludes, "that the power by which the feveral rays of light are tranfmitted through different media is inherent in the particles themfelves, and therefore is not confined to the furfaces of fuch media. For if the tranfmiffive force was exerted at the furface only, the thinner plates of coloured fubftances would act upon the rays as powerfully as thicker maffes. But it appears from experiment, that in proportion as the rays pafs through different thickneffes of coloured media, they exhibit colours differing not only in degree, but frequently in fpecies alfo.

43 How colours are fhown by tranfmitted light.

"The fun's light, by which bodies are illuminated, confifts of all the rays of which a white light is compounded. Thefe rays, in their entire and undivided ftate, are incident upon the opaque particles of femipellucid fubftances, and upon the colouring particles of tranfparent coloured fubftances, whenever thefe media are expofed to the light. When the rays accede to the opaque particles of femipellucid fubftances, fome forts of them are reflected back from the anterior furface of thefe particles: the other forts of rays, which are not reflected back, are diverted from the direction which is oppofite to the anterior furface of the opaque particles, and paffing through the intervals between the particles, are tranfmitted through the mafs.

"When the rays are incident upon the particles of tranfparent coloured bodies, none of them are reflected back; becaufe the colouring particles are not endowed with any reflective power; but fome of the rays are either ftopped at the interior furface of the particles, or are diverted into fuch directions as render them incapable of paffing towards the further fide of the mafs; and confequently fuch rays cannot be tranfmitted. The rays which are not thus intercepted or difperfed, are tranfmitted in the fame manner as thofe which pafs through femipellucid media. Thus it is evident, that the coloured rays which are tranfmitted through femipellucid fubftances, are *inflected* by the opaque particles; and thofe which are tranfmitted through tranfparent-coloured fubftances are *inflected* by the colouring particles. From the preceding obfervations likewife it appears, that the particles of coloured media inflect the feveral forts of rays according to the feveral fizes and denfities of the particles; alfo in proportion to the inflammability of the media which owe their colour to them; and it is manifeft that the tranfmiffion of coloured rays depends upon their inflection. All thefe obfervations are conformable to Sir Ifaac Newton's doctrine that the rays of light are reflected, refracted, and inflected, by one and the fame principle acting varioufly in various circumftances."

The moft remarkable part of Mr Delaval's doctrine is that concerning the metals; for the better underftanding of which we fhall premife a fhort abftract of his general doctrine concerning white bodies, and the manner in which light is reflected by them. "All the earths, (he obferves), which in their natural ftate are of a pure white, conftitute tranfparent colourlefs media when vitrified with proper fluxes, or when diffolved in colourlefs menftrua; and the faline maffes obtainable from their folutions are tranfparent and colourlefs, while they retain the water which is effential to their cryftallization, and are not flawed or reduced to powder; but after their pores and interftices are opened in fuch a manner as to admit the air, they become then white and opaque by the entrance of that rare medium. The earthy particles which form the folid parts of bodies generally exceed the other in denfity; confequently thefe particles, when contiguous to the rare media already mentioned, muft reflect the rays of light with a force proportionate to their denfity. The reflective power of bodies does not depend merely upon their excefs of denfity, but upon their difference of denfity with refpect to the furrounding media. Tranfparent colourlefs particles, whofe denfity is greatly inferior to that of the media they come between, alfo powerfully reflect all forts of rays, and thereby become white. Of this kind are the air or other rare fluids which occupy the interftices of liquors; and in general of all denfer media in whofe interftices fuch rare particles are admitted.

44 Of the manner in which light is reflected from white bodies.

Hence we may conclude, that white opaque bodies are conftituted by the union or contiguity of two or more tranfparent colourlefs media differing confiderably from each other in their reflective powers. Of thefe fubftances we have examples in froth, emulfions, or other imperfect combinations of pellucid liquors, milk, fnow, calcined or pulverized falts, glafs or cryftal reduced to powder, white earths, paper, linen, and even thofe metals which are called white by mineralogifts and chemifts: for the metals juft mentioned do not appear white unlefs their furfaces be rough; as in that cafe only there are interftices on their furfaces fufficient to admit the air, and thus make a reflection of a white and vivid light.

"But the polifhed furfaces of metallic mirrors reflect the incident rays equably and regularly, according to their feveral angles of incidence; fo that the reflected rays do not interfere with each other, but remain feparate and unmixed, and therefore diftinctly exhibit their feveral colours. Hence it is evident, that white furfaces cannot act upon the light as mirrors; becaufe all the rays which are reflected from them are blended in a promifcuous and diforderly manner.

45 Of the caufe of opacity.

"The above mentioned phenomena give much infight into the nature and caufe of opacity: as they clearly fhow, that even the rareft tranfparent colourlefs fubftances, when their furfaces are adjacent to media differing greatly from them in refractive power, may thereby acquire a perfect opacity, and may affume a refplendency and hue fo fimilar to that of white metals, that the rarer pellucid fubftances cannot by the fight

light be diſtinguiſhed from the denſe opaque metals. And this ſimilarity to the ſurfaces of metals, occurs in the rare pellucid ſubſtances, not only when, from the roughneſs of their ſurfaces, they reſemble unpoliſhed metals in whiteneſs, but alſo when, from their ſmoothneſs, they reſemble the poliſhed ſurfaces of metals.

"Metals ſeem to conſiſt entirely of tranſparent matter, and to derive their apparent opacity and luſtre ſolely from the copious reflection of light from their ſurfaces. The analogy between the metals and tranſparent media, as far as reſpects their optical properties, will appear from the following conſiderations.

"1. All metals diſſolved in their proper menſtrua are tranſparent. 2. By the union of two or more tranſparent media, ſubſtances are conſtituted which are ſimilar to metals in their opacity and luſtre, as plumbago and marcaſites. 3. The tranſparent ſubſtances of metals, as well as thoſe of minerals, by their union with carbone, acquire their ſtrong reflective powers from which their luſtre and opacity ariſe. 4. The ſurfaces of pellucid media, ſuch as glaſs or water, aſſume a metallic appearance, when by their ſmoothneſs, difference of denſity with reſpect to the contiguous media, or any other cauſe, they are diſpoſed copiouſly to reflect the light.

"From all theſe conſiderations it is evident, that opaque ſubſtances are conſtituted by the union or contiguity of tranſparent colourleſs media, differing from one another in their reflective powers; and that, when the common ſurface, which comes between ſuch media, is plane, equal, and ſmooth, it reflects the incident rays equally and regularly as a mirror; but when the ſurface is rough and unequal, or divided into minute particles, it reflects the incident rays irregularly and promiſcuouſly in different directions, and conſequently appears white."

46 Theory of colours ſtill uncertain.

From all theſe experiments we can only conclude, that the theory of colours ſeems not yet to be determined with certainty; and very formidable, perhaps unanſwerable, objections might be brought againſt every hypotheſis of this ſubject that hath been invented. The diſcoveries of Sir Iſaac Newton, however, are ſufficient to juſtify the following

APHORISMS.

1. All the colours in nature proceed from the rays of light.

2. There are ſeven primary colours; which are red, orange, yellow, green, blue, indigo, and violet.

3. Every ray of light may be ſeparated into the ſeven primary colours.

4. The rays of light in paſſing through the ſame medium have different degrees of refrangibility.

5. The difference in the colours of light ariſes from its different refrangibility: that which is the leaſt refrangible producing red; and that which is the moſt refrangible, violet.

6. By compounding any of the two primary colours, as red and yellow, or yellow and blue, the intermediate colour, as orange or green, may be produced.

7. The colours of bodies ariſe from their diſpoſitions to reflect one ſort of rays and to abſorb the other; thoſe that reflect the leaſt refrangible rays appearing red; and thoſe that reflect the moſt refrangible, violet.

8. Such bodies as reflect two or more ſorts of rays appear of various colours.

9. The whiteneſs of bodies ariſes from their diſpoſition to reflect all the rays of light promiſcuouſly.

10. The blackneſs of bodies proceeds from their incapacity to reflect any of the rays of light (c).

Entertaining EXPERIMENTS, *founded on the preceding Principles.*

I. *Out of a ſingle colourleſs ray of light to produce ſeven other rays, which ſhall paint, on a white body, the ſeven primary colours of nature.*

Plate CXLV. Fig. 1.

PROCURE from an optician a large glaſs priſm DEF, (fig. 1.), well poliſhed, two of whoſe ſides muſt contain an angle of about ſixty-four degrees. Make a room quite dark, and in the window-ſhutter AB, cut a round hole, about one-third of an inch in diameter, at C, through which a ray of light LI paſſing, falls on the priſm DEF; by that it is refracted out of the direction IT, in which it would have proceeded, into another GH; and, falling on the paper MNSX, will there form an oblong ſpectrum PQ, whoſe ends will be ſemicircular, and its ſides ſtraight; and if the diſtance of the priſm from the paper be about eighteen feet, it will be ten inches long, and two inches wide. This ſpectrum will exhibit all the primary colours; the rays between P and V, which are the moſt refracted, will paint a deep violet; thoſe between V and I, indigo; thoſe between I and B, blue; thoſe between B and G, green; thoſe between G and Y, yellow; thoſe between Y and O, orange; and thoſe between O and R, being the leaſt refracted, an intenſe red. The colours between theſe ſpaces will not be everywhere equally intenſe, but will incline to the neighbouring colour: thus the part of the orange next to R will incline to a red, that next to Y to a yellow; and ſo of the reſt.

II. *From two or more of the primary colours, to compoſe others that ſhall, in appearance, reſemble thoſe of the former.*

By mixing the two homogeneous colours red and yellow, an orange will be produced, ſimilar in appearance to that in the ſeries of primary colours; but the light of the one being homogeneous, and that of the other heterogeneous, if the former be viewed through a priſm it will remain unaltered, but the other will be reſolved into its component colours red and yellow. In like manner, other contiguous homogeneous colours may compound new colours; as by mixing yellow and green, a colour between them is formed; and if blue be added, there will appear a green, that is the middle colour

(c) From hence it ariſes, that black bodies, when expoſed to the ſun, become ſooner heated than all others.

colour of thofe three. For the yellow and blue, if they are equal in quantity, will draw the intermediate green equally toward them, and keep it, as it were, in equilibrio, that it verge not more to the one than to the other. To this compound green there may be added fome red and violet; and yet the green will not immediately ceafe, but grow lefs vivid; till by adding more red and violet it will become more diluted; and at laft, by the prevalence of the added colours, it will be overcome, and turned into fome anomalous colour.

If the fun's white, compofed of all kinds of rays, be added to any homogeneous colour, that colour will not vanifh, nor change its fpecies, but be diluted; and by adding more white, it will become continually more diluted. Laftly, if red and violet be mixed, there will be generated, according to their various proportions, various purples, fuch as are not like, in appearance, to the colour of any homogeneous light; and of thefe purples, mixed with blue and yellow, other new colours may be compofed.

III. *Out of three of the primary colours, red, yellow, and blue, to produce all the other prifmatic colours, and all that are intermediate to them.*

Fig. 2. Provide three panes of glafs (fig. 2.) of about five inches fquare; and divide each of them, by parallel lines, into five equal parts. Take three fheets of very thin paper; which you muft paint, lightly, one blue, another yellow, and the third red (D). Then pafte on one of the glaffes five pieces of the red paper, one of which muft cover the whole glafs, the fecond only the four lower divifions, the third the three lower, the fourth the two loweft, and the fifth the laft divifion only. On the other glaffes five pieces of the blue and yellow papers muft be pafted in like manner. You muft alfo have a box of about fix inches long, and the fame depth and width as the glaffes; it muft be black on the infide: let one end be quite open, and in the oppofite end there muft be a hole large enough to fee the glaffes completely. It muft alfo open at the top, that the glaffes may be placed in it conveniently.

When you have put any one of thefe glaffes in the box, and the open end is turned toward the fun, you will fee five diftinct fhades of the colour it contains. If you place the blue and yellow glaffes together, in a fimilar direction, you will fee five fhades of green diftinctly formed. When the blue and red glaffes are placed, a bright violet will be produced: and by the red and yellow, the feveral fhades of orange.

Fig. 3. If, inftead of placing thefe glaffes in a fimilar pofition, you place the fide AB of the yellow glafs againft the fide BD of the blue, you will fee all the various greens that are produced by nature (E); if the blue and red glaffes be placed in that manner, you will have all the poffible varieties of purples, violets, &c.; and, laftly, if the red and orange glaffes be fo placed, there will be all the intermediate colours, as the marygold, aurora, &c.

IV. *By means of the three primary colours, red, yellow, and blue, together with light and fhade, to produce all the gradations of the prifmatic colours.*

On feven fquare panes of glafs, pafte papers that are painted with the feven prifmatic colours, in the fame manner as the laft experiment. The colours for the orange, green, indigo, and violet, may be made by mixing the other three. Then with biftre (F,) well diluted, fhade a fheet of very thin paper, by laying it light on both its fides. With pieces of this paper cover four-fifths of a glafs, of the fame fize with the others, by laying one piece on the four loweft divifions, another on the three loweft, a third on the two loweft, and the fourth on the loweft divifion only, and leaving the top divifion quite uncovered. When one of the coloured glaffes is placed in the box, together with the glafs of fhades, fo that the fide AB of the one be applied to the fide BC of the other, as in fig. 3. the feveral gradations of colours will appear fhaded in the fame manner as a drapery judicioufly painted with that colour.

It is on this principle that certain French artifts have proceeded in their endeavours to imitate, by defigns printed in colours, paintings in oil: which they do by four plates of the fame fize, on each of which is engraved the fame defign. One of thefe contains all the fhades that are to be reprefented, and which are painted either black or with a dark gray. One of the three other plates is covered with blue, another with red, and the third with yellow; each of them being engraved on thofe parts only which are to reprefent that colour (G); and the engraving is either ftronger or weaker, in proportion to the tone of colour that is to be reprefented (H).

Thefe four plates are then paffed alternately under the

(D) Water-colours muft be ufed for this purpofe: the blue may be that of Pruffia, and very bright; the red, carmine; and the yellow, gamboge, mixed with a little faffron. Thefe colours muft be laid very light and even on both fides of the paper.

(E) In the firft pofition of the glaffes, the quantity of blue and yellow being equal, the fame fort of green was conftantly vifible; but by thus inverting the glaffes, the quantity of the colours being conftantly unequal, a very pleafing variety of tints is produced.

(F) The biftre here ufed muft be made of foot, not that in ftone.

(G) When a red drapery is required, it is engraved on the plate affigned to that colour; and fo of yellow and blue: but if one of the other colours be wanting, fuppofe violet, it muft be engraved on thofe that print the red blue: and fo of the reft. The plates of this kind have been hitherto engraved in the manner of mezzotinto; but thefe, unlefs they are fkilfully managed, are foon effaced. Engravings in the manner of crayon will perhaps anfwer better.

(H) The principal difficulty in this fort of engraving arifes from want of fkilful management, in giving each plate that precife degree of engraving which will produce the tone of colour required. If a bright green is

the prefs, and the mixture of their colours produces a print that bears no fmall refemblance to a painting. It muft be confeffed, however, that what has been hitherto done of this kind falls far fhort of that degree of perfection of which this art appears fufceptible. If they who engrave the beft in the manner of the crayon, were to apply themfelves to this art, there is reafon to expect they would produce far more finifhed pieces than we have hitherto feen.

V. *To make figures appear of different colours fucceffively.*

Fig. 4. Make a hole in the window-fhutter of a dark room, through which a broad beam of light may pafs, that is to be refracted by the large glafs prifm ABC, (fig. 4.), which may be made of pieces of mirrors cemented together, and filled with water. Provide another prifm DEF, made of three pieces of wood: through the middle of this there muft pafs an axis on which it is to revolve. This prifm muft be covered with white paper; and each of its fides cut through in feveral places, fo as to reprefent different figures; and thofe of each fide fhould likewife be different. The infide of this prifm is to be hollow, and made quite black, that it may not reflect any of the light that paffes through the fides into it. When this prifm is placed near to that of glafs, as in the figure, with one of its fides EF perpendicular to the ray of light, the figures on that fide will appear perfectly white: but when it comes into the pofition *g h*, the figures will appear yellow and red; and when it is in the pofition *k l*, they will appear blue and violet. As the prifm is turned round its axis, the other fides will have a fimilar appearance. If, inftead of a prifm, a four or five-fided figure be here ufed, the appearances will be ftill further diverfified.

This phenomenon arifes from the different refrangibility of the rays of light. For when the fide EF is in the pofition *g h*, it is more ftrongly illuminated by the leaft refrangible rays; and wherever they are predominant, the object will appear red or yellow. But when it is on the pofition *k l*, the more refrangible rays being then predominant, it will appear tinged with blue and violet.

VI. *The folar magic lanthorn.*

Procure a box, of about a foot high, and eighteen inches wide, or fuch other fimilar dimenfions as you fhall think fit, and about three inches deep. Two of the oppofite fides of this box muft be quite open; and in each of the other fides let there be a groove, wide enough to pafs a ftiff paper or paftebord. This box muft be faftened againft a window on which the fun's rays fall direct. The reft of the window fhould be clofed up, that no light may enter. Provide feveral fheets of ftiff paper, which muft be blacked on one fide. On thefe papers cut out fuch figures as you fhall think proper; and placing them alternately in the grooves of the box, with their blacked fides towards you, look at them through a large and clear glafs prifm: and if the light be ftrong, they will appear to be painted with the moft lively colours in nature. If you cut on one of thefe papers the form of the rainbow, about three quarters of an inch wide, you will have a lively reprefentation of that in the atmofphere.

This experiment may be farther diverfified, by pafting very thin papers, lightly painted with different colours, over fome of the parts that are cut out: which will appear to change their colours when viewed through the prifm, and to ftand out from the paper, at different diftances, according to the different degrees of refrangibility of the colours with which they are painted. For greater convenience, the prifm may be placed in a ftand on a table, at the height of your eye, and made to turn round on an axis, that when you have got an agreeable profpect, you may fix it in that pofition.

VII. *The prifmatic camera obfcura.*

Fig. 5. Make two holes, F, *f*, (fig. 5.) in the fhutter of a dark chamber, near to each other; and againft each hole place a prifm ABC, and *a b c*, in a perpendicular direction, that their fpectrums NM may be caft on the paper in a horizontal line, and coincide with each other; the red and violet of the one being in the fame part with thofe of the other. The paper fhould be placed at fuch a diftance from the prifms that the fpectrum may be fufficiently dilated. Provide feveral papers nearly of the fame dimenfions with the fpectrum; crofs thefe papers, and draw lines parallel to the divifions of the colours. In thefe divifions cut out fuch figures as you fhall find will have an agreeable effect, as flowers, trees, animals, &c. When you have placed one of thefe papers in its proper pofition, hang a black cloth or paper behind it, that none of the rays that pafs through may be reflected and confufe the phenomena. The figures cut on the paper will then appear ftrongly illuminated with all the original colours of nature. If, while one of the prifms remains at reft, the other be revolved on its axis, the continual alteration of the colours will afford a pleafing variety; which may be further increafed by turning the prifm round in different directions.

When the prifms are fo placed that the two fpectrums become coincident in an inverted order of their colours, the red end of one falling on the violet end of the other; if they be then viewed through a third prifm DH, held parallel to their length, they will no longer appear coincident, but in the form of two diftinct fpectrums, *p t* and *n m* (fig. 6.), croffing one another in the middle, like the letter X: the red of one fpectrum and violet of the other, which were coincident at NM, being parted from each other by a greater refraction of the violet to *p* and *m*, than that of the red to *n* and *t*. Fig 6.

This experiment may be further diverfified by adding two other prifms, that fhall form a fpectrum in the fame line, and contiguous to the other; by which not only the variety of figures, but the viciffitude of colours, will be confiderably augmented.

VIII.

---

is to be reprefented, there fhould be an equal quantity of engraving on the red and yellow plates: but if an olive green, the yellow plate fhould be engraved much deeper than the red.

VIII. *The diatonic scale of colours.*

The illustrious Newton, in the course of his investigations of the properties of light, discovered that the length of the spaces which the seven primary colours possess in the spectrum, exactly corresponds to those of chords that sound the seven notes in the diatonic scale of music: As is evident by the following experiment.

Fig. 7. On a paper in a dark chamber, let a ray of light be largely refracted into the spectrum AFTMGP (fig. 7.), and mark the precise boundaries of the several colours, as *a*, *b*, *c*, &c. Draw lines from those points perpendicular to the opposite side, and you will find that the spaces M*rf*F, by which the red is bounded; *rgef*, by which the orange is bounded; *qped*, by which the yellow is bounded, &c. will be in exact proportion to the divisions of a musical chord for the notes of an octave; that is, as the intervals of these numbers $1, \frac{8}{9}, \frac{5}{6}, \frac{3}{4}, \frac{2}{3}, \frac{3}{5}\ \frac{9}{16}, \frac{1}{2}$.

IX. *Colorific music.*

Father Castel, a Frenchman, in a curious book he has published on chromatics, supposes the note *ut* to answer to blue in the prismatic colours; the note *re* to yellow, and *mi* to red. The other tones he refers to the intermediate colours; from whence he constructs the following gamut of colorific music:

Ut	Blue
Ut sharp	Sea green
Re	Bright green
Re sharp	Olive green
Mi	Yellow
Fa	Aurora
Fa sharp	Orange
Sol	Red
Sol sharp	Crimson
La	Violet
La sharp	Blue violet
Si	Sky blue
Ut	Blue

This gamut, according to this plan, is to be continued in the same manner for the following octave; except that the colours are to be more vivid.

He supposes that these colours, by striking the eye in the same succession as the sounds (to which he makes them analogous) do the ear, and in the same order of time, they will produce correspondent sensations of pleasure in the mind. It is on these general principles, which F. Castel has elucidated in his treatise, that he has endeavoured, though with little success, to establish his ocular harpsichord.

The construction of this instrument, as here explained, will show that the effects produced by colours by no means answer those of sounds, and that the principal relation there is between them consists in the duration of the time that they respectively affect the senses.

Fig. 8. Between two circles of pasteboard, of ten inches diameter, AB and CD, (fig. 8.), inclose a hollow pasteboard cylinder E, 18 inches long. Divide this cylinder into spaces half an inch wide, by a spiral line that runs round it from the top to the bottom, and divide its surface into six equal parts by parallel lines drawn between its two extremities: as is expressed in the figure.

Let the circle AB, at top, be open, and let that at bottom, CD, be closed, and supported by an axis or screw, of half an inch diameter, which must turn freely in a nut placed at the bottom of a box we shall presently describe. To the axis just mentioned adjust a wooden wheel G, of two inches and a half in diameter, and that has 12 or 15 teeth, which take the endless screw H. Let this cylinder be inclosed in a box ILMN (fig. 9.) whose base is square, and at whose bottom there is a nut, in which the axis F turns. Observe that the endless screw H should come out of the box, that it may receive the handle O, by which the cylinder is to be turned.

This box being closed all round, place over it a tin covering A, which will be perforated in different parts; from this cover there must hang three or four lights, so placed that they may strongly illumine the inside of the cylinder. In one side of this box (which should be covered with pasteboard) cut eight apertures, *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, (fig. 9.) of half an inch wide, and $\frac{1}{5}$ of an inch high; they must be directly over each other, and the distance between them must be exactly two inches. It is by these openings, which here correspond to the musical notes, that the various colours analogous to them are to appear; and which being placed on the pasteboard cylinder, as we have shown, are reflected by means of the lights placed within it. Fig. 9.

It is easy to conceive, that when the handle O is turned, the cylinder in consequence rising half an inch, if it be turned five times round, it will successively show, at the openings made in the side of the box, all those that are in the cylinder itself, and which are ranged according to the direction of the inclined lines drawn on it. It is therefore according to the duration of the notes which are to be expressed, that the apertures on the cylinder are to be cut. Observe, that the space between two of the parallel lines drawn vertically on the cylinder, is equal to one measure of time; therefore, for every turn of the cylinder, there are six measures, and thirty measures for the air that is to be played by this instrument.

The several apertures being made in the side of the cylinder, in conformity to the notes of the tune that is to be expressed, they are to be covered with double pieces of very thin paper, painted on both sides with the colours that are to represent the musical notes.

This experiment might be executed in a different manner, and with much greater extent; but as the entertainment would not equal the trouble and expence, we have thought it sufficient to give the above piece, by which the reader will be enabled to judge how far the analogy supposed by F. Castel really exists.

Fig. 3.

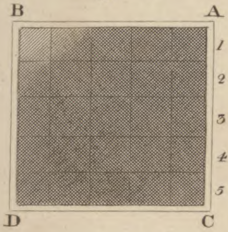


Fig. 2.

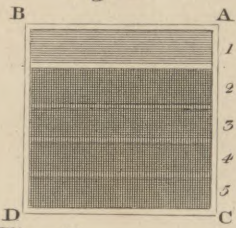


Fig. 1.

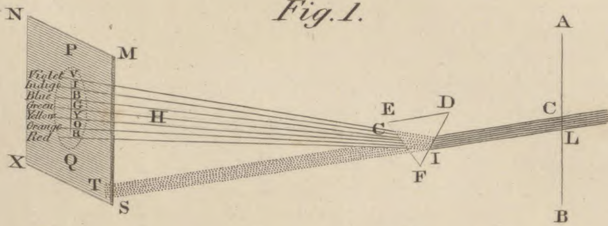


Fig. 7.

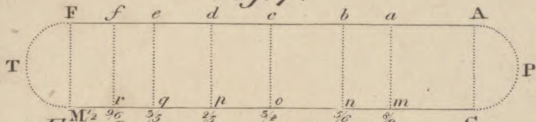


Fig. 4.

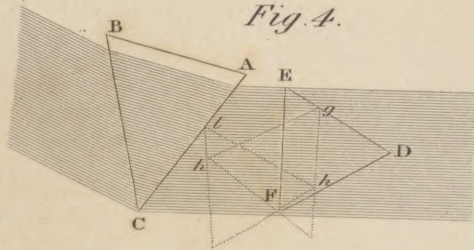


Fig. 9.

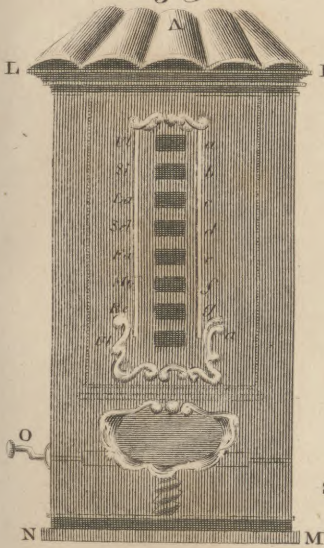


Fig. 8.

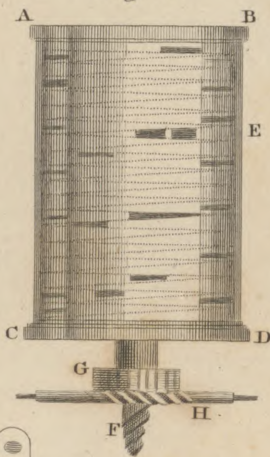


Fig. 6.

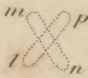
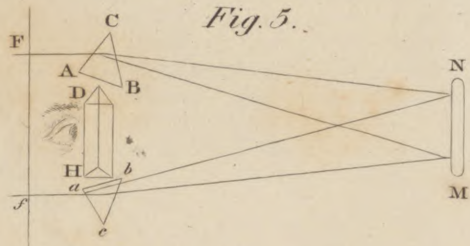
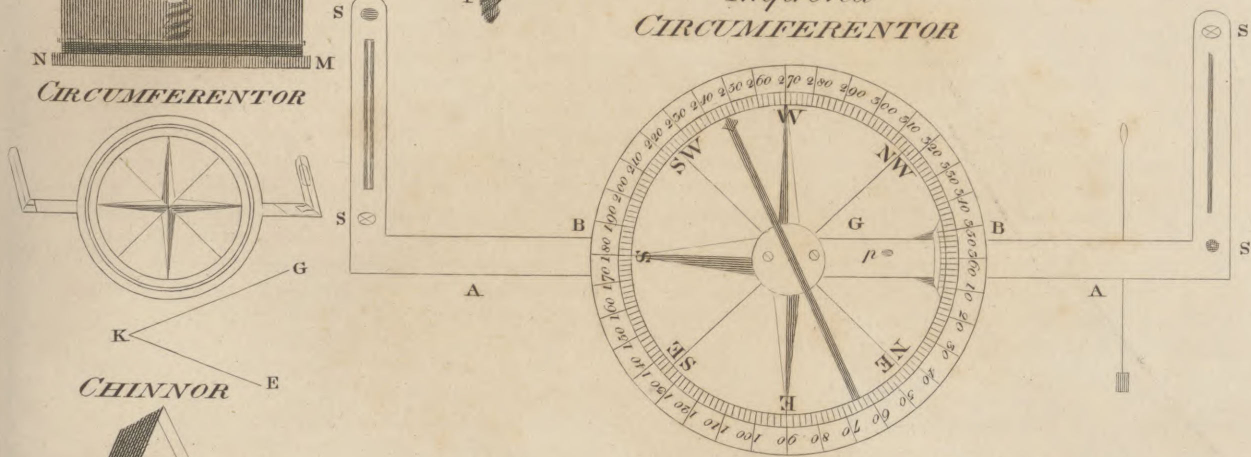


Fig. 5.



Improved CIRCUMFERENTOR

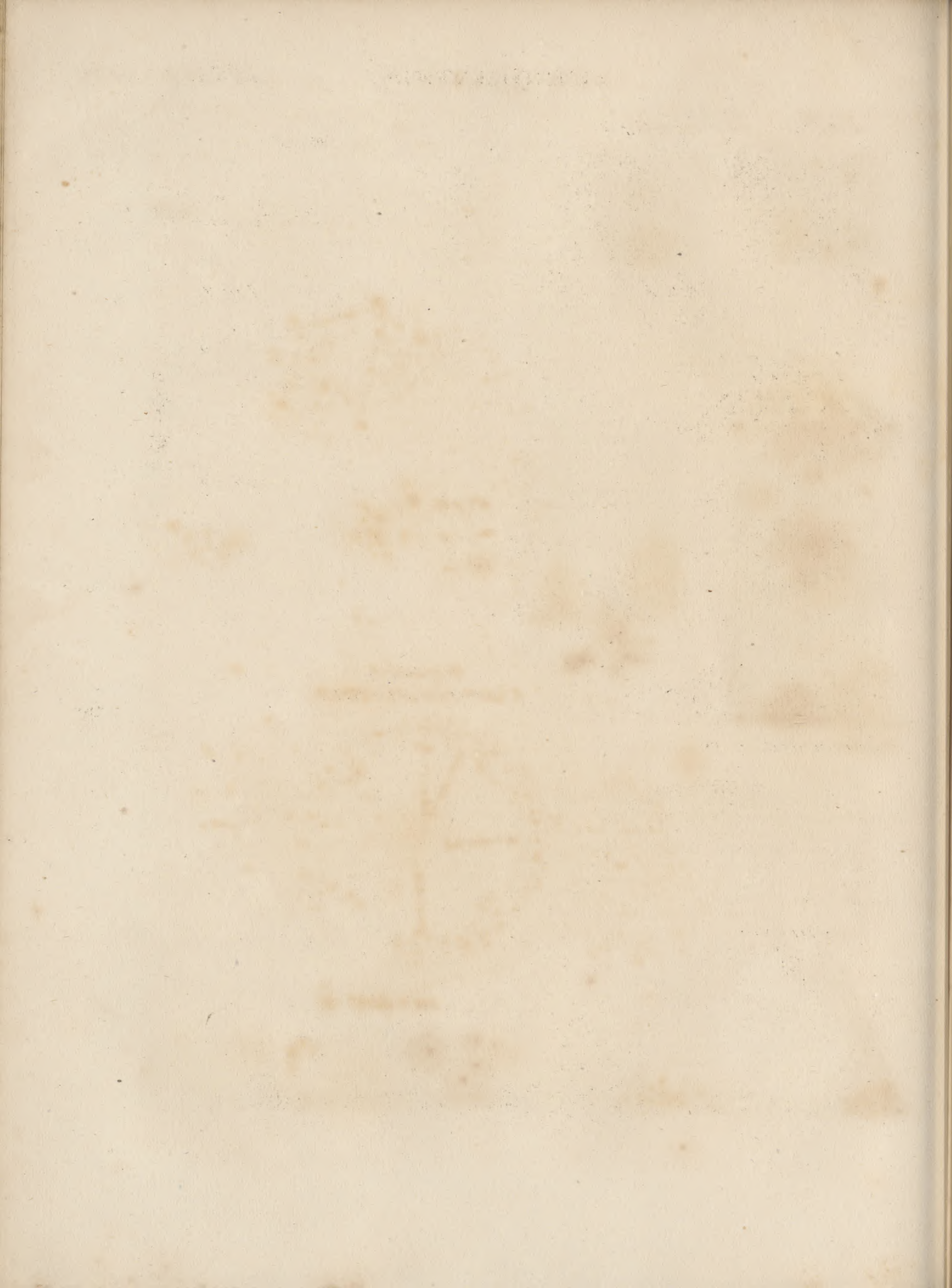
CIRCUMFERENTOR



CHINNOR

Druidical CIRCLE

E. Mitchell sculpt.



Chronic, Chronicle.

CHRONIC, or CHRONICAL, among phyficians, an appellation given to difeafes that continue a long time; in contradiftinction to thofe that foon terminate, and are called *acute*.

CHRONICLE, in matters of literature, a fpecies or kind of hiftory difpofed according to the order of time, and agreeing in moft refpects with annals. See ANNALS.

Parian CHRONICLE. See *ARUNDELIAN Marbles.* Since that article was printed, in which an abftract was given of Mr Robertfon's doubts and obfervations refpecting the authenticity of the Parian Chronicle, one or two publications have appeared in anfwer, but none of them calculated to remove the objections, or materially to affect the arguments that had been ftated with fo much learning and ingenuity againft it. The following ftrictures, however, with which the Monthly Reviewers have concluded their critique of Mr Robertfon's performance, feem to merit confideration.

Monthly Review. Jan. 1789.

On Objection I. *That the characters have no certain or unequivocal marks of antiquity*, the Reviewers remark, that this feems rather to be an anfwer to a defender of the infcription, than an objection. If a zealous partizan of the marble fhould appeal to its characters and orthography, as decifive proofs of its being genuine, it would be proper enough to anfwer, that thefe circumftances afford no certain criterion of authenticity. But in this word *certain* fculks an unlucky ambiguity. If it means demonftrative, it muft be allowed that no infcription can be proved to be certainly genuine from thefe appearances; but if it means no more than highly probable, many infcriptions poffefs fufficient internal evidence to give their claims this degree of certainty. The true queftion is, Has not the Parian Chronicle every mark of antiquity that can be expected in a monument claiming the age of 2000 years? The letters Γ and ⌶ are, by Mr R.'s own confeffion, fuch as occur in genuine infcriptions; and to fay in anfwer, that an impoftor might copy the forms of thefe letters from other infcriptions, is already to fuppofe the infcription forged, before it is rendered probable by argument. The learned author of the Differtation feems to betray fome doubt of his own conclufion: for he adds, p. 56. "that the antiquity of an infcription can never be proved by the mere form of the letters, becaufe the moft ancient characters are as eafily counterfeited as the modern." But this objection is equally applicable to all other ancient infcriptions; and is not to the purpofe, if the prefent infcription has any peculiar marks of impofture in its characters and orthography. "The characters do not refemble the Sigean, the Nemean, or the Delian infcriptions." Mr R. anfwers this objection himfelf, by adding, "which are fuppofed to be of a more ancient date." The oppofite reafon to this will be a fufficient anfwer to the other objection, "that they do not refemble the Farnefian pillars or the Alexandrian MS." If "they differ in many refpects from the Marmor Sandvicenfe," they may be prefumed to agree in many. "They feem to refemble more than any other, the alphabet taken by Montfauçon from the marmor Cyzicenum." Thus it appears that the Parian Chronicle moft nearly refembles the two infcriptions, to whofe age it moft nearly approaches.

When Mr R. adds, that the letters "are fuch as an ordinary ftone-cutter would probably make, if he were employed to engrave a Greek infcription, according to the alphabet now in ufe," he muft be underftood *cum grano falis*. The engraver of a fac-fimile generally omits fome nice and minute touches in taking his copy; but, even with this abatement, we dare appeal to any adept in Greek calligraphy, whether the fpecimen facing p. 56. will juftify our author's obfervation? "The fmall letters (O, Θ, Ω,) intermixed among the larger, have an air of affectation and artifice." Then has the greater part of ancient infcriptions an air of affectation and artifice. For the O is perpetually engraved in this diminutive fize; and Ω being of a kindred found, and Θ of a kindred fhape, how can we wonder that all three fhould be reprefented of the fame magnitude? In the infcription which immediately follows the marble in Dr Chandler's edition, No. xxiv. thefe very three letters are never fo large as the reft, and often much fmaller; of which there are inftances in the three firft lines. See alfo two medals in the fecond part of Dorville's Sicula, Tab. xvi. Numb. 7. 9.

Chronicle.

"From the archaifms, fuch as εγ Λυκωρειας εγ Κυβελοις, εμ Παρωι, &c. &c. no conclufion can be drawn in favour of the authenticity of the infcription." Yet furely every thing common to it with other infcriptions, confeffedly genuine, creates a reafonable prefumption in its favour. "But what reafon could there be for thefe archaifms in the Parian Chronicle? We do not ufually find them in Greek writers of the fame age, or even of a more early date." The reafon is, according to our opinion, that fuch archaifms were then in ufe: this we know from other infcriptions, in which fuch archaifms (or, as our author afterwards calls them, barbarifms) are frequent. Nothing can be inferred from the Greek writers, unlefs we had their autographs. The prefent fyftem of orthography in our printed Greek books is out of the queftion. Again, "The infcription fometimes adopts and fometimes neglects thefe archaifms, as in lines 4, 12, 27, 52, 63, 67." This inconfiftency either is no valid objection, or if it be valid, will demolifh not only almoft every other infcription, but almoft every writing whatfoever. For example, in the infcription juft quoted, No. xxiv. we find τοΝ βασιλεα, l. 20. and οταΜ, πεμπτηι, 24. A little farther, N° xxvi. l. 31. we have εΓ Μαγνησιας, 57. 73. 81. εΚ Μαγνησιας, and 106, 108. εΚΓ Μαγνησιας. The Corcyrean infcription (Montfauçon, Diar. Ital. p. 420.) promifcuoufly ufes εΚδανειζομαι and εΓδανειζομαι. In Englifh, who is furprifed to find *has* and *hath*, *a hand* and *an hand*, *a ufeful* and *an ufeful*, in the works of the fame author? We could produce inftances of this inaccuracy from the fame page, nay from the fame fentence.

"The authenticity of thofe infcriptions, in which thefe archaifms appear, muft be eftablifhed, before they can be produced in oppofition to the prefent argument." This is, we cannot help thinking, rather too fevere a reftriction. If no infcription may be quoted before it be proved genuine, the learned author of the Differtation need not be afraid of being confuted; for nobody will engage with him on fuch conditions. Perhaps the reverfe of the rule will be thought more equitable; that every infcription be allowed to be genuine, till its authenticity be rendered doubtful

by

by probable arguments. We will conclude this head with two short observations. In Selden's copy, l. 26. was written ΠΟΗΣΙΝ, which the later editions have altered to ΠΟΙΗΣΙΝ, but without reason, the other being the more ancient way of writing, common in MSS. and sometimes found on inscriptions. (See G. Koen's Notes on *Gregorius de Dialectis*, p. 30.) In l. 83. the marble has Καλλεου, for which Palmer wished to substitute Καλλιου. Dr Taylor refutes him from the *Marmor Sandvicense*, observing at the same time, that this orthography occurs in no other place whatever except in these two monuments. Is it likely that two engravers should by chance coincide in the same mistake, or that the forger of the Parian Chronicle (if it be forged) should have seen the *Marmor Sandvicense*, and taken notice of this peculiarity with the intention of afterward employing it in the fabrication of an imposture?

The reviewers next proceed to consider, but more briefly, the other objections.

II. *It is not probable that the Chronicle was engraved for private use.*—1. *Because it was such an expence, as few learned Greeks were able to afford.* If only a *few* were able to afford it, some one of those few might be willing to incur it. But let Mr R. consider how likely it is that a modern, and probably a needy Greek, should be more able to afford it in the last century, than a learned Greek 2000 years ago! 2. *A manuscript is more readily circulated.* Do men never prefer cumbrous splendor to cheapness and convenience? And if this composition, instead of being engraved on marble, had been committed to parchment, would it have had a better chance of coming down to the present age? Such a flying sheet would soon be lost; or, if a copy had, by miracle, been preserved to us, the objections to its being genuine would be more plausible than any that have been urged against the inscription. What Mr R. says about the errors to which an inscription is liable, &c. will only prove that chronological inscriptions ought not to be engraved; but not that they never were. We allow that the *common* method of writing in the reign of Ptolemy Philadelphus was NOT on STONES. But it was common enough to occur to the mind of any person who wished to leave behind him a memorial at once of his learning and magnificence.

III. This objection, *that the marble does not appear to be engraved by public authority*, we shall readily admit, though Bentley (Diss. on Phalaris, p. 251.) leans to the contrary opinion. In explaining this objection, the learned dissertator observes, that though the expression, αρχοντος εν Παρῳ, would lead us to suppose that the inscription related to Paros, not a single circumstance in the history of that island is mentioned. But this expression only shows that the author was an inhabitant of Paros, and intended to give his readers a clue, or *parapegma*, by the aid of which they might adjust the general chronology of Greece to the dates of their own history. "It is as absurd as would be a marble in Jamaica containing the revolutions of England." We see no absurdity in supposing a book to be written in Jamaica containing the revolutions of England. The natives of Paros were not uninterested in events relating to the general history of Greece, particularly of Athens; and how can we tell whether the author were an *inquilinus*, or a native of the island; whether he thought it a place beneath his care; or whether he had devoted a separate inscription to the chronology of Paros?

IV. *It has been frequently observed, that the earlier periods of the Grecian history are involved in darkness and confusion.* Granted. It follows, then, that "an author who should attempt to settle the dates of the earlier periods would frequently contradict preceding, and be contradicted by subsequent, writers; that he would naturally fall into mistakes; and at best could only hope to adopt the most probable system. But the difficulty of the task, or the impossibility of success, are not sufficient to prove that no man has been rash or mad enough to make the attempt." On the contrary, we know that many have made it. What a number of discordant opinions has Mr R. himself given us from the ancients concerning the age of Homer? This consideration will in part obviate another objection, that the Parian Chronicle does not agree with any ancient author. For if the ancients contradict one another, how could it follow more than one of them? and why might not the author, without any imputation of ignorance or rashness, sometimes depart from them all? If indeed he disagrees with them when they are unanimous, it might furnish matter for suspicion: though even this would be far from a decisive argument, unless the ancients were so extremely unlike the moderns, as never to be fond of singular and paradoxical positions.

V. *This Chronicle is not once mentioned by any writer of antiquity.* How many of those inscriptions, which are preserved to the present day, are mentioned by classical authors? Verrius Flaccus composed a Roman kalendar, which, as a monument of his learning and industry, was engraved on marble, and fixed in the most public part of Preneste. Fragments of this very kalendar were lately dug up at Preneste, and have been published by a learned Italian. Now if the passage of Suetonius, which informs us of this circumstance, had been lost, would the silence of the Latin writers prove that the fragments were not genuine remains of antiquity? It may be said that the cases are not parallel; for not a single author mentions the Parian Chronicle, whereas Suetonius does mention Verrius's Roman kalendar. To this we answer, It is dangerous to deny the authenticity of any monument on the slender probability of its being casually mentioned by a single author. We shall also observe, that this fact of the Hemicyclium of Verrius will answer some part of the Dissertator's second objection: "The Parian Chronicle is not an inscription that might have been concealed in a private library." Why not? it is of no extraordinary bulk; and might formerly have been concealed in a private library, or in a private room, with as much ease as many inscriptions are now concealed in very narrow spaces. But unless this monument were placed in some conspicuous part of the island, and obtruded itself on the notice of every traveller, the wonder will in great measure cease why it is never quoted by the ancients. Of the nine authors named in p. 109, had any one ever visited Paros? If Pausanias had travelled thither, and published his description of the place, we might perhaps expect to find some mention of this marble in so curious and inquisitive a writer. But though the inscription existed, and were famous at Paros, there seems no necessity for any

any of the authors whofe works are ftill extant to have known or recorded it. If there be, let this learned antagonift point out the place where this mention ought to have been made. If any perfons were bound by a ftronger obligation than others to fpeak of the Parian infcription, they muft be the profeffed chronologers; but alas! we have not the entire works of fo much as a fingle ancient chronologer: it is therefore impoffible to determine whether this Chronicle were quoted by any ancient. And fuppofing it had been feen by fome ancient, whofe writings ftill remain, why fhould he make particular mention of it? Many authors, as we know from their remains, very freely copied their predeceffors without naming them. Others, finding only a collection of bare events in the infcription, without hiftorical proofs or reafons, might entirely neglect it, as deferving no credit. Mr R. feems to lay much ftrefs on the precife, exact, and particular fpecification of the events, p. 109. But he ought to reflect, that this abrupt and pofitive method of fpeaking is not only ufual, but neceffary, in fuch fhort fyftems of chronology as the marble contains, where events only, and their dates, are fet down, unaccompanied by any examination of evidences for and againft, without ftating any computation of probabilities, or deduction of reafons. When therefore a chronological writer had undertaken to reduce the general hiftory of Greece into a regular and confiftent fyftem, admitting that he was acquainted with this infcription, what grounds have we to believe that he would fay any thing about it? Either his fyftem coincided with the Chronicle or not: if it coincided, he would very probably difdain to prop his own opinions with the unfupported affertions of another man, who, as far as he knew, was not better informed than himfelf. On the other hand, if he differed from the authority of the marble, he might think it a fuperfluous exertion of complaifance, to refute, by formal demonftration, a writer who had chofen to give no reafons for his own opinion. We fhall pafs hence to

Objection VII. With refpect to the parachronifms that Mr R. produces, we fhall without hefitation grant that the author of the infcription may have committed fome miftakes in his chronology, as perhaps concerning Phidon, whom he feems to have confounded with another of the fame name, &c. But thefe miftakes will not conclude againft the antiquity of the infcription, unlefs we at the fame time reject many of the principal Greek and Roman writers, who have been convicted of fimilar errors. We return therefore to

Objection VI. *Some of the facts feem to have been taken from authors of a later date.* We have endeavoured impartially to examine and compare the paffages quoted in proof of this objection; but we are obliged to confefs, that we do not perceive the fainteft traces of theft or imitation. One example only deferves to be excepted; to which we fhall therefore pay particular attention.

"The names of fix, and, if the lacunæ are properly fupplied, the names of twelve cities, appear to have been engraved on the marble, exactly, as we find them in Ælian's Various Hiftory. But there is not any imaginable reafon for this particular arrangement. It does not correfpond with the time of their foundation, with their fituation in Ionia, with their relative importance, or with the order in which they are placed by other eminent hiftorians."

The chance of fix names, fays Mr R. being placed by two authors in the fame order, is as 1 to 720; of 12, as 1 to 479,001,600. "It is therefore utterly improbable that thefe names would have been placed in this order on the marble, if the author of the infcription had not tranfcribed them from the hiftorian."

On this argument we fhall obferve, 1ft, That the very contrary conclufion might poffibly be juft, that the hiftorian tranfcribed from the infcription. Yet we fhall grant that in the prefent cafe this is improbable, efpecially if the author of the Various Hiftory be the fame Ælian, who, according to Philoftratus, Vit. Sophift. II. 31. never quitted Italy in his life. But an intermediate writer might have copied the marble, and Ælian might have been indebted to him. 2dly, We fee no reafon to allow, that the *lacunæ* are properly fupplied. Suppofe we fhould affert, that the names ftood originally thus: Miletus, Ephefus, Erythræ, Clazomene, Lebedos, Chios, Phocæa, Colophon, Myus, Priene, Samos, Teos. In this arrangement, only four names would be together in the fame order with Ælian; and from thefe Miletus muft be excepted, becaufe there is an obvious reafon for mentioning that city firft. Three only will then remain; and furely that is too flight a refemblance to be conftrued into an imitation. For Paufanias and Paterculus, quoted by our author, p. 154, have both enumerated the fame twelve cities, and both agree in placing the five laft in the fame order; nay, the fix laft, if Voffius's conjecture that TEUM ought to be inferted in Paterculus after Myum TEM, be as true as it is plaufible. But who imagines that Paufanias had either opportunity or inclination to copy Paterculus? 3dly, Allowing that the names were engraved on the marble exactly in the order that Ælian has chofen, is there no way of folving the phenomenon but by fuppofing that one borrowed from the other? Seven authors at leaft (Mr R. feems to fay more, p. 154, 155.) mention the colonization of the fame cities: how many authors now loft may we reafonably conjecture to have done the fame? If therefore the compofer of the Chronicle and Ælian lighted on the fame authors, the former would probably preferve the fame arrangement that he found, becaufe in tranfcribing a lift of names, he could have no temptation to deviate; and the latter would certainly adhere faithfully to his original, becaufe he is a notorious and fervile plagiarift. Mr R. indeed thinks, p. 158, that if a fucceeding writer had borrowed the words of the infcription, he would not have fuppreffed the name of the author. This opinion muft fall to the ground, if it be fhown that Ælian was accuftomed to fupprefs the names of the authors to whom he was obliged. Ælian has given a lift of fourteen celebrated gluttons; and elfewhere, another of twenty-eight drunkards (from which, by the way, it appears, that people were apt to eat and drink rather too freely in ancient as well as modern times); and both thefe lifts contain exactly the fame names in the fame order with Atheneus. Now it is obfervable, that fourteen names may be tranfpofed 87,178,291,200 different ways, and that twenty-eight names admit of 304,888,344,611,713,860,501,504,000,000 different tranfpofitions, &c. &c. Ælian therefore tranfcribed them

them from Atheneüs: yet Ælian never mentions Atheneüs in his Various Hiſtory. So that whether Ælian copied from the marble, or only drew from a common ſource, he might, and very probably would, conceal his authority.

VIII. *The hiſtory of the diſcovery of the Marbles is obſcure and unſatisfactory.*

In p. 169, it is ſaid to be "related with ſuſpicious circumſtances, and without any of thoſe clear and unequivocal evidences which always diſcriminate truth from falſehood." The queſtion is then finally decided. If the inſcription has not any of thoſe evidences which truth always poſſeſſes, and which falſehood always wants, it is moſt certainly forged. The learned diſſertator ſeems for a moment to have forgotten the modeſt character of a *doubter*, and to perſonate the dogmatiſt. But waving this, we ſhall add, that, as far as we can ſee, no appearance of fraud is diſcoverable in any part of the tranſaction. The hiſtory of many inſcriptions is related in a manner equally unſatisfactory; and if it could be clearly proved that the marble was dug up at Paros, what could be eaſier for a critic, who is determined at any rate to object, than to ſay, that it was buried there in order to be afterward dug up? If the perſon who brought this treaſure to light had been charged on the ſpot with forging it, or concurring in the forgery, and had then refuſed to produce the external evidences of its authenticity, we ſhould have a right to queſtion, or perhaps to deny, that it was genuine. But no ſuch objection having been made or hinted, at the original time of its diſcovery, it is unreaſonable to require ſuch teſtimony as it is now impoſſible to obtain. "There is nothing ſaid of it in Sir T. Roe's negociations." What is the inference? That Sir Thomas knew nothing of it, or believed it to be ſpurious, or forged it, or was privy to the forgery? Surely nothing of this kind can be pretended. But let our author account for the circumſtance if he can. To us it ſeems of no conſequence on either ſide. "Piereſc made no effort to recover this precious relic; and from this compoſure he ſeems to have entertained ſome ſecret ſuſpicions of its authenticity." Piereſc would have had no chance of recovering it after it was in the poſſeſſion of Lord Arundel's agents. He was either a real or a pretended patron of letters; and it became him to affect to be pleaſed that the inſcription had come into England, and was illuſtrated by his learned friend Selden. John F. Gronovius had, with great labour and expence, collated Anna Comnena's Alexiades, and intended to publiſh them. While he was waiting for ſome other collations, they were intercepted, and the work was publiſhed by another. As ſoon as Gronovius heard this unpleaſant news, he anſwered, that learned men were engaged in a common cauſe; that if one prevented another in any publication, he ought rather to be thanked for lightening the burden, than blamed for interfering. But who would conclude from this anſwer, that Gronovius thought the Alexiades ſpurious, or not worthy of any regard?

Mr R. calculates, that the venders of the marble received 200 pieces. But here again we are left in the dark, unleſs we knew the preciſe value of theſe pieces. Perhaps they might be equal to an hundred of our pounds, perhaps only to fifty. Beſides, as they at firſt bargained with Samſon, Piereſc's ſuppoſed Jew agent, for fifty pieces only, they could not have forged the inſcription with the clear proſpect of receiving more; neither does it appear that they were paid by Samſon. It is fully as reaſonable to ſuppoſe fraud on the one ſide as on the other; and if Samſon, after having the marble in his poſſeſſion, refuſed or delayed to pay the ſum ſtipulated, he might, in conſequence of ſuch refuſal or delay, be thrown into priſon, and might, in revenge, damage the marble before the owners could recover it. We own this account of ours to be a romance; but it is lawful to combat romance with romance.

IX. *The world has been frequently impoſed upon by ſpurious books and inſcriptions; and therefore we ſhould be extremely cautious with regard to what we receive under the venerable name of antiquity.*

Much truth is obſervable in this remark. But the danger lies in applying ſuch general apophthegms to particular caſes. In the firſt place, it muſt be obſerved, that no forged books will exactly ſuit Mr R.'s purpoſe, but ſuch as pretend to be the author's own hand-writing; nor any inſcriptions, but ſuch as are ſtill extant on the original materials, or ſuch as were known to be extant at the time of their pretended diſcovery. Let the argument be bounded by theſe limits, and the number of forgeries will be very much reduced. We are not in poſſeſſion of Cyriacus Anconitanus's book; but if we were governed by authority, we ſhould think that the teſtimony of Reineſius in his favour greatly overbalances all that Auguſtinus has ſaid to his prejudice. The opinion of Reineſius is of the more weight, becauſe he ſuſpects Urſinus of publiſhing counterfeit monuments. We likewiſe find the moſt eminent critics of the preſent age quoting Cyriacus without ſuſpicion (Vid. Ruhnken. in Timæi Lex. Plat. p. 10. apud Koen, ad Gregor. p. 140.). The doctrine advanced in the citation from Hardouin is exactly conformable to that writer's uſual paradoxes. He wanted to deſtroy the credit of all the Greek and Latin writers. But inſcriptions hung like a millſtone about the neck of his project. He therefore reſolved to make ſure work, and to deny the genuineneſs of as many as he ſaw convenient: to effect which purpoſe, he intrenches himſelf in a general accuſation. If the author of the diſſertation had quoted a few more paragraphs from Hardouin, in which he endeavours, after his manner, to ſhow the forgery of ſome inſcriptions, he would at once have adminiſtered the poiſon and the antidote. But to the reveries of that learned madman, reſpecting Greek ſuppoſititious compoſitions of this nature, we ſhall content ourſelves with oppoſing the ſentiments of a modern critic, whoſe judgment on the ſubject of ſpurious inſcriptions will not be diſputed. Maffei, in the introduction to the third book, c. 1. p. 51. of his admirable, though unfiniſhed, work, *de Arte Critica Lapidaria*, uſes theſe words: *Inſcriptionum Græce loquentium commentitias, ſi cum Latinis comparemus, deprehendi paucas; neque enim ullum omnino eſt, in tanta debacchantium falſariorum libidine, monumenti genus, in quod ii ſibi minus licere putaverint. Argumento eſt, pauciſſimas uſque in hanc diem ab eruditis viris, et in hoc literarum genere plurimum verſatis rejectas eſſe, falſique damnatas.*

Books of CHRONICLES, a canonical writing of the Old

Chronicles.

Old Testament. It is uncertain which were written first, *The Books of Kings*, or *The Chronicles*, since they each refer to the other. However it be, the latter is often more full and comprehensive than the former. Whence the Greek interpreters call these two books Παραλειπομενα, *Supplements*, *Additions*, or things omitted, because they contain some circumstances which are omitted in the other historical books. The Jews make but one book of the Chronicles, under the title of *Dibre-Haiamim*, i. e. *Journals* or *Annals*. Ezra is generally believed to be the author of these books. It is certain they were written after the end of the Babylonish captivity and the first year of the reign of Cyrus, of whom mention is made in the last chapter of the second book.

The *Chronicles*, or *Paraleipomena*, are an abridgement of all the sacred history, from the beginning of the Jewish nation to their first return from the captivity, taken out of those books of the Bible which we still have, and out of other annals which the author had then by him. The design of the writer was to give the Jews a series of their history. The first book relates to the rise and propagation of the people of Israel from Adam, and gives a punctual and exact account of the reign of David. The second book sets down the progress and end of the kingdom of Judah, to the very year of their return from the Babylonish captivity.

Chronogram, Chronology.

CHRONOGRAM, a species of false wit, consisting in this, that a certain date or epocha is expressed by numeral letters of one or more verses; such is that which makes the motto of a medal struck by Gustavus Adolphus in 1632:

ChrIstVs DVX; ergo trIVMphVs.

CHRONOLOGY,

TREATS of time, the method of measuring its parts, and adapting these, when distinguished by proper marks and characters, to past transactions, for the illustration of history. This science therefore consists of two parts. The first treats of the proper measurement of time, and the adjustment of its several divisions; the second, of fixing the dates of the various events recorded in history, and ranging them according to the several divisions of time, in the order in which they happened.

1 How divided.

2 Chronology unknown to the ancients.

Chronology, comparatively speaking, is but of modern date. The ancient poets appear to have been entirely unacquainted with it; and Homer, the most celebrated of them all, mentions nothing like a formal kalendar in any part of his writings. In the most early periods, the only measurement of time was by the seasons, the revolutions of the sun and moon; and many ages must have elapsed before the mode of computation by dating events came into general use. Several centuries intervened between the era of the Olympic games and the first historians; and several more between these and the first authors of chronology. When time first began to be reckoned, we find its measures very indeterminate. The succession of Juno's priestesses at Argos served Hellanicus for the regulation of his narrative; while Ephorus reckoned his matters by generations. Even in the histories of Herodotus and Thucydides, we find no regular dates for the events recorded: nor was there any attempt to establish a fixed era, until the time of Ptolemy Philadelphus, who attempted it by comparing and correcting the dates of the Olympiads, the kings of Sparta, and the succession of the priestesses of Juno at Argos. Eratosthenes and Apollodorus digested the events recorded by them, according to the succession of the Olympiads and of the Spartan kings.

3 Inaccurate methods of computing time at first made use of.

The uncertainty of the measures of time in the most early periods renders the histories of those times equally uncertain; and even after the invention of dates and eras, we find the ancient historians very inattentive to them, and inaccurate in their computations. Frequently their eras and years were reckoned differently without their being sensible of it, or at least without giving the reader any information concerning it; a circumstance which has rendered the fragments of their works now remaining of very little use to posterity. The Chaldean and Egyptian writers are generally acknowledged to be fabulous; and Strabo acquaints us, that Diodorus Siculus, and the other early historians of Greece, were ill informed and credulous. Hence the disagreement among the ancient historians, and the extreme confusion and contradiction we meet with on comparing their works. Hellanicus and Acusilaus disagreed about their genealogies; the latter rejected the traditions of Hesiod. Timæus accused Ephorus of falsehood, and the rest of the world accused Timæus. The most fabulous legends were imposed on the world by Herodotus; and even Thucydides and Diodorus, generally accounted able historians, have been convicted of error. The chronology of the Latins is still more uncertain. The records of the Romans were destroyed by the Gauls; and Fabius Pictor, the most ancient of their historians, was obliged to borrow the greatest part of his information from the Greeks. In other European nations the chronology is still more imperfect and of a later date; and even in modern times, a considerable degree of confusion and inaccuracy has arisen from want of attention in the historians to ascertain the dates and epochs with precision.

4 Ancient historians not to be credited.

From these observations it is obvious how necessary a proper system of chronology must be for the right understanding of history, and likewise how very difficult it must be to establish such a system. In this, however, several learned men have excelled, particularly Julius Africanus, Eusebius of Cæsarea, George Cyncelle, John of Antioch, Dennis, Petau, Cluviar, Calvisius, Usher, Simson, Marsham, Blair, and Playfair. It is founded, 1. On astronomical observations, particularly of the eclipses of the sun and moon, combined with the calculations of the eras and years of different nations. 2. The testimonies of credible authors. 3. Those epochs in history which are so well attested and determined, that they have never been controverted.

5 Utility of chronology, list of chronologers, &c.

verted. 4. Ancient medals, coins, monuments, and inſcriptions. None of theſe, however, can be ſufficiently intelligible without an explanation of the firſt part, which, we have already obſerved, conſiders the diviſions of time, and of which therefore we ſhall treat in the firſt place.

6
Of the diviſion of time into days.

The moſt obvious diviſion of time is derived from the apparent revolutions of the celeſtial bodies, particularly of the ſun, which by the viciſſitudes of day and night becomes evident to the moſt barbarous and ignorant nations. In ſtrict propriety of ſpeech, the word *day* ſignifies only that portion of time during which the ſun diffuſes light on any part of the earth; but in the moſt comprehenſible ſenſe, it includes the night alſo, and is called by chronologers a *civil* day; by aſtronomers a *natural*, and ſometimes an *artificial* day.

7
Civil, ſolar, &c. days defined.

By a civil day is meant the interval betwixt the ſun's departure from any given point in the heavens and next return to the ſame, with as much more as anſwers to its diurnal motion eaſtward, which is at the rate of 59 minutes and 8 ſeconds of a degree, or 3 minutes and 57 ſeconds of time. It is alſo called a *ſolar* day, and is longer than a *ſidereal* one, inſomuch that, if the former be divided into 24 equal parts or hours, the latter will conſiſt only of 23 hours 56 minutes. The apparent inequality of the ſun's motion, likewiſe, ariſing from the obliquity of the ecliptic, produces another inequality in the length of the days: and hence the difference betwixt real and apparent time, ſo that the apparent motion of the ſun cannot always be a true meaſure of duration. Thoſe inequalities, however, are capable of being reduced to a general ſtandard, which furniſhes an exact meaſure throughout the year; whence ariſes the difference between mean and apparent time, as is explained under the article ASTRONOMY.

8
Different ways of computing the beginning of the day.

There have been very conſiderable differences among nations with regard to the beginning and ending of their days. The beginning of the day was counted from ſunriſe by the Babylonians, Syrians, Perſians, and Indians. The civil day of the Jews was begun from ſunriſe, and their ſacred one from ſunſet; the latter mode of computation being followed by the Athenians, Arabs, ancient Gauls and other European nations. According to ſome, the Egyptians began their day at ſunſet, while others are of opinion that they computed from noon or from ſunriſe; and Pliny informs us that they computed their civil day from one midnight to another. It is probable, however, that they had different modes of computation in different provinces or cities. The Auſonians, the moſt ancient inhabitants of Italy, computed the day from midnight; and the aſtronomers of Cathay and Oighur in the Eaſt Indies reckoned in the ſame manner. This mode of computation was adopted by Hipparchus, Copernicus, and other aſtronomers, and is now in common uſe among ourſelves. The *aſtronomical* day, however, as it is called, on account of its being uſed in aſtronomical calculation, commences at noon, and ends at the ſame time the following day. The Mahometans reckon from one twilight to another. In Italy, the civil day commences at ſome indeterminate point after ſunſet; whence the time of noon varies with the ſeaſon of the year. At the ſummer ſolſtice, the clock ſtrikes 16 at noon, and 19 at the time of the winter ſolſtice. Thus alſo the length of each day differs by ſeveral minutes from that immediately preceding or following it. This variation requires a conſiderable difficulty in adjuſting their time by clocks. It is accompliſhed, however, by a ſudden movement which corrects the difference when it amounts to a quarter of an hour; and this it does ſometimes at the end of eight days, ſometimes at the end of 15, and ſometimes at the end of 40. Information of all this is given by a printed kalendar, which announces, that from the 16th of February, for inſtance to the 24th, it will be noon at a quarter paſt 18; from the 24th of February to the 6th of March, it will be noon at 18 o'clock preciſely; from the firſt of June to the 13th of July, the hour of noon will be at 16 o'clock; on the 13th of July it will be at half an hour after 16; and ſo on throughout the different months of the year. This abſurd method of meaſuring the day continues, notwithſtanding ſeveral attempts to ſuppreſs it, throughout the whole of Italy, a few provinces only excepted.

9
Strange method of computa- Italy.

10
Various ſubdiviſions of the day.

The ſubdiviſions of the day have not been leſs various than the computations of the day itſelf. The moſt obvious diviſion, and which could at no time, nor in no age, be miſtaken, was that of morning and evening. In proceſs of time the two intermediate points of noon and midnight were determined; and this diviſion into quarters was in uſe long before the invention of hours.

From this ſubdiviſion probably aroſe the method uſed by the Jews and Romans of dividing the day and night into four vigils or watches. The firſt began at ſunriſing, or ſix in the morning; the ſecond at nine; the third at twelve; and the fourth at three in the afternoon. In like manner the night was divided into four parts; the firſt beginning at ſix in the evening, the ſecond at nine, the third at twelve, and the fourth at three in the morning. The firſt of theſe diviſion was called by the Jews the *third* hour of the day; the ſecond the *ſixth*; the third the *ninth*; and the fourth the *twelfth*, and ſometimes the *eleventh*. Another diviſion in uſe, not only among the nations above mentioned, but the Greeks alſo, was that which reckoned the firſt quarter from ſunſet to midnight; the ſecond from midnight to ſunriſe; the third, or morning watch, from morning to noon; and the fourth from noon to ſunſet.

11
Invention of hours uncertain.

It is uncertain at what time the more minute ſubdiviſion of the day into hours firſt commenced. It does not appear from the writings of Moſes that he was acquainted with it, as he mentions only the morning, mid-day, evening, and ſunſet. Hence we may conclude, that the Egyptians at that time knew nothing of it, as Moſes was well ſkilled in their learning. According to Herodotus, the Greeks received the knowledge of the twelve hours of the day from the Babylonians. It is probable, however, that the diviſion was actually known and in uſe before the name *hour* was applied to it; as Cenſorinus informs us that the term was not made uſe of in Rome for 300 years after its foundation; nor was it known at the time the twelve tables were conſtructed.

The eaſtern nations divide the day and night in a very ſingular manner; the origin of which is not eaſily diſcovered.

discovered. The Chinese have five watches in the night, which are announced by a certain number of strokes on a bell or drum. They begin by giving one stroke, which is answered by another; and this is repeated at the distance of a minute or two, until the second watch begin, which is announced by two strokes; and so on throughout the rest of the watches. By the ancient Tartars, Indians, and Persians, the day was divided into eight parts, each of which contained seven hours and a half. The Indians on the coast of Malabar divide the day into six parts, called *najika;* each of these six parts is subdivided into 60 others, called *venaigas;* the venaiga into 60 *birpes;* the birpe into 10 *kenikans;* the kenikan into four *mattires;* the mattire into eight *kaunimas* or *caignodes;* which divisions, according to our mode of computation, stand as follow:

12 Method of computation on the coast of Malabar.

Najika,	Venaiga,	Birpe,	Kenikan,	Mattire,	Caignode.
24 min.	24 sec.	4 sec.	$\frac{2}{5}$ sec.	$\frac{1}{10}$ sec.	$\frac{1}{80}$ sec.

The day of the Chinese is begun at midnight, and ends with the midnight following. It is divided into twelve hours, each distinguished by a particular name and figure. They also divide the natural day into 100 parts, and each of these into 100 minutes; so that the whole contains 10,000 minutes. In the northern parts of Europe, where only two seasons are reckoned in the year, the divisions of the day and night are considerably larger than with us. In Iceland the 24 hours are divided into eight parts; the first of which commences at three in the morning; the second at five; the third at half an hour after eight; the fourth at eleven; the fifth at three in the afternoon; the sixth at six in the evening; the seventh at eight, and the last at midnight. In the eastern part of Turkestan, the day is divided into twelve equal parts, each of which is distinguished by the name of some animal. These are subdivided into eight *keh;* so that the whole 24 hours contain 96 *keh.*

13 Divisions of the hour into minutes, &c.

The modern divisions of the hour in use among us are into minutes, seconds, thirds, fourths, &c. each being a sixtieth part of the former subdivision. By the Chaldæans, Jews, and Arabians, the hour is divided into 1080 scruples; so that one hour contains 60 minutes, and one minute, 18 scruples. The ancient Persians and Arabs were likewise acquainted with this division; but the Jews are so fond of it, that they pretend to have received it in a supernatural manner. "Issachar (say they) ascended into heaven, and brought from thence 1080 parts for the benefit of the nation."

14 Methods of announcing the hours.

The division of the day being ascertained, it soon became an object to indicate in a public manner the expiration of any particular hour or division; as without some general knowledge of this kind, it would be in a great measure impossible to carry on business. The methods of announcing this have been likewise very different. Among the Egyptians it was customary for the priests to proclaim the hours like watchmen among us. The same method was followed at Rome; nor was there any other method of knowing the hours until the year 293 B. C. when Papirius Cursor first set up a sun-dial in the Capitol. A similar method is practised among the Turks, whose priests proclaim from the top of their mosques, the cock-crowing, day-break, mid-day, three o'clock in the afternoon, and twilight, being their appointed times of worship.

15 Invention of instruments for this purpose.

As this mode of proclaiming the hour could not but be very inconvenient, as well as imperfect, the introduction of an instrument which every one could have in his possession, and which might answer the same purpose, must have been considered as a valuable acquisition. One of the first of these was the clepsydra or water-clock *. Various kinds of these were in use among the Egyptians at a very early period. The invention of the instrument is attributed to Thoth or Mercury, and it was afterwards improved by Ctesibius of Alexandria. It was a common measure of time among the Greeks, Indians, and Chaldæans, as well as the Egyptians, but was not introduced into Rome till the time of Scipio Nasica. The Chinese astronomers have long made use of it; and by its means divided the zodiac into twelve parts; but it is a very inaccurate measure of time, varying, not only according to the quantity of water in the vessel, but according to the state of the atmosphere.

* See *Clepsydra.*

The clepsydra was succeeded by the gnomon or sun-dial.—This at first was no more than a stile erected perpendicularly to the horizon; and it was a long time before the principles of it came to be thoroughly understood. The invention is with great probability attributed to the Babylonians, from whom the Jews received it before the time of Ahaz, when we know that a sun-dial was already erected at Jerusalem. The Chinese and Egyptians also were acquainted with the use of the dial at a very early period, and it was considerably improved by Anaximander or Anaximenes; one of whom is for that reason looked upon to be the inventor. Various kinds of dials, however, were invented and made use of in different nations long before their introduction at Rome. The first erected in that city, as has been already mentioned, was that by Papirius Cursor; and 30 years after, Valerius Messala brought one from Sicily, which was used in Rome for no less than 99 years, though constructed for a Sicilian latitude, and consequently incapable of showing the hours exactly in any other place; but at last another was constructed by L. Philippus, capable of measuring time with greater accuracy.

It was long after the invention of dials before mankind began to form any idea of clocks; nor is it well known at what period they were first invented. A clock was sent by Pope Paul I. to Pepin king of France, which at that time was supposed to be the only one in the world. A very curious one was also sent to Charles the Great from the caliph Haroun Alraschid, which the historians of the time speak of with surprise and admiration: but the greatest improvement was that of Mr Huygens, who added the pendulum to it. Still, however, the instruments for dividing time were found to be inaccurate for nice purposes. The expansion of the materials by heat, and their contraction by cold, would cause a very perceptible alteration in the going of an instrument in the same place at different times of the year, and much more if carried from one climate to another. Various methods have been contrived to correct this; which indeed can be done very effectually at land by a certain construction of

of the pendulum; but at sea, where a pendulum cannot be used, the inaccuracy is of consequence much greater; nor was it thought possible to correct the errors arising from these causes in any tolerable degree, until the late invention of Mr Harrison's time-piece, which may be considered as making perhaps as near an approach to perfection as possible.

Having thus given an account of the more minute divisions of time, with the methods of measuring them, we must now proceed to the larger; which more properly belong to chronology, and which must be kept on record, as no instrument can be made to point them out. Of these the division into weeks of seven days is one of the most ancient, and probably took place from the creation of the world. Some, indeed, are of opinion, that the week was invented some time after for the more convenient notation of time; but whatever may be in this, we are certain that it is of the highest antiquity, and even the most rude and barbarous nations have made use of it. It is singular indeed that the Greeks, notwithstanding their learning, should have been ignorant of this division; and M. Goguet informs us, that they were almost the only nation who were so. By them the month of 30 days was divided into three times 10, and the days of it named accordingly. Thus the 15th day of the month was called the *second fifth*, or fifth of the second tenth; the 24th was called the *third fourth*, or the fourth day of the third tenth. This method was in use in the days of Hesiod, and it was not until several ages had elapsed, that the use of weeks was received into Greece from the Egyptians. The inhabitants of Cathay, in the northern part of China, were likewise unacquainted with the week of seven days, but divided the year into six parts of 60 days each. They had also a cycle of 15 days, which they used as a week. The week was likewise unknown to the ancient Persians and to the Mexicans; the former having a different name for every day of the month, and the latter making use of a cycle of 13 days. By almost all other nations the week of seven days was adopted.

16 Of weeks.

17 Of holidays.

It is remarkable, that one day in the week has always been accounted as sacred by every nation. Thus Saturday was consecrated to pious purposes among the Jews, Friday by the Turks, Tuesday by the Africans of Guinea, and Sunday by the Christians. Hence also the origin of *Feriæ* or holidays frequently made use of in Systems of Chronology; and which arose from the following circumstance. In the church of Rome the old ecclesiastical year began with Easter week; all the days of which were called *Feriæ* or *Feriati*, that is, holy or sacred days; and in process of time the days of other weeks came to be distinguished by the same appellation, for the two following reasons, 1. Because every day ought to be holy in the estimation of a Christian. 2. Because all days are holy to ecclesiastics, whose time ought to be entirely devoted to religious worship.—The term *week* is sometimes used to signify seven years, not only in the prophetical writings, but likewise by profane authors: thus Varro, in his book inscribed *Hebdomades*, informs us, that he had then entered the 12th week of his years.

18 Of months.

The next division of time superior to weeks, is that of *months*. This appears to have been, if not coeval with the creation, at least in use before the flood. As this division is naturally pointed out by the revolution of the moon, the months of all nations were originally lunar; until after some considerable advances had been made in science, the revolutions of that luminary were compared with the sun, and thus the limits of the month fixed with greater accuracy. The division of the year into 12 months, as being founded on the number of full revolutions of the moon in that time, has also been very general; though Sir John Chardin informs us, that the Persians divided the year into 24 months; and the Mexicans into 18 months of 20 days each. The months generally contained 30 days, or 29 and 30 days alternately; though this rule was far from being without exception. The months of the Latins consisted of 16, 18, 22, or 36 days; and Romulus gave his people a year of 10 months and 304 days. The Kamtschatkadales divide the year into 10 months; reckoning the time proper for labour to be nine months, and the winter season, when they are obliged to remain inactive, only as one month.

It has been a very ancient custom to give names to the different months of the year, though this appears to have been more modern than the departure of the Israelites out of Egypt, as they would otherwise undoubtedly have carried it with them; but for a considerable time after their settlement in Canaan, they distinguished the months only by the names of first, second, &c. After their return from the Babylonish captivity, they adopted the names given to the months by the Chaldæans. Other nations adopted various names, and arranged the months themselves according to their fancy. From this last circumstance arises the variety in the dates of the months; for as the year has been reckoned from different signs in the ecliptic, neither the number nor the quantity of months have been the same, and their situation has likewise been altered by the intercalations necessary to be made.

These intercalations became necessary on account of the excess of the solar above the lunar year; and the months composed of intercalary days are likewise called *embolismal*. These embolismal months are either *natural* or *civil*. By the former the solar and lunar years are adjusted to one another; and the latter arises from the defect of the civil year itself. The *adar* of the Jews, which always consists of 30 days, is an example of the natural embolismal month.

The Romans had a method of dividing their months into kalends, nones, and ides. The first was derived from an old word *calo*, "to call;" because, at every new moon, one of the lower class of priests assembled the people, and called over, or announced, as many days as intervened betwixt that and the nones, in order to notify the difference of time and the return of festivals. The 2d, 3d, 4th, 5th, 6th, and 7th of March, May, July, and October, were the nones of these months; but in the other months were the 2d, 3d, 4th, and 5th days only. Thus the 5th of January was its nones; the 4th was *pridie nonarum;* the 3d, *tertio nonarum*, &c. The ides contained eight days in every month, and were nine days distant from the nones. Thus the 15th day of the four months already mentioned was the

the ides of them; but in the others the 13th was accounted as ſuch; the 12th was *pridie iduum*, and the 11th *tertio iduum*. The ides were ſucceeded by the kalends; the 14th of January, for inſtance, being the 19th kalend of February; the 15th was the 18th kalend; and ſo on till the 31ſt of January, which was *pridie kalendarum*; and February 1ſt was the kalends.

19
Aſtronomical and civil months.

Among the European nations the month is either aſtronomical or civil. The former is meaſured by the motion of the heavenly bodies; the civil conſiſts of a certain number of days ſpecified by the laws, or by the civil inſtitutions of any nation or ſociety. The aſtronomical months, being for the moſt part regulated by the motions of the ſun and moon, are thus divided into ſolar and lunar, of which the former is ſometimes alſo called *civil*. The aſtronomical ſolar month is the time which the ſun takes up in paſſing through a ſign of the ecliptic. The lunar month is periodical, ſynodical, ſidereal, and civil. The ſynodical lunar month is the time that paſſes between any conjunction of the moon with the ſun and the conjunction following. It includes the motion of the ſun eaſtward during that time; ſo that a mean lunation conſiſts of 29d. 12h. 44′ 2″ 8921. The ſidereal lunar month is the time of the mean revolution of the moon with regard to the fixed ſtars. As the equinoctial points go backwards about 4′ in the ſpace of a lunar month, the moon muſt, in conſequence of this retroceſſion, arrive at the equinox ſooner than at any fixed ſtar, and conſequently the mean ſidereal revolution muſt be longer than the mean periodical one. The latter conſiſts of 27d. 7h. 43′ 4″ 6840. The civil lunar month is computed from the moon, to anſwer the ordinary purpoſes of life; and as it would have been inconvenient, in the computation of lunar months, to have reckoned odd parts of days, they have been compoſed of 30 days, or of 29 and 30 alternately, as the neareſt round numbers. When the month is reckoned from the firſt appearance of the moon after her conjunction, it is called the *month of illumination*. The Arabs, Turks, and other nations, who uſe the era of the Hegira, follow this method of computation. As twelve lunar months, however, are 11 days leſs than a ſolar year, Julius Cæſar ordained that the month ſhould be reckoned from the courſe of the ſun and not of the moon; and that they ſhould conſiſt of 30 and 31 days alternately, February only excepted, which was to conſiſt of 28 commonly, and of 29 in leap years.

20
Of years.

The higheſt natural diviſion of time is into years. At firſt, however, it is probable that the courſe of the ſun through the ecliptic would not be obſerved, but that all nations would meaſure their time by the revolutions of the moon. We are certain, at leaſt, that the Egyptian year conſiſted originally of a ſingle lunation; though at length it included two or three months, and was determined by the ſtated returns of the ſeaſons. As the eaſtern nations, however, particularly the Egyptians, Chaldeans, and Indians, applied themſelves in very early periods to aſtronomy, they found, by comparing the motions of the ſun and moon together, that one revolution of the former included nearly 12 of the latter. Hence a year of 12 lunations was formed, in every one of which were reckoned 30 days; and hence alſo the diviſion of the ecliptic into 360 degrees. The luniſolar year, conſiſting of 360 days, was in uſe long before any regular intercalations were made; and hiſtorians inform us, that the year of all ancient nations was luniſolar. Herodotus relates, that the Egyptians firſt divided the year into 12 parts by the aſſiſtance of the ſtars, and that every part conſiſted of 30 days. The Thebans corrected this year by adding five intercalary days to it. The old Chaldean year was alſo reformed by the Medes and Perſians: and ſome of the Chineſe miſſionaries have informed us, that the luniſolar year was alſo corrected in China; and that the ſolar year was aſcertained in that country to very conſiderable exactneſs. The Latin year, before Numa's correction of it, conſiſted of 360 days, of which 304 were divided into ten months; to which were added two private months not mentioned in the kalendar.

21
Explanation of a paſſage in Herodotus.

The imperfection of this method of comparing time is now very evident. The luniſolar year was about $5\frac{1}{4}$ days ſhorter than the true ſolar year, and as much longer than the lunar. Hence the months could not long correſpond with the ſeaſons; and even in ſo ſhort a time as 34 years, the winter months would have changed places with thoſe of ſummer. From this rapid variation, Mr Playfair takes notice, that a paſſage in Herodotus, by which the learned have been exceedingly puzzled, may receive a ſatisfactory ſolution, viz. that "in the time of the ancient Egyptian kings, the ſun had twice ariſen in the place where it had formerly ſet, and twice ſet where it had ariſen." By this he ſuppoſes it is meant, "that the beginning of the year had twice gone through all the ſigns of the ecliptic; and that the ſun had riſen and ſet twice in every day and month in the year." This, which ſome have taken for a proof of moſt extravagant antiquity, he further obſerves, might have happened in 138 years only; as in that period there would be a difference of nearly two years between the ſolar and lunar year. Such evident imperfections could not but produce a reformation everywhere; and accordingly we find that there was no nation which did not adopt the method of adding a few intercalary days at certain intervals. We are ignorant, however, of the perſon who was the firſt inventor of this method. The Theban prieſts attributed the invention to Mercury or Thoth; and it is certain that they were acquainted with the year of 365 days at a very early period. The length of the ſolar year was repreſented by the celebrated golden circle of Oſymandyas of 365 cubits circumference; and on every cubit of which was inſcribed a day of the year, together with the heliacal riſings and ſettings of the ſtars. That monarch is ſuppoſed to have reigned in the 11th or 12th century before the Chriſtian era.

22
Great Egyptian year, or canicular cycle.

The Egyptian ſolar year being almoſt ſix hours ſhorter than the true one, this inaccuracy, in proceſs of time, produced another revolution; ſome circumſtances attending which ſerve to fix the date of the diſcovery of the length of the year, and which, from the above deſcription of the golden circle, we may ſuppoſe to have been made during the reign of Oſymandyas. The inundation of the Nile was annually announced by the heliacal riſing of Sirius, to which the reformers of the kalendar adjuſted the beginning of the year, ſuppoſing that it would remain immoveable. In a number of years, however, it appeared that their ſuppoſi-

tions

tions of this were ill founded. By reaſon of the inequality above mentioned, the heliacal riſing of Sirius gradually advanced nearly at the rate of one day in four years; ſo that in 1461 years it completed a revolution, by ariſing on every ſucceeding day of the year, and returning to the point originally fixed for the beginning of the year. This period, equal to 1460 Julian years, was termed the *great Egyptian year*, or *canicular cycle.* From the accounts we have of the time that the canicular cycle was renewed, the time of its original commencement may be gathered with tolerable certainty. This happened, according to Cenſorinus, in the 138th year of the Chriſtian era. Reckoning backward therefore from this time for 1460 years, we come to the year B. C. 1322, when the ſun was in Cancer, about 14 or 15 days after the ſummer ſolſtice, which happened on July 5th. The Egyptians uſed no intercalation till the time of Auguſtus, when the corrected Julian year was received at Alexandria by his order; but even this order was obeyed only by the Greeks and Romans who reſided in that city; the ſuperſtitious natives refuſing to make any addition to the length of a year which had been ſo long eſtabliſhed among them.

23 Of the time when it commenced.

24 Uncertainty of the time when the true ſolar year was diſcovered.

We are not informed at what preciſe period the true year was obſerved to conſiſt of nearly ſix hours more than the 365 days. Though the prieſts of Thebes claim the merit of the diſcovery, Herodotus makes no mention of it; neither did Thales, who introduced the year of 365 days into Greece, ever uſe any intercalation. Plato and Eudoxus are ſaid to have obtained it as a ſecret from the Egyptians about 80 years after Herodotus, and to have carried it into Greece; which ſhowed, that the knowledge of this form of the year was at that time recent, and only known to a few learned men.

25 Years of the Jews, &c.

The year of the ancient Jews was luniſolar; and we are informed by tradition, that Abraham preſerved in his family, and tranſmitted to poſterity, the Chaldean form of the year, conſiſting of 360 days; which remained the ſame without any correction until the date of the Era of Nabonaſſar. The ſolar year was adopted among them after their return from the Babyloniſh captivity; but when ſubjected to the ſucceſſors of Alexander in Syria, they were obliged to admit the lunar year into their kalendar. In order to adjuſt this year to the courſe of the ſun, they added at certain periods a month to Adar, formerly mentioned, and called it *Ve Adar.* They compoſed alſo a cycle of 19 years, in ſeven of which they inſerted the intercalary month. This correction was intended to regulate the months in ſuch a manner, as to bring the 15th of Niſan to the equinoctial point; and likewiſe the courſes of the ſeaſons and feaſts in ſuch a manner, that the corn might be ripe at the paſſover as the law required.

26 Reformation of the kalendar by Julius Cæſar and Pope Gregor.

We ſhall not take up the reader's time with any further account of the years made uſe of by different nations, all of which are reſolved at laſt into the luniſolar; it will be ſufficient to mention the improvements in the kalendar made by the two great reformers of it, Julius Cæſar, and Pope Gregory XIII. The inſtitution of the Roman year by Romulus has been already taken notice of; but as this was evidently very imperfect, Numa, on his advancement to the throne, undertook to reform it. With a deſign to make a complete lunar year of it, he added 50 days to the 304 of Romulus; and from every one of his months, which conſiſted of 31 and 30 days, he borrowed one day. Of theſe additional days he compoſed two months; calling the one January, and the other February. Various other corrections and adjuſtments were made; but when Julius Cæſar obtained the ſovereignty of Rome, he found that the months had conſiderably receded from the ſeaſons to which Numa had adjuſted them. To bring them forward to their places, he formed a year of 15 months, or 445 days; which, on account of its length, and the deſign with which it was formed, has been called the *year of confuſion.* It terminated on the firſt of January 45 B. C. and from this period the civil year and months were regulated by the courſe of the ſun. The year of Numa being ten days ſhorter than the ſolar year, two days were added by Julius to every one of the months of January, Auguſt, and December; and one to April, June, September, and November. He ordained likewiſe, that an intercalary day ſhould be added every fourth year to the month of February, by reckoning the 24th day, or ſixth of the kalends of March, twice over. Hence this year was ſtyled *biſſextile*, and alſo *leap year*, from its leaping a day more than a common year.

The Julian year has been uſed by modern chronologers, as being a meaſure of time extremely ſimple and ſufficiently accurate. It is ſtill, however, ſomewhat imperfect, for as the true ſolar year conſiſts of 365d. 5h. 48′ 45½″, it appears that in 131 years after the Julian correction, the ſun muſt have arrived one day too ſoon at the equinoctial point. During Cæſar's reign the vernal equinox had been obſerved by Soſigenes on the 25th of March; but by the time of the Nicene council it had gone backward to the 21ſt. The cauſe of the error was not then known; but in 1582, when the equinox happened on the 11th of March, it was thought proper to give the kalendar its laſt correction. Pope Gregory XIII. having invited to Rome a conſiderable number of mathematicians and aſtronomers, employed ten years in the examination of their ſeveral formulæ, and at laſt gave the preference to that of Aloſia and Antoninus Lelius, who were brothers. Ten days were now cut off in the month of October, and the 4th of that month was reckoned the 15th. To prevent the ſeaſons from receding in time to come, he ordained that one day ſhould be added every fourth or biſſextile year as before; and that the 1600th year of the Chriſtian era, and every fourth century thereafter, ſhould be a biſſextile or leap year. One day therefore is to be intercalated in the years 2000, 2300, 2800, &c. but in the other centuries, as 1700, 1800, 1900, 2100, &c. it is to be ſuppreſſed, and theſe are to be reckoned as common years. Even this correction, however, is not abſolutely exact; but the error muſt be very inconſiderable, and ſcarce amounting to a day and a half in 5000 years.

27 Commencement of the year.

The commencement of the year has been determined by the date of ſome memorable event or occurrence, ſuch as the creation of the world, the univerſal deluge, a conjunction of planets, the incarnation of our Saviour, &c. and of courſe has been referred to different points in the ecliptic. The Chaldean and the

the Egyptian years were dated from the autumnal equinox. The eccleſiaſtical year of the Jews began in the ſpring; but, in civil affairs, they retained the epoch of the Egyptian year. The ancient Chineſe reckoned from the new moon neareſt the middle of Aquarius; but according to ſome recent accounts, the beginning of their year was transferred (B. C. 1740) to the new moon neareſt to the winter ſolſtice. This likewiſe is the date of the Japaneſe year. Diemſchid, or Gemſchid, king of Perſia, obſerved, on the day of his public entry into Perſepolis, that the ſun entered into Aries. In commemoration of this fortunate event and coincidence, he ordained the beginning of the year to be removed from the autumnal to the vernal equinox. This epoch was denominated *Neuruz*, viz. new-day; and is ſtill celebrated with great pomp and feſtivity. (See EPOCHS.) The ancient Swediſh year commenced at the winter ſolſtice, or rather at the time of the ſun's appearance in the horizon, after an abſence of about 40 days. The feaſt of this epoch was ſolemnized on the 20th day after the ſolſtice. Some of the Grecian ſtates computed from the vernal, ſome from the autumnal equinox, and others from the ſummer tropic. The year of Romulus commenced in March, and that of Numa in January. The Turks and Arabs date the year from the 16th of July: and the American Indians reckon from the firſt appearance of the new moon of the vernal equinox. The church of Rome has fixed new year's day on the Sunday that correſponds with the full moon of the ſame ſeaſon. The Venetians, Florentines, and Piſans in Italy, and the inhabitants of Treves in Germany, begin the year at the vernal equinox. The ancient clergy reckoned from the 25th of March; and this method was obſerved in Britain, until the introduction of the new ſtyle (A. D. 1752); after which our year commenced on the 1ſt day of January.

28
Of cycles.

Beſides theſe natural diviſions of time ariſing immediately from the revolutions of the heavenly bodies, there are others formed from ſome of the leſs obvious conſequences of theſe revolutions, which are called *cycles*, from the Greek *κυκλος*, *a circle*. The moſt remarkable of theſe are the following.

1. The *cycle of the ſun* is a revolution of 28 years, in which time the days of the months return again to the ſame days of the week; the ſun's place to the ſame ſigns and degrees of the ecliptic on the ſame months and days, ſo as not to differ one degree in 100 years; and the leap years begin the ſame courſe over again with reſpect to the days of the week on which the days of the month fell. The *cycle of the moon*, commonly called the *golden number*, is a revolution of 19 years; in which time, the conjunctions, oppoſitions, and other aſpects of the moon, are within an hour and a half of being the ſame as they were on the ſame days of the months 19 years before. The *indiction* is a revolution of 15 years, uſed only by the Romans for indicating the times of certain payments made by the ſubjects to the republic: It was eſtabliſhed by Conſtantine, A. D. 312.

29
Golden number.

30
To find the year of any cycle.

The year of our Saviour's birth, according to the vulgar era, was the 9th year of the ſolar cycle, the firſt year of the lunar cycle; and the 312th year after his birth was the firſt year of the Roman indiction. Therefore, to find the year of the ſolar cycle, add 9 to any given year of Chriſt, and divide the ſum by 28, the quotient is the number of cycles elapſed ſince his birth, and the remainder is the cycle for the given year: If nothing remains, the cycle is 28. To find the lunar cycle, add one to the given year of Chriſt, and divide the ſum by 19; the quotient is the number of cycles elapſed in the interval, and the remainder is the cycle for the given year: If nothing remains, the cycle is 19. Laſtly, ſubtract 312 from the given year of Chriſt, and divide the remainder by 15; and what remains after this diviſion is the indiction for the given year: If nothing remains, the indiction is 15.

31
Variation of the golden numbers.

Although the above deficiency in the lunar cycle of an hour and a half every 19 years be but ſmall, yet in time it becomes ſo ſenſible as to make a whole natural day in 310 years. So that, although the cycle be of uſe, when the golden numbers are rightly placed againſt the days of the month in the kalendar, as in the Common Prayer Books, for finding the days of the mean conjunctions or oppoſitions of the ſun and moon, and conſequently the time of Eaſter; it will only ſerve for 310 years, old ſtyle. For as the new and full moons anticipate a day in that time, the golden numbers ought to be placed one day earlier in the kalendar for the next 310 years to come. Theſe numbers were rightly placed againſt the days of new moon in the kalendar by the council of Nice, A. D. 325: but the anticipation, which has been neglected ever ſince, is now grown almoſt into five days: And therefore all the golden numbers ought now to be placed five days higher in the kalendar for the old ſtyle, than they were at the time of the ſaid council; or ſix days lower for the new ſtyle, becauſe at preſent it differs 11 days from the old.

32
To find the golden number.

In the firſt of the following tables, the golden numbers under the months ſtand againſt the days of new moon in the left hand column, for the new ſtyle; adapted chiefly to the ſecond year after leap-year, as being the neareſt mean for all the four; and will ſerve till the year 1900. Therefore, to find the day of new moon in any month of a given year till that time, look for the golden number of that year under the deſired month, and againſt it you have the day of new moon in the left hand column. Thus, ſuppoſe it were required to find the day of new moon in September 1789; the golden number for that year is 4, which I look for under September, and right againſt it, in the left-hand column, you will find 19, which is the day of new moon in that month. *N. B.* If all the golden numbers, except 17 and 6, were ſet one day lower in the table, it would ſerve from the beginning of the year 1900 till the end of the year 2199. The table at the end of this ſection ſhows the golden number for 4000 years after the birth of Chriſt, by looking for the even hundreds of any given year at the left-hand, and for the reſt to make up that year at the head of the table; and where the columns meet, you have the golden number (which is the ſame both in old and new ſtyle) for the given year. Thus, ſuppoſe the golden number was wanted for the year 1789, look for 1700 at the left hand of the table, and for 89 at the top of it: then guiding your eye downward from 89 to overagainſt 1700, you will find 4, which is the golden number for that year.

But becauſe the lunar cycle of 19 years ſometimes includes five leap-years, and at other times only four, this

this table will sometimes vary a day from the truth in leap-years after February. And it is impossible to have one more correct, unless we extend it to four times 19 or 76 years; in which there are 19 leap-years without a remainder. But even then to have it of perpetual use, it must be adapted to the old style; because, in every centennial year not divisible by 4, the regular course of leap-years is interrupted in the new; as was the case in the year 1800.

33 Dionysian period, or cycle of Easter.

2. The *cycle of Easter*, also called the *Dionysian period*, is a revolution of 532 years, found by multiplying the solar cycle 28 by the lunar cycle 19. If the new moons did not anticipate upon this cycle, Easter-day would always be the Sunday next after the first full moon which follows the 21st of March. But, on account of the above anticipation, to which no proper regard was had before the late alteration of the style, the ecclesiastic Easter has several times been a week different from the true Easter within this last century; which inconvenience is now remedied by making the table, which used to find Easter for ever, in the Common Prayer Book, of no longer use than the lunar difference from the new style will admit of.

The earliest Easter possible is the 22d of March, the latest the 25th of April. Within these limits are 35 days, and the number belonging to each of them is called the *number of direction;* because thereby the time of Easter is found for any given year.

34 Dominical letter.

The first seven letters of the alphabet are commonly placed in the annual almanacks, to show on what days of the week the days of the months fall throughout the year. And because one of these seven letters must necessarily stand against Sunday, it is printed in a capital form, and called the *dominical letter;* the other six being inserted in small characters, to denote the other six days of the week. Now, since a common Julian year contains 365 days, if this number be divided by 7 (the number of days in a week) there will remain one day. If there had been no remainder, it is plain the year would constantly begin on the same day of the week; but since one remains, it is plain that the year must begin and end on the same day of the week; and therefore the next year will begin on the day following. Hence, when January begins on Sunday, A is the dominical or Sunday letter for that year: Then, because the next year begins on Monday, the Sunday will fall on the seventh day, to which is annexed the seventh letter G, which therefore will be the dominical letter for all that year: and as the third year will begin on Tuesday, the Sunday will fall on the sixth day; therefore F will be the Sunday letter for that year. Whence it is evident, that the Sunday letters will go annually in a retrograde order thus, G, F, E, D, C, B, A. And, in the course of seven years, if they were all common ones, the same days of the week and dominical letters would return to the same days of the months. But because there are 366 days in a leap-year, if this number be divided by 7, there will remain two days over and above the 52 weeks of which the year consists. And therefore, if the leap-year begins on Sunday, it will end on Monday; and the next year will begin on Tuesday, the first Sunday whereof must fall on the sixth of January, to which is annexed the letter F, and not G, as in common years. By this means, the leap-year returning every fourth year, the order of the dominical letters is interrupted; and the series cannot return to its first state till after four times seven, or 28 years; and then the same days of the months return in order to the same days of the week as before.

TABLE I.

Days.	*Jan.*	*Feb.*	*March.*	*April.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1	9		9	17	17	6				11		19
2		17			6	14	14	3	11		19	
3	17	6	17	6			3	11		19	8	8
4	6		6	14	14	3			19	8		16
5		14			3	11	11	19	8		16	
6	14	3	14	3			19			16	5	5
7	3		3	11	11	19		8	16			13
8		11			19	8	8	16	5	5	13	
9	11	19	11	19						13		2
10			19	8	8	16	16	5	13		2	10
11	19	8					5	13	2	2	10	
12	8	16	8	16	16	5				10		18
13					5	13	13	2	10		18	7
14	16	5	16	5			2	10	18	18	7	
15	5			13	13	2				7		15
16		13			2	10	10	18	7		15	
17	13	2	13	2			18	7		15	4	4
18	2		2	10	10	18			15			12
19		10			18	7	7	15	4	4	12	
20	10	18	10	18			15			12	1	1
21	18		18	7	7	15		4	12			9
22		7			15	4	4	12	1	1	9	
23	7	15	7	15			12			9	17	17
24			15	4	4	12		1	9			6
25	15	4			12		1	9	17	17	6	
26	4		4	12		1				6		15
27		12		1	1	9	9	17	6		14	
28	12	1	12		9		17	6	14	14	3	3
29	1		1	9		17				3		11
30					17	6	6	14	3		11	
31	9		9				14	3		11		19

TABLE

TABLE II.

Table, *showing the Golden Number, (which is the ſame both in the Old and New Style) from the Chriſtian Era, to A. D.* 400.

Hundreds of Years.			Years leſs than a hundred.																		
			0 19 38 57 76 95	1 20 39 58 77 96	2 21 40 59 78 97	3 22 41 60 79 98	4 23 42 61 80 99	5 24 43 62 81	6 25 44 63 82	7 26 45 64 83	8 27 46 65 84	9 28 47 66 85	10 29 48 67 86	11 30 49 68 87	12 31 50 69 88	13 32 51 70 89	14 33 52 71 90	15 34 53 72 91	16 35 54 73 92	17 36 55 74 93	18 37 56 75 94
0	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5
200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10
300	2200	&c.	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400	2300	—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
500	2400	—	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6
600	2500	—	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11
700	2600	—	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
800	2700	—	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2
900	2800	—	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7
1000	2900	—	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12
1100	3000	—	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1200	3100	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3
1300	3200	—	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8
1400	3300	—	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13
1500	3400	—	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1600	3500	—	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4
1700	3600	—	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9
1800	3700	—	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14

35 Julian period.

From the multiplication of the ſolar cycle of 28 years into the lunar cycle of 19 years, and the Roman indiction of 15 years, ariſes the great Julian period, conſiſting of 7980 years, which had its beginning 764 years before Strauchius's ſuppoſed year of the creation (for no later could all the three cycles begin together), and it is not yet completed: And therefore it includes all other cycles, periods, and eras. There is but one year in the whole period that has the ſame numbers for the three cycles of which it is made up: And therefore, if hiſtorians had remarked in their writings the cycles of each year, there had been no diſpute about the time of any action recorded by them.

36 To find the year of the Julian period.

The Dionyſian or vulgar era of Chriſt's birth was about the end of the year of the Julian period 4713; and conſequently the firſt year of his age, according to that account, was the 4714th year of the ſaid period. Therefore, if to the current year of Chriſt we add 4713, the ſum will be found to be the Julian period. So the year 1789 will be found to be the 6502d year of that period. Or, to find the year of the Julian period anſwering to any given year before the firſt year of Chriſt, ſubtract the number of that given year from 4714, and the remainder will be the year of the Julian period. Thus, the year 585 before the firſt year of Chriſt (which was the 584th before his birth) was the 4129th year of the ſaid period. Laſtly, to find the cycles of the ſun, moon, and indiction for any given year of this period, divide the given year by 28, 19, and 15; the three remainders will be the cycles ſought, and the quotients the number of cycles run ſince the beginning of the period. So in the above 4714th year of the Julian period, the cycle of the ſun was 10, the cycle of the moon 2, and the cycle of indiction 4; the ſolar cycle having run through 168 courſes, the lunar 248, and the indiction 314.

37 Year of Chriſt's birth when ſettled.

The vulgar era of Chriſt's birth was never ſettled till the year 527, when Dionyſius Exiguus, a Roman abbot, fixed it to the end of the 4713th year of the Julian period, which was four years too late; for our Saviour was born before the death of Herod, who ſought to kill him as ſoon as he heard of his birth. And according to the teſtimony of Joſephus (*B.* xvii. *ch.* 8.), there was an eclipſe of the moon in the time of Herod's laſt illneſs; which eclipſe appears by our aſtronomical tables to have been in the year of the Julian period 4710, March 13. at three hours paſt midnight, at Jeruſalem. Now, as our Saviour muſt have been born ſome months before Herod's death, ſince in the interval he was carried into Egypt, the lateſt time in which we can fix the

the true era of his birth is about the end of the 4709th year of the Julian period.

38
Eras or Epochs.

As there are certain fixed points in the heavens from which aſtronomers begin their computations, ſo there are certain points of time from which hiſtorians begin to reckon; and theſe points or roots of time are called *eras* or *epochs*. The moſt remarkable eras are, thoſe of the Creation, the Greek Olympiads, the building of Rome, the era of Nabonaſſar, the death of Alexander, the birth of Chriſt, the Arabian Hegira, and the Perſian Jeſdegird: All which, together with ſeveral others of leſs note, have their beginnings fixed by chronologers to the years of the Julian period, to the age of the world at thoſe times, and to the years before and after the year of Chriſt's birth.

39
Hiſtoric chronology.

Having thus treated as fully as our limits will admit, of the various diviſions of time, we muſt now conſider the ſecond part of chronology, viz. that which more immediately relates to hiſtory, and which has already been obſerved to have the four following foundations: 1. Aſtronomical obſervations, particularly of eclipſes. 2. The teſtimonies of credible authors. 3. Epochs in hiſtory univerſally allowed to be true. 4. Ancient medals, coins, monuments, and inſcriptions. We ſhall conſider theſe four principal parts in the order they here ſtand.

40
Of eclipſes of the ſun and moon.

I. It is with great reaſon that the eclipſes of the ſun and moon, and the aſpects of the other planets, have been called public and celeſtial characters of the times, as their calculations afford chronologers infallible proofs of the preciſe epochs in which a great number of the moſt ſignal events in hiſtory have occurred. So that in chronological matters we cannot make any great progreſs, if we are ignorant of the uſe of aſtronomic tables, and the calculation of eclipſes. The ancients regarded the latter as prognoſtics of the fall of empires, of the loſs of battles, of the death of monarchs, &c. And it is to this ſuperſtition, to this wretched ignorance, that we happily owe the vaſt labour that hiſtorians have taken to record ſo great a number of them. The moſt able chronologers have collected them with ſtill greater labour. Calviſius, for example, founds his chronology on 144 eclipſes of the ſun, and 127 of the moon, that he ſays he had calculated. The grand conjunction of the two ſuperior planets, Saturn and Jupiter, which, according to Kepler, occurs once in 800 years in the ſame point of the zodiac, and which has happened only eight times ſince the creation (the laſt time in the month of December 1603), may alſo furniſh chronology with inconteſtable proofs. The ſame may be ſaid of the tranſit of Venus over the ſun, which has been obſerved in our days, and all the other uncommon poſitions of the planets. But among theſe celeſtial and natural characters of times, there are alſo ſome that are named *civil* or *artificial*, and which, nevertheleſs, depend on aſtronomic calculation.

Such are the ſolar and lunar cycles; the Roman indiction; the feaſt of Eaſter; the biſſextile year; the jubilees; the ſabbatic years; the combats and Olympic games of the Greeks, and Hegira of the Mahometans, &c. And to theſe may be added the periods, eras, epochs, and years of different nations, ancient and modern. We ſhall only remark on this occaſion, that the period or era of the Jews commences with the creation of the world; that of the ancient Romans with the foundation of the city of Rome; that of the Greeks at the eſtabliſhment of the Olympic games; that of Nabonaſſar, with the advancement of the firſt king of Babylon to the throne; the Yezdegerdic years, with the laſt king of the Perſians of that name; the Hegira of the Turks, with the flight of Mahomet from Mecca to Medina, &c. The year of the birth of Chriſt was the 4713th year of the Julian period, according to the common method of reckoning. Aſtronomical chronology teaches us to calculate the preciſe year of the Julian period in which each of theſe epochs happened.

41
Of the teſtimony of authors.

II. The teſtimony of authors is the ſecond principal part of hiſtoric chronology. Though no man whatever has a right to pretend to infallibility, or to be regarded as a ſacred oracle, it would, however, be making a very unjuſt judgment of mankind, to treat them all as dupes or impoſtors; and it would be an injury offered to public integrity, were we to doubt the veracity of authors univerſally eſteemed, and of facts that are in themſelves highly worthy of belief. It would be even a kind of infatuation to doubt that there have been ſuch cities as Athens, Sparta, Rome, Carthage, &c. or that Xerxes reigned in Perſia, and Auguſtus in Rome: whether Hannibal ever was in Italy; or that the emperor Conſtantine built Conſtantinople, &c. The unanimous teſtimony of the moſt reſpectable hiſtorians will not admit any doubt of theſe matters. When an hiſtorian is allowed to be completely able to judge of an event, and to have no intent of deceiving by his relation, his teſtimony is unexceptionable. But to avoid the danger of adopting error for truth, and to be ſatisfied of a fact that appears doubtful in hiſtory, we may make uſe of the four following rules, as they are founded in reaſon.

1. We ought to pay a particular regard to the teſtimonies of thoſe who wrote at the ſame time the events happened, and who have not been contradicted by any cotemporary author of known authority. Who can doubt, for example, of the truth of the facts related by Admiral Anſon, in the hiſtory of his voyage round the world? The admiral ſaw all the facts there mentioned with his own eyes, and publiſhed his book when two hundred companions of his voyage were ſtill living in London, and could have contradicted him immediately, if he had given any falſe or exaggerated relations.

2. After the cotemporary authors, we ſhould give more credit to thoſe who lived near the time the events happened than thoſe who lived at a diſtance.

3. Thoſe doubtful hiſtories, which are related by authors that are but little known, can have no weight, if they are at variance with reaſon, or eſtabliſhed tradition.

4. We muſt diſtruſt the truth of a hiſtory that is related by modern authors, when they do not agree among themſelves in ſeveral circumſtances, nor with ancient hiſtorians, who are to be regarded as original ſources. We ſhould eſpecially doubt the truth of thoſe brilliant portraits, that are drawn at pleaſure by ſuch as never knew the perſons they are intended for, and even made ſeveral centuries after their deceaſe.

The

The moſt pure and moſt fruitful ſource of ancient hiſtory is doubtleſs to be found in the Holy Bible. Let us here for a moment ceaſe to regard it as divine, and let us preſume to conſider it as a common hiſtory. Now, when we regard the writers of the books of the Old Teſtament, and conſider them ſometimes as authors, ſometimes as ocular witneſſes, and ſometimes as reſpectable hiſtorians; whether we reflect on the ſimplicity of the narration, and the air of truth that is there conſtantly viſible; or, when we conſider the care that the people, the governments, and the learned men of all ages, have taken to preſerve the true text of the Bible; or that we have regard to the happy conformity of the chronology of the holy ſcriptures with that of profane hiſtory; or, if we obſerve the admirable harmony that is between theſe books and the moſt reſpectable hiſtorians, as Joſephus and others: and laſtly, when we conſider that the books of the holy ſcripture furniſh us alone with an accurate hiſtory of the world from the creation, through the line of patriarchs, judges, kings, and princes of the Hebrews; and that we may, by its aid, form an almoſt entire ſeries of events down to the birth of Chriſt, or the time of Auguſtus, which comprehends a ſpace of about 4000 years, ſome ſmall interruptions excepted, and which are eaſily ſupplied by profane hiſtory; when all theſe reflections are juſtly made, we muſt conſtantly allow that the ſcriptures form a book which merits the firſt rank among all the ſources of ancient hiſtory. It has been objected, that this book contains contradictions; but the moſt able interpreters have reconciled theſe ſeeming contradictions. It has been ſaid, that the chronology of the Hebrew text and the Vulgate do not agree with the chronology of the verſion of the Septuagint; but the ſoundeſt critics have ſhown that they may be made to agree. It has been obſerved, moreover, that the Scriptures abound with miracles and prodigies; but they are miracles that have really happened: and what ancient hiſtory is there that is not filled with miracles and other marvellous events? And do we for that reject their authority? Cannot the true God be ſuppoſed to have performed thoſe miracles which Pagan hiſtorians have attributed to their falſe divinities? Muſt we pay no regard to the writings of Livy, becauſe his hiſtory contains many fabulous relations?

42 Epochs.

III. The *epochs* form the third principal part of chronology. Theſe are thoſe fixed points in hiſtory that have never been conteſted, and of which there can, in fact, be no doubt. Chronologers fix on the events that are to ſerve as epochs, in a manner quite arbitrary; but this is of little conſequence, provided the dates of theſe epochs agree, and that there is no contradiction in the facts themſelves. When we come to treat expreſsly on hiſtory, we ſhall mention, in our progreſs, all the principal epochs.

43 Medals, &c.

IV. Medals, monuments, and inſcriptions, form the fourth and laſt principal part of chronology. It is ſcarce more than 150 years ſince cloſe application has been made to the ſtudy of theſe; and we owe to the celebrated Spanheim the greateſt obligations, for the progreſs that is made in this method: his excellent work, *De præſtantia et uſu numiſmatum antiquorum*, has ſhown the great advantages of it; and it is evident that theſe monuments are the moſt authentic witneſſes that can be produced. It is by the aid of medals that M. Vaillant has compoſed his judicious hiſtory of the kings of Syria, from the time of Alexander the Great to that of Pompey: they have been, moreover, of the greateſt ſervice in elucidating all ancient hiſtory, eſpecially that of the Romans; and even ſometimes that of the middle age. Their uſe is more fully ſpoken of in the article MEDALS. What we here ſay of medals, is to be underſtood equally, in its full force, of ancient inſcriptions, and of all other authentic documents that have come down to us.

Every reader, endowed with a juſt diſcernment, will readily allow that theſe four parts of chronology afford clear lights, and are excellent guides to conduct us through the thick darkneſs of antiquity. That impartiality, however, which directs us to give a faithful relation of that which is true and falſe, of the certainty and uncertainty of all the ſciences, obliges us here freely to confeſs, that theſe guides are not infallible, nor the proofs that they afford mathematical demonſtrations. In fact, with regard to hiſtory in general, and ancient hiſtory in particular, ſomething muſt be always left to conjecture and hiſtoric faith. It would be an offence againſt common probity were we to ſuffer ourſelves to paſs over in ſilence thoſe objections which authors of the greateſt reputation have made againſt the certainty of chronology. We ſhall extract them from their own works; and we hope that there is no magiſtrate, theologian, or public profeſſor in Europe, who would be mean enough to accuſe us of a crime, for not unworthily diſguiſing the truth.

1. The prodigious difference there is between the Septuagint Bible and the Vulgate, in point of chronology, occaſions an embarraſſment, which is the more difficult to avoid, as we cannot poſitively ſay on which ſide the error lies. The Greek Bible counts, for example, from the creation of the world to the birth of Abraham, 1500 years more than the Hebrew or Latin Bibles, &c. 2. How difficult is it to aſcertain the years of the Judges of the Jewiſh nation, in the Bible? What darkneſs is ſpread over the ſucceſſion of the kings of Judah and Iſrael? The calculation of time is there ſo inaccurate, that the Scripture never marks if they are current or complete years. For we cannot ſuppoſe that a patriarch, judge, or king, lived exactly 60, 90, 100, or 969 years, without any odd months or days. 3. The different names that the Aſſyrians, Egyptians, Perſians, and Greeks, have given to the ſame prince, have contributed not a little to embarraſs all ancient chronology. Three or four princes have borne the name of Aſſuerus, though they had alſo other names. If we did not know that Nabucodonoſor, Nabucodroſor, and Nabucolaſſar, were the ſame name, or the name of the ſame man, we ſhould ſcarcely believe it. Sargon is Sennacherib; Ozias is Azarias; Sedecias is Mathanias; Joachas is alſo called Sellum; Aſaraddon, which is pronounced indifferently Eſarhaddon and Aſarhaddon, is called Aſenaphar by the Cuthæans; and by an oddity of which we do not know the origin, Sardanapalus is called by the Greeks Tenos Concoleros. 4. There remain to us but few monuments of the firſt monarchs of the

the world. Numberleſs books have been loſt, and thoſe which have come down to us are mutilated or altered by tranſcribers. The Greeks began to write very late. Herodotus, their firſt hiſtorian, was of a credulous diſpoſition, and believed all the fables that were related by the Egyptian prieſts. The Greeks were in general vain, partial, and held no nation in eſteem but their own. The Romans were ſtill more infatuated with notions of their own merit and grandeur: their hiſtorians were altogether as unjuſt as was their ſenate, toward other nations that were frequently far more reſpectable. 5. The eras, the years, the periods, and epochs, were not the ſame in each nation; and they, moreover, began at different ſeaſons of the year. All this has thrown ſo much obſcurity over chronology, that it appears to be beyond all human capacity totally to diſperſe it.

Chriſtianity itſelf had ſubſiſted near 1200 years, before they knew preciſely how many years had paſſed ſince the birth of our Saviour. They ſaw clearly that the vulgar era was defective, but it was a long time before they could comprehend that it required four whole years to make up the true period. Abbé Denis the Little, who in the year 532 was the firſt among the Chriſtians to form the era of that grand epoch, and to count the years from that time, in order to make their chronology altogether Chriſtian, erred in his calculation, and led all Europe into his error. They count 132 contrary opinions of different authors concerning the year in which the Meſſiah appeared on the earth. M. Vallemont names 64 of them, and all celebrated writers. Among all theſe authors, however, there is none that reckon more than 7000, nor leſs than 3700 years. But even this difference is enormous. The moſt moderate fix the birth of Chriſt in the 4000th year of the world. The reaſons, however, on which they found their opinion, appear to be ſufficiently arbitrary.

Be theſe matters, however, as they may, the wiſdom of Providence has ſo diſpoſed all things, that there remain ſufficient lights to enable us nearly to connect the ſeries of events: for in the firſt 3000 years of the world, where profane hiſtory is defective, we have the chronology of the Bible to direct us; and after that period, where we find more obſcurity in the chronology of the Holy Scriptures, we have, on the other hand, greater lights from profane authors. It is at this period that begins the time which Varro calls *hiſtoric;* as, ſince the time of the Olympiads, the truth of ſuch events as have happened ſhines clear in hiſtory. Chronology, therefore, draws its principal lights from hiſtory; and, in return, ſerves it as a guide. Referring the reader, therefore, to the article HISTORY, and the *Chart* thereto annexed, we ſhall conclude the preſent article with

A CHRONOLOGICAL TABLE *of Remarkable Events, Diſcoveries, and Inventions, from the Creation to the year* 1804.

Bef. Chriſt.

4008 The Creation of the world and Adam and Eve.

4007 The birth of Cain, the firſt who was born of a woman.

3017 Enoch, for his piety, is tranſlated to heaven.

2352 The old world is deſtroyed by a deluge which continued 377 days.

2247 The tower of Babel is built about this time by Noah's poſterity, upon which God miraculouſly confounds their language, and thus diſperſes them into different nations.

2237 About this time, Noah is, with great probability, ſuppoſed to have parted from his rebellious offspring, and to have led a colony of ſome of the more tractable into the eaſt, and there either he or one of his ſucceſſors to have founded the Chineſe monarchy.

2234 The celeſtial obſervations are begun at Babylon, the city which firſt gave birth to learning and the ſciences.

2188 Miſraim, the ſon of Ham, founds the kingdom of Egypt, which laſted 1663 years, down to the conqueſt of Cambyſes, in 525 before Chriſt.

2059 Ninus, the ſon of Belus, founds the kingdom of Aſſyria, which laſted above 1000 years, and out of its ruins were formed the Aſſyrians of Babylon, thoſe of Nineveh, and the kingdom of the Medes.

1985 The covenant of God made with Abram, when he leaves Haran, to go into Canaan, which begins the 430 years of ſojourning.

1961 The cities of Sodom and Gomorrah are deſtroyed for their wickedneſs by fire from heaven.

1856 The kingdom of Argos, in Greece, begins under Inachus.

1822 Memnon, the Egyptian, invents the letters.

1715 Prometheus firſt ſtruck fire from flints.

1635 Joſeph dies in Egypt.

1574 Aaron born in Egypt; 1490, appointed by God firſt high prieſt of the Iſraelites.

1571 Moſes, brother to Aaron, born in Egypt, and adopted by Pharaoh's daughter, who educates him in all the learning of the Egyptians.

1556 Cecrops brings a colony of Saites from Egypt into Attica, and begins the kingdom of Athens in Greece.

1555 Moſes performs a number of miracles in Egypt, and departs from that kingdom, together with 600,000 Iſraelites, beſides children, which completed the 430 years of ſojourning. They miraculouſly paſs through the Red Sea, and come to the deſert of Sinai, where Moſes receives from God, and delivers to the people, the Ten Commandments, and the other laws, and ſets up the Tabernacle, and in it the ark of the covenant.

1546 Scamander comes from Crete into Phrygia, and begins the kingdom of Troy.

1515 The Iſraelites, after ſojourning in the Wilderneſs forty years, are led under Joſhua into the land of Canaan, where they fix themſelves, after having ſubdued the natives; and the period of the ſabbatical year commences.

1503 The deluge of Deucalion.

1496 The council of Amphictyons eſtabliſhed at Thermopylæ.

1493 Cadmus carried the Phenician letters into Greece, and built the citadel of Thebes.

1490 Sparta built by Lacedæmon.

Before Christ.

1485 The first ship that appeared in Greece was brought from Egypt by Danaus, who arrived at Rhodes, and brought with him his fifty daughters.
1480 Troy built by Dardanus.
1452 The Pentateuch, or five first books of Moses, are written in the land of Moab, where he died the year following, aged 110.
1406 Iron is found in Greece, from an accidental burning of the woods.
1344 The kingdom of Mycenæ begins.
1325 Isthmian games instituted at Corinth.
The Egyptian canicular year began July 20th.
1307 The Olympic games instituted by Pelops.
1300 The Lupercalia instituted.
1294 The first colony came from Italy to Sicily.
1264 The second colony came from Italy to Sicily.
1252 The city of Tyre built.
1243 A colony of Arcadians conducted by Evander into Italy.
1233 Carthage founded by the Tyrians.
1225 The Argonautic expedition.
1204 The rape of Helen by Paris; which gave rise to the Trojan war, ending with the destruction of the city in 1184.
1176 Salamis in Cyprus built by Teucer.
1152 Ascanius builds Alba Longa.
1130 The kingdom of Sicyon ended.
1124 Thebes built by the Bœotians.
1115 The mariner's compass known in China.
1104 The expedition of the Heraclidæ into Peloponnesus; the migration of the Dorians thither; and the end of the kingdom of Mycenæ.
1102 The kingdom of Sparta commenced.
1070 The kingdom of Athens ended.
1051 David besieged and took Jerusalem.
1044 Migration of the Ionian colonies.
1008 The Temple is solemnly dedicated by Solomon.
996 Solomon prepared a fleet on the Red Sea to send to Ophir.
986 Samos and Utica in Africa built.
979 The kingdom of Israel divided.
974 Jerusalem taken and plundered by Shishak king of Egypt.
911 The prophet Elijah flourished.
894 Money first made of gold and silver at Argos.
884 Olympic games restored by Iphitus and Lycurgus.
873 The art of sculpture in marble found out.
869 Scales and measures invented by Phidon.
864 The city of Carthage, in Africa, enlarged by Queen Dido.
821 Nineveh taken by Arbaces.
814 The kingdom of Macedon begins.
801 The city of Capua in Campania built.
799 The kingdom of Lydia began.
786 The ships called *Triremes* invented by the Corinthians.
779 The race of kings in Corinth ended.
776 The era of the Olympiads began.
760 The Ephori established at Sparta.
758 Syracuse built by Archias of Corinth.
754 The government of Athens changed.
753 Era of the building of Rome in Italy by Romulus, first king of the Romans.
747 The era of Nabonassar commenced on the 26th of February; the first day of Thoth.
746 The government of Corinth changed into a republic.
743 The first war between the Messenians and Spartans.
742 Mycænæ reduced by the Spartans.
724 A colony of the Messenians settled at Rhegium in Italy.
720 Samaria taken, after three years siege, and the kingdom of Israel finished by Salmanazer king of Assyria, who carries the ten tribes into captivity.
The first eclipse of the moon on record.
713 Gela in Sicily built.
703 Corcyra, now Corfu, founded by the Corinthians.
702 Ecbatan in Media built by Deioces.
685 The second Messenian war under Aristomenes.
670 Byzantium (now Constantinople) built by a colony of Athenians.
666 The city of Alba destroyed.
648 Cyrene in Africa founded.
634 Cyaxares besieges Nineveh, but is obliged to raise the siege by an incursion of the Scythians, who remained masters of Asia for 28 years.
624 Draco published his inhuman laws at Athens.
610 Pharaoh Necho attempted to make a canal from the Nile to the Red Sea, but was not able to accomplish it.
607 By order of the same monarch, some Phenicians sailed from the Red Sea round Africa, and returned by the Mediterranean.
606 The first captivity of the Jews by Nebuchadnezzar. Nineveh destroyed by Cyaxares.
600 Thales, of Miletus, travels into Egypt, consults the priests of Memphis, acquires the knowledge of geometry, astronomy, and philosophy; returns to Greece, calculates eclipses, gives general notions of the universe, and maintains that an only Supreme Intelligence regulates all its motions.
Maps, globes, and the signs of the zodiac, invented by Anaximander, the scholar of Thales.
598 Jehoiakin, king of Judah, is carried away captive, by Nebuchadnezzar, to Babylon.
594 Solon made Archon at Athens.
591 The Pythian games instituted in Greece, and tragedy first acted.
588 The first irruption of the Gauls into Italy.
586 The city of Jerusalem taken after a siege of 18 months.
582 The last captivity of the Jews by Nebuchadnezzar.
581 The Isthmian games restored.
580 Money first coined at Rome.
571 Tyre taken by Nebuchadnezzar after a siege of 13 years.
566 The first census at Rome, when the number of citizens was found to be 84,000.
562 The first comedy at Athens acted upon a moveable scaffold.
559 Cyrus the first king of Persia.
538 The kingdom of Babylon finished; that city being

Before Christ.

ing taken by Cyrus, who, in 536, gives an edict for the return of the Jews.
534 The foundation of the temple laid by the Jews.
526 Learning is greatly encouraged at Athens, and a public library first founded.
520 The second edict to rebuild Jerusalem.
515 The second temple at Jerusalem is finished under Darius.
510 Hippias banished from Athens.
509 Tarquin, the seventh and last king of the Romans, is expelled, and Rome is governed by two consuls, and other republican magistrates, till the battle of Pharsalia, being a space of 461 years.
508 The first alliance between the Romans and Carthaginians.
507 The second census at Rome, 130,000 citizens.
504 Sardis taken and burnt by the Athenians, which gave occasion to the Persian invasion of Greece.
498 The first dictator appointed at Rome.
497 The Saturnalia instituted at Rome.
The number of citizens 150,700.
493 Tribunes created at Rome; or, in 488.
490 The battle of Marathon, September 28.
486 Æschylus, the Greek poet, first gains the prize of tragedy.
483 Questors created at Rome.
481 Xerxes, king of Persia, begins his expedition against Greece.
480 The defence of Thermopylæ by Leonidas, and the sea-fight at Salamis.
476 The number of Roman citizens reduced to 103,000.
469 The third Messenian war.
466 The number of Roman citizens increased to 124,214.
458 Ezra is sent from Babylon to Jerusalem, with the captive Jews and the vessels of gold and silver, &c. being seventy weeks of years, or 490 years, before the crucifixion of our Saviour.
456 The Ludi Seculares first celebrated at Rome.
454 The Romans sent to Athens for Solon's laws.
451 The Decemvirs created at Rome, and the laws of the twelve tables compiled and ratified.
449 The Decemvirs banished.
445 Military tribunes, with consular power, created at Rome.
443 Censors created at Rome.
441 The battering ram invented by Artemones.
437 The Metonic cycle began July 15th.
431 The Peloponnesian war begun, and lasted 27 years.
430 The history of the Old Testament finishes about this time.
A plague over all the known world.
Malachi the last of the prophets.
405 The Athenians entirely defeated by Lysander, which occasions the loss of the city, and ruin of the Athenian power.
401 The retreat of the 10,000 Greeks under Xenophon. The 30 tyrants expelled from Athens, and democratic government restored.
400 Socrates, the founder of moral philosophy among the Greeks, believes the immortality of the soul, a state of rewards and punishments; for which and other sublime doctrines, he is put to death by the Athenians, who soon after repent, and erect to his memory a statue of brass.
399 The feast of Lectisternium instituted. Catapultæ invented by Dionysius.
394 The Corinthian war begun.
390 Rome burnt by the Gauls.
387 The peace of Antalcidas between the Greeks and Persians.
The number of Roman citizens amounted to 152,583.
384 Dionysius begins the Punic war.
379 The Bœotian war commences.
377 A general conspiracy of the Greek states against the Lacedemonians.
373 A great earthquake in Peloponnesus.
371 The Lacedemonians defeated by Epaminondas at Leuctra.
367 Prætors established in Rome. The Licinian law passed.
363 Epaminondas killed at the battle of Mantinea.
359 The obliquity of the ecliptic observed to be 23° 49′ 10″.
358 The Social war began.
357 Dionysius expelled from Syracuse.
A transit of the moon over Mars observed.
356 The Sacred war begun in Greece.
Birth of Alexander the Great.
345 Dionysius II. expelled from Syracuse.
Commencement of the Syracusan era.
338 Philip of Macedon gains the battle of Chæronæa, and thus attains to the sovereignty of Greece.
335 Thebes taken and rased by Alexander the Great.
334 The Persians defeated at Granicus, May 22.
333 They are again defeated at Issus in Cilicia, October.
332 Alexander takes Tyre, and marches to Jerusalem.
331 Alexandria built.
Darius entirely defeated at Arbela.
330 Alexander takes Babylon, and the principal cities of the Persian empire.
The Calippic period commences.
328 Alexander passes Mount Caucasus, and marches into India.
327 He defeats Porus, an Indian prince, and founds several cities.
326 The famous sedition of Corcyra.
324 Alexander the Great dies at Babylon.
323 His family exterminated, and his dominions parted by his officers.
315 Rhodes almost destroyed by an inundation.
311 The Appian way, aqueducts, &c. constructed at Rome.
308 The cities of Greece recovered their liberties for a short time.
307 Antioch, Seleucia, Laodicea, and other cities, founded by Seleucus.
301 Antigonus defeated and killed at Ipsus.
299 The first barbers came from Sicily to Rome.
294 The number of effective men in Rome amounts to 270,000.
293 The first sun-dial erected at Rome by Papirius Cursor.

Before Christ.

285 Dionyſius of Alexandria began his aſtronomical era on Monday June 26. being the firſt who found the exact ſolar year to conſiſt of 365 days, 5 hours, and 49 minutes.
The watch tower of Pharos at Alexandria built.
Ptolemy Philadelphus, king of Egypt, employs 72 interpreters to tranſlate the Old Teſtament into the Greek language, which is called the *Septuagint.*
284 The foundation of the Achæan republic laid.
283 The college and library founded at Alexandria.
282 The Tarentine war begins.
280 Pyrrhus invades Italy.
279 A cenſus at Rome. The number of citizens 278,222.
269 The firſt coining of ſilver at Rome.
265 The number of Roman citizens augmented to 292,224.
264 The firſt Punic war begins, and continues 23 years. The chronology of the Arundelian marbles compoſed.
262 A tranſit of Mercury over the bull's horn; the planet being in 23° of ♉, and the ſun in 29° 30′ ♈.
260 Provincial queſtors eſtabliſhed at Rome.
The Romans firſt concern themſelves in naval affairs, and defeat the Carthaginians at ſea.
255 Regulus, the Roman conſul, defeated and taken priſoner by the Carthaginians under Xantippus.
252 A cenſus at Rome. The number of citizens 297,897.
247 Another cenſus. The number of citizens 251,212.
246 The records of China deſtroyed.
241 Concluſion of the firſt Punic war.
240 Comedies firſt acted at Rome.
237 Hamilcar, the Carthaginian, cauſes his ſon Hannibal, at nine years old, to ſwear eternal enmity to the Romans.
236 The Tartars expelled from China.
235 Rome at peace with other nations. The temple of Janus ſhut.
231 Corſica and Sardinia ſubdued by the Romans.
The firſt divorce at Rome.
230 The obliquity of the ecliptic obſerved by Eratoſthenes to be 23° 51′ 20″.
224 The Coloſſus at Rhodes overturned by an earthquake.
219 The art of ſurgery introduced at Rome.
218 Commencement of the ſecond Punic war.
Hannibal paſſes the Alps, and invades Italy.
216 The Romans defeated at Cannæ, May 21ſt.
214 Syracuſe beſieged by Marcellus.
209 A cenſus at Rome. The number of citizens 227,107.
208 Aſdrubal invades Italy; but is defeated and killed.
206 Gold firſt coined at Rome.
202 Hannibal defeated by Scipio at Zama.
201 Concluſion of the ſecond Punic war.
194 Sparta and Hither Spain ſubdued by the Romans.
192 A cenſus at Rome. The number of citizens 243,704.
191 Antiochus defeated by the Romans at Thermopylæ.
190 The firſt Roman army enters Aſia, and from the ſpoils of Antiochus brings the Aſiatic luxury firſt to Rome.
188 The Spartans obliged to renounce the inſtitutions of Lycurgus.
179 A cenſus at Rome. The number of citizens 273,244.
173 The Jewiſh high-prieſthood ſold by Antiochus Epiphanes.
170 Paper invented in China.
The temple of Jeruſalem plundered by Antiochus.
169 A cenſus at Rome. The number of citizens 212,805.
168 Macedon reduced to the form of a Roman province.
The firſt library erected at Rome.
165 The temple of Jeruſalem purified by Judas Maccabeus.
164 A cenſus at Rome. The number of citizens 327,032.
162 Hipparchus began his aſtronomical obſervations at Rhodes.
161 Philoſophers and rhetoricians baniſhed from Rome.
150 The third Punic war commenced.
146 Corinth deſtroyed.
Carthage, the rival to Rome, is raſed to the ground by the Romans.
A remarkable comet appeared in Greece.
143 Hipparchus began his new cycle of the moon, conſiſting of 111,035 days.
141 The Numantine war commenced.
135 The hiſtory of the Apocrypha ends.
133 Numantia deſtroyed by Scipio.
124 A cenſus at Rome. The number of citizens 390,736.
105 The Cimbri and Teutones defeated the Romans.
102 The Teutones and Ambrones defeated by Marius.
88 Rome beſieged by the chiefs of the Marian faction.
82 Sylla created perpetual dictator at Rome.
69 A cenſus at Rome. The number of citizens 450,000.
66 Catiline's conſpiracy.
55 Julius Cæſar makes his firſt expedition into Britain.
Craſſus defeated and killed by the Parthians.
51 Gaul reduced to a Roman province.
50 A cenſus at Rome. The number of citizens 320,000.
48 The battle of Pharſalia, between Cæſar and Pompey, in which the latter is defeated.
The Alexandrian library, conſiſting of 400,000 valuable books, burnt by accident.
45 The war of Africa, in which Cato kills himſelf.
The ſolar year introduced by Cæſar.
44 Cæſar, the greateſt of the Roman conquerors, after having fought 50 pitched battles, and ſlain 1,192,000 men, is killed in the ſenate-houſe by conſpirators.
42 The republicans defeated at Philippi.
31 The battle of Actium fought, in which Mark

Before Christ.

Antony and Cleopatra are totally defeated by Octavius, nephew to Julius Cæſar.

30 Alexandria, in Egypt, is taken by Octavius, upon which Antony and Cleopatra put themſelves to death, and Egypt is reduced to a Roman province.

29 A cenſus at Rome. The number of citizens 4,101,017.

27 Octavius, by a decree of the ſenate, obtains the title of Auguſtus Cæſar, and an abſolute exemption from the laws, and is properly the firſt Roman emperor.

The Pantheon at Rome built.

19 Rome at the height of its glory.

The temple of Jeruſalem rebuilt by Herod.

Agrippa conſtructed the magnificent aqueducts at Rome.

8 A cenſus at Rome. The number of citizens 4,233,000.

5 The temple of Janus is ſhut by Auguſtus, as an emblem of univerſal peace; and

JESUS CHRIST is born, on Monday, December 25.

After Chriſt.

1 The vulgar Chriſtian era commenced from January 1. the Saviour of the world being then five years of age.

8 Jeſus Chriſt diſputes with the doctors in the temple.

14 A cenſus at Rome, 4,370,000 citizens.

16 Mathematicians and magicians expelled from Rome.

17 Twelve cities in Aſia deſtroyed by an earthquake.

27 Pilate made governor of Judea.

29 Jeſus baptized in Jordan by John.

33 He is crucified at Jeruſalem.

35 St Paul converted.

39 St Matthew writes his goſpel.

Pontius Pilate kills himſelf.

A conjunction of Saturn, Jupiter, and Mars.

40 The name of Chriſtians firſt given at Antioch to the followers of Chriſt.

43 Claudius Cæſar's expedition into Britain.

44 St Mark writes his goſpel.

50 London is founded by the Romans; 368, ſurrounded by ditto with a wall, ſome parts of which are ſtill obſervable.

51 Caractacus, the Britiſh king, is carried in chains to Rome.

52 The council of the Apoſtles at Jeruſalem.

55 St Luke writes his goſpel.

56 Rotterdam built.

59 The emperor Nero puts his mother and brothers to death.

——— perſecutes the Druids in Britain.

60 Chriſtianity introduced into Britain.

61 Boadicea, the Britiſh queen, defeats the Romans; but is conquered ſoon after by Suetonius, governor of Britain.

62 St Paul is ſent in bonds to Rome—writes his epiſtles between 51 and 66.

63 The Acts of the Apoſtles written.

A great earthquake in Aſia.

64 Rome ſet on fire, and burned for ſix days; upon which began (under Nero) the firſt perſecution againſt the Chriſtians.

65 Many prodigies ſeen about Jeruſalem.

66 St Peter and St Paul put to death.

70 While the factious Jews are deſtroying one another with mutual fury, Titus the Roman general takes Jeruſalem, which is raſed to the ground, and the plough made to paſs over it.

73 The philoſophers baniſhed from Rome by Veſpaſian.

79 The cities of Pompeii and Herculaneum deſtroyed by an eruption of Veſuvius.

80 The Capitol and Pantheon at Rome deſtroyed by fire.

83 The philoſophers expelled Rome by Domitian.

85 Julius Agricola, governor of South Britain, to protect the civilized Britons from the incurſions of the Caledonians, builds a line of forts between the rivers Forth and Clyde; defeats the Caledonians under Galgacus on the Grampian hills; and firſt ſails round Britain, which he diſcovers to be an iſland.

86 The Capitoline games inſtituted by Domitian.

88 The Secular games celebrated at Rome.

93 The empire of the Huns in Tartary deſtroyed by the Chineſe.

The Evangeliſt John baniſhed to Patmos.

94 The ſecond perſecution of the Chriſtians, under Domitian.

96 St John the Evangeliſt wrote his Revelation—his Goſpel in 97.

103 Dacia reduced to a Roman province.

105 A great earthquake in Aſia and Greece.

107 The third perſecution of the Chriſtians, under Trajan.

114 Armenia reduced to a Roman province.

A great earthquake in China.

115 Aſſyria ſubdued by Trajan.

An inſurrection of the Jews, who murder 200,000 Greeks and Romans.

A violent earthquake at Antioch.

120 Nicomedia and other cities ſwallowed up by an earthquake.

121 The Caledonians reconquer from the Romans all the ſouthern parts of Scotland; upon which the emperor Adrian builds a wall between Newcaſtle and Carliſle; but this alſo proving ineffectual, Pollius Urbicus, the Roman general, about the year 134, repairs Agricola's forts, which he joins by a wall four yards thick.

130 Jeruſalem rebuilt by Adrian.

132 The ſecond Jewiſh war commenced.

135 The ſecond Jewiſh war ends, when they were all baniſhed Judea.

139 Juſtin writes his firſt apology for the Chriſtians.

141 A number of hereſies appear about this time.

146 The worſhip of Serapis introduced at Rome.

152 The emperor Antoninus Pius ſtops the perſecution againſt the Chriſtians.

An inundation of the Tiber, and an earthquake at Rhodes.

163 The fourth perſecution of the Chriſtians, under Marcus Aurelius Antoninus.

166 The Romans ſent ambaſſadors to China.

168

After Christ.

168 A plague over the whole world.
188 The Capitol at Rome destroyed by lightning.
191 A great part of Rome destroyed by fire.
203 The fifth persecution of the Christians, under Severus.
205 An earthquake in Wales.
209 Severus's wall in Britain built.
218 Two comets appeared at Rome. The course of the most remarkable from east to west.
222 About this time the Roman empire begins to decline. The barbarians begin their irruptions, and the Goths have annual tribute not to molest the empire.
225 Mathematicians allowed to teach publicly at Rome.
236 The sixth persecution of the Christians under Maximin.
241 The Franks first mentioned in history.
250 The seventh persecution, under Decius.
252 A dreadful pestilence broke out in Ethiopia, and spread over the whole world.
The eighth persecution, under Gallus.
253 Europe ravaged by the Scythians and Goths.
258 The ninth persecution, under Valerian.
260 Valerian is taken prisoner by Sapor king of Persia, and flayed alive.
The Scythians ravaged the Roman empire.
The temple of Diana at Ephesus burnt.
261 A great plague throughout the Roman empire.
262 Earthquakes in Europe, Asia, and Africa, and three days of darkness.
273 The Romans took Palmyra.
274 Silk first brought from India; the manufactory of it introduced into Europe by some monks, 551; first worn by the clergy in England, 1534.
276 Wine first made in Britain.
277 The Franks settled in Gaul.
284 The Dioclesian era commenced August 29th, or September 17th.
287 Carausius proclaimed emperor of Britain.
289 A great comet visible in Mesopotamia for 29 days.
291 Two emperors and two Cæsars march to defend the four quarters of the empire.
297 Alexandria destroyed by Dioclesian.
303 The tenth persecution under Dioclesian.
306 Constantine the Great begins his reign.
308 Cardinals first appointed.
312 Pestilence all over the East.
Cycle of indiction began.
313 The tenth persecution ends by an edict of Constantine, who favours the Christians, and gives full liberty to their religion.
314 Three bishops, or fathers, are sent from Britain to assist at the council of Arles.
315 Crucifixion abolished.
321 Observation of Sunday enjoined.
323 The first general council at Nice, when 318 fathers attended, against Arius, the founder of Arianism, where was composed the famous Nicene Creed, which we attribute to them.
328 Constantine removes the seat of empire from Rome to Byzantium, which is thereafter called Constantinople.
330 A dreadful persecution of the Christians in Persia, which lasts 40 years.
333 Constantine orders all the heathen temples to be destroyed.
334 Three hundred thousand Sarmatians revolted from their masters.
341 The gospel propagated in Ethiopia by Frumentius.
344 Neocæsarea ruined by an earthquake.
351 The heathens first called Pagans.
358 A hundred and fifty cities in Asia and Greece overturned by an earthquake.
360 The first monastery founded near Poictiers in France, by Martin.
363 The Roman emperor Julian, surnamed the Apostate, endeavours in vain to rebuild the temple of Jerusalem.
364 The Roman empire is divided into the Eastern (Constantinople the capital) and Western (of which Rome continued to be the capital), each being now under the government of different emperors.
373 The Bible translated into the Gothic language.
376 The Goths settled in Thrace.
379 The cycle of Theophilus commenced.
390 A fiery column seen in the air for 30 days.
400 Bells invented by Bishop Paulinus of Campania.
401 Europe overrun by the Goths, under Alaric.
404 Another irruption of the Goths.
The kingdom of Caledonia, or Scotland, revives under Fergus.
406 Third irruption of the Goths.
The Vandals, Alans, and Suevi, spread into France and Spain, by a concession of Honorius, emperor of the West.
408 The Christian religion propagated in Persia.
409 Rome taken and plundered by the Goths, August 24.
412 The Vandals begin their kingdom in Spain.
413 The kingdom of Burgundy begun in Alsace.
415 The kingdom of Thoulouse founded by the Visigoths.
417 The Alans extirpated by the Goths.
419 Many cities in Palestine destroyed by an earthquake.
420 The kingdom of France begins upon the Lower Rhine, under Pharamond.
421 The Salique law promulgated.
426 The Romans, reduced to extremities at home, withdraw their troops from Britain, and never return: advising the Britons to arm in their own defence, and trust to their own valour.
432 The gospel preached in Ireland by St Patrick.
444 All Europe ravaged by the Huns.
446 The Britons, now left to themselves, are greatly harassed by the Scots and Picts, upon which they once more make their complaint to the Romans (which they entitle, *The Groans of the Britons*), but receive no assistance from that quarter.
447 Attila (surnamed the Scourge of God) with his Huns ravage the Roman empire.
449 Vortigern, king of the Britons, invites the Saxons into Britain, against the Scots and Picts.

After Christ.

452 The city of Venice founded.
455 The Saxons having repulsed the Scots and Picts, invite over more of their countrymen, and begin to establish themselves in Kent, under Hengist.
476 The western empire is finished, 523 years after the battle of Pharsalia; upon the ruins of which several new states arise in Italy and other parts, consisting of Goths, Vandals, Huns, and other barbarians, under whom literature is extinguished, and the works of the learned are destroyed.
480 A great earthquake at Constantinople, which lasted 40 days.
493 Italy reduced by Theodoric king of the Goths.
496 Clovis, king of France, baptized, and Christianity begins in that kingdom.
506 The Jews talmud published.
508 Prince Arthur begins to reign over the Britons.
510 Paris made the capital of the French dominions.
514 Constantinople besieged by Vitalianus, whose fleet is burnt by a speculum of brass made by Proclus.
516 The computing of time by the Christian era is introduced by Dionysius the monk.
517 Five years drought and famine in Palestine.
519 A bearded comet appears.
529 The codex of Justinian, the eastern emperor, is published.
534 The kingdom of the Vandals in Africa comes to an end, after having continued 105 years.
536 The manufacture of silk introduced at Constantinople by two Indian monks.
540 Antioch destroyed by the Persians.
541 Basilius the last consul elected at Rome.
542 Antioch rebuilt.
An earthquake all over the world.
550 An earthquake in Palestine and Syria.
The kingdom of Poland founded.
551 An earthquake in Greece, attended with a great commotion in the sea.
553 The empire of the Goths in Italy destroyed by Narses.
A great earthquake at Constantinople.
557 Another violent earthquake at Constantinople, Rome, &c.
A terrible plague all over Europe, Asia, and Africa, which continues near 50 years.
568 The Lombards founded a kingdom in Italy.
569 The Turks first mentioned in history.
The exarchate of Ravenna begins.
575 The first monarchy founded in Bavaria.
580 Antioch destroyed by an earthquake.
581 Latin ceased to be spoken about this time in Italy.
584 The origin of fiefs in France.
588 The city of Paris destroyed by fire.
589 Rome overflowed by the Tiber.
593 The Gascons establish themselves in the country called by their name.
596 John of Constantinople assumes the title of universal bishop.
597 Augustine the monk comes into England with forty monks.
599 A dreadful pestilence in Africa.
604 St Paul's church in London founded.
605 The use of bells introduced into churches.
606 Here begins the power of the popes, by the concessions of Phocas, emperor of the East.
622 Mahomet, the false prophet, flies from Mecca to Medina in Arabia, in the 44th year of his age, and 10th of his ministry, when he laid the foundation of the Saracen empire, and from whom the Mahometan princes to this day claim their descent. His followers compute their time from this era, which in Arabic is called *hegira*, i. e. "the Flight."
628 An academy founded at Canterbury.
632 The era of Jesdegird commenced June 16th.
637 Jerusalem is taken by the Saracens, or followers of Mahomet.
641 Alexandria in Egypt is taken by ditto, and the grand library there burnt by order of Omar, their caliph or prince.
643 The temple of Jerusalem converted into a Mahometan mosque.
653 The Saracens now extend their conquests on every side, and retaliate the barbarities of the Goths and Vandals upon their posterity.
They take Rhodes, and destroy the famous Colossus.
England invaded by the Danes.
660 Organs first used in churches.
663 Glass invented by a bishop, and brought into England by a Benedictine monk.
669 Sicily invaded, and Syracuse destroyed by the Saracens.
685 The Britons, after a brave struggle of near 150 years, are totally expelled by the Saxons, and drove into Wales and Cornwall.
698 The Saracens take Carthage, and expel the Romans from Africa.
700 Cracow built, and first prince of Poland elected.
704 The first province given to the Pope.
713 The Saracens conquer Spain.
714 France governed by Charles Martel.
718 The kingdom of the Asturias in Spain founded by Pelagio.
719 Christianity promulgated in Germany.
726 The controversy about images begins, and occasions many insurrections in the eastern empire.
727 Tax of Peter's pence begun by Ina king of Wessex.
732 Charles Martel defeats the Saracens near Tours.
735 Institution of the office of Pope's nuncio.
746 Three years pestilence in Europe and Asia.
748 The computing of years from the birth of Christ began to be used in history.
749 The race of Abbas become caliphs of the Saracens, and encourage learning.
The empire of the Saracens divided into three.
752 The exarchate of Ravenna abolished by Astolphus king of the Lombards.
755 Commencement of the Pope's temporal dominion.
762 The city of Bagdad upon the Tigris is made the capital for the caliphs of the house of Abbas.

After Christ.

762 Burials, which formerly used to be in highways, permitted in towns.
792 An academy founded in Paris.
794 The Huns extirpated by Charlemagne.
797 Seventeen days of unusual darkness.
800 Charlemagne, king of France, begins the empire of Germany, afterwards called the Western empire; gives the present names to the winds and months; endeavours to restore learning in Europe; but mankind are not yet disposed for it, being solely engrossed in military enterprises.
801 A great earthquake in France, Germany, and Italy.
807 Jan. 31. Jupiter eclipsed by the moon. March 17. A large spot seen on the sun for eight days.
808 The first descent of the Normans on France.
825 The obliquity of the ecliptic observed by Benimula to be 23° 55′.
826 Harold, king of Denmark, dethroned by his subjects for being a Christian.
The kingdoms of Navarre and Arragon founded.
832 Painters banished out of the eastern empire.
836 The Flemings trade to Scotland for fish.
840 The Scots and Picts have a decisive battle, in which the former prevail, and both kingdoms are united by Kenneth, which begins the second period of the Scottish history.
842 Germany separated from the empire of the Franks.
856 An earthquake over the greatest part of the known world.
861 Ruric the first prince of Russia began to reign.
864 The Danes begin their ravages in England.
867 Christianity propagated in Bulgaria.
868 Egypt becomes independent on the caliphs of Bagdad.
872 Bells and clocks first used in Constantinople.
873 France distressed by locusts and pestilence.
874 Iceland peopled by the Norwegians.
Scotland invaded by the Danes.
875 A bearded comet appears in France.
878 Alfred the Great, after subduing the Danish invaders (against whom he fought 56 battles by sea and land), composes his body of laws; divides England into counties, hundreds, tythings; in 890 erects county-courts, having founded the university of Oxford in 886.
880 The obliquity of the ecliptic observed by Albategni to be 23° 35′.
889 The Hungarians settled near the Danube.
891 The first land-tax in England.
895 The monastery of Cluny founded.
905 A very remarkable comet appeared in China.
Rome taken by the Normans.
911 The obliquity of the ecliptic observed by Thebit to be 23° 33′ 30″.
912 The Normans establish themselves in Normandy.
913 The Danes become masters of England.
915 The university of Cambridge founded.
923 Fiefs established in France.
925 Sigefroi elected first marquis of Brandenburg.
928 The marquisate of Misnia established.
937 The Saracen empire is divided by usurpation into seven kingdoms.
941 Arithmetic brought into Europe.
961 Candia recovered from the Saracens.
967 Antioch recovered from the Saracens.
969 The race of Abbas extinguished in Egypt.
975 Pope Boniface VII. is deposed and banished for his crimes.
977 Greece, Macedon, and Thrace, ravaged by the Bulgarians for ten years.
The Bohemians subdued by Otho.
979 Coronation oath first used in England.
Juries first instituted in ditto.
985 The Danes under Sueno invade England and Scotland.
987 The Carlovingian race in France ended.
991 The figures in arithmetic are brought into Europe by the Saracens from Arabia; letters of the alphabet were hitherto used.
993 A great eruption of Mount Vesuvius.
995 England invaded by the Danes and Norwegians.
996 Otho III. makes the empire of Germany elective.
999 Boleslaus the first king of Poland.
The obliquity of the ecliptic observed by Aboul Wasi and Abu Hamed to be 23° 35′.
1000 Paper made of cotton rags was in use; that of linen rags in 1170; the manufactory introduced into England at Deptford, 1588.
1002 The emperor Henry assumed the title of king of the Romans.
1005 All the old churches are rebuilt about this time in a new manner of architecture.
1006 A plague in Egypt for three years.
1007 A great eruption of Vesuvius.
The obliquity of the ecliptic observed by Albatrunius to be 23° 35′.
1014 Sueno the Dane becomes master of England.
Sept. 28. Almost all Flanders laid under water by a storm.
1015 Children forbidden by law to be sold by their parents in England.
1017 Rain of the colour of blood for three days in Aquitain.
1022 A new species of music invented by Aretin.
1035 Togrul-Beg, or Tangrolipix, the Turkish sultan, establishes himself in Korasan.
The kingdoms of Castile and Arragon began.
1040 The Danes, after several engagements with various success, are about this time driven out of Scotland, and never again return in a hostile manner.
Smyrna destroyed by an earthquake.
1041 The Saxon line restored under Edward the Confessor.
1043 The Turks become formidable and take possession of Persia.
The Russians come from Scythia, and land in Thrace.
1054 Leo IX. the first pope that kept up an army.
1055 The Turks take Bagdad, and overturn the empire of the Saracens.
1057 Malcolm III. king of Scotland, kills the tyrant Macbeth at Dunsinnan, and marries the princess Margaret, sister to Edgar Atheling.

After Christ.

1061 Surnames appointed to be taken in Scotland by a parliament held in Forfar.
1065 The Turks take Jerufalem from the Saracens.
1066 The conqueft of England by William (furnamed the baftard) duke of Normandy, in the battle of Haftings, where Harold is flain.
1070 The feudal law introduced into England.
1075 Henry IV. emperor of Germany, and the pope, quarrel about the nomination of the German bifhops. Henry, in penance, walks barefooted to the pope towards the end of January.
1076 Juftices of the peace firft appointed in England.
An earthquake in England.
Afia Minor, having been two years under the power of Soliman, is from this time called Turkey.
1080 Doomfday-book began to be compiled by order of William, from a furvey of all the eftates in England, and finifhed in 1086.
The tower of London built by ditto, to curb his Englifh fubjects; numbers of whom fly to Scotland, where they introduce the Saxon or Englifh language, are protected by Malcolm, and have lands given them.
1086 The order of Carthufians eftablifhed by Bruno.
1090 The dynafty of Bathineens or Affaffins begins in Irak, and continues for 117 years.
1091 The Saracens in Spain, being hard preffed by the Spaniards, call to their affiftance Jofeph king of Morocco; by which the Moors get poffeffion of all the Saracen dominions in Spain.
1096 The firft crufade to the Holy Land is begun under feveral Chriftian princes, to drive the infidels from Jerufalem.
1098 The order of St Benedict inftituted.
1099 Jerufalem taken by the crufaders; Godfrey elected king of it; and the order of knights of St John inftituted.
1110 Edgar Atheling, the laft of the Saxon princes, dies in England, where he had been permitted to refide as a fubject.
Learning revived at Cambridge.
Writing on paper made of cotton common about this time.
1118 The order of the Knights Templars inftituted, to defend the Sepulchre at Jerufalem, and to protect Chriftian ftrangers.
1119 Bohemia erected into a kingdom.
1132 The kingdom of Portugal began.
1137 The pandect of Juftinian found in the ruins of Amalphi.
1141 The factions of the Guelphs and Gibellines prevailed about this time.
1143 The Koran tranflated into Latin.
1144 The Peripatetic philofophy introduced into Germany.
1151 The canon law collected by Gratian, a monk of Bologna.
1154 Chriftianity introduced into Finland.
1156 The city of Mofcow in Ruffia founded.
The order of the Carmelites inftituted.
1163 London bridge, confifting of 19 fmall arches, firft built of ftone.
1164 The Teutonic order of religious knights begins in Germany.
1171 The dynafty of the Fatemites ended in Egypt; the fovereigns of the country henceforth called Sultans.
1172 Henry II. king of England (and firft of the Plantagenets), takes poffeffion of Ireland; which from that period has been governed by an Englifh viceroy or lord-lieutenant.
1176 England is divided by Henry into fix circuits, and juftice is difpenfed by itinerant judges.
1179 The univerfity of Padua founded.
1180 Glafs windows began to be ufed in private houfes in England.
1181 The laws of England are digefted about this time by Glanville.
1182 Pope Alexander III. compelled the kings of England and France to hold the ftirrups of his faddle when he mounted his horfe.
1183 Seven thoufand Albigenfes maffacred by the inhabitants of Berry.
1186 A conjunction of all the planets at funrife September 16. The fun in 30° ♍; Jupiter in 2° 3′ ♎; Venus in 3° 49′; Saturn in 8° 6′; Mercury in 4° 10′; Mars, 9° 8′; tail of the Dragon, 18° 23′ ♎.
1187 Jerufalem taken by Saladin.
1192 The battle of Afcalon, in Judea, in which Richard, king of England, defeats Saladin's army, confifting of 300,000 combatants.
1194 *Dieu et mon Droit*, firft ufed as a motto by Richard, on a victory over the French.
1195 Denmark and Norway laid wafte by a dreadful tempeft.
1198 Inftitution of the order of the Holy Trinity.
1200 Chimneys were not known in England.
Surnames now began to be ufed; firft among the nobility.
Univerfity of Salamanca in Spain founded.
1204 Conftantinople taken by the French and Venetians.
The inquifition eftablifhed.
The empire of Trebizond eftablifhed.
1208 London incorporated, and obtained their firft charter, for electing their lord mayor and other magiftrates, from King John.
The order of *Fratres Minores* eftablifhed.
The pope excommunicates King John.
1209 The works of Ariftotle imported from Conftantinople into Europe.
The filk manufacture imported from Greece into Venice.
1210 The works of Ariftotle condemned to be burnt at Paris.
The emperor Otho excommunicated by the pope.
Violent perfecution of the Albigenfes.
1215 Magna Charta is figned by King John and the barons of England.
Court of common pleas eftablifhed.
Orders of the Dominicans and Knights Hofpitallers founded.
The doctrine of tranfubftantiation introduced.
1216 King Alexander and the whole kingdom of Scotland excommunicated by the pope's legate.

After Christ.

1220 Aſtronomy and geography brought into Europe by the Moors.
1222 A great earthquake in Germany.
1223 A comet of extraordinary magnitude appeared in Denmark.
1226 A league formed againſt the Albigenſes by the French king and many prelates and lords.
1227 The Tartars under Jenghiz-khan emerge from the northern parts of Aſia, overrun all the Saracen empire, and carry death and deſolation wherever they march.
1228 The univerſity of Thoulouſe founded.
1230 The kingdom of Denmark diſtreſſed by peſtilence.
The kingdoms of Leon and Caſtile united.
Pruſſia ſubdued by the Teutonic knights.
Univerſity of Naples founded.
1231 The Almageſt of Ptolemy tranſlated into Latin.
1233 The Inquiſition, begun in 1204, is now truſted to the Dominicans.
The houſes of London, and other cities in England, France, and Germany, ſtill thatched with ſtraw.
1238 The univerſity of Vienna founded.
1239 A writing of this year's date on paper made of rags ſtill extant.
1241 The Hanſeatic league formed.
Tin mines diſcovered in Germany.
1245 A clear red ſtar, like Mars, appears in Capricorn.
1250 Painting revived in Florence by Cimabue.
1251 Wales ſubdued, and Magna Charta confirmed.
1253 The famous aſtronomical tables are compoſed by Alonſo king of Caſtile.
1256 The order of the Auguſtines eſtabliſhed.
1258 The Tartars take Bagdad, which finiſhes the empire of the Saracens.
1260 The ſect of Flagellantes appeared in Italy.
1263 Acho king of Norway invades Scotland with 160 ſail, and lands 20,000 men at the mouth of the Clyde; but they are cut to pieces by Alexander III. who recovers the weſtern iſles.
1264 The commons of England firſt ſummoned to parliament about this time.
1268 The Tartars invade China.
1269 The Hamburgh company incorporated in England.
The obliquity of the ecliptic obſerved by Cozah Naſirodni to be 23° 30′.
Weſtminſter abbey rebuilt, and conſecrated in the preſence of Henry III.
1272 The academy of Florence founded.
1273 The empire of the preſent Auſtrian family begins in Germany.
The obliquity of the ecliptic obſerved by Cheou-king in China to be 23° 33′ 39″.
1274 The firſt commercial treaty betwixt England and Flanders.
1279 King Edward renounced his right to Normandy.
The mortmain act paſſed in England.
1282 Lewellyn, prince of Wales, defeated and killed by Edward I. who unites that principality to England.
A great peſtilence in Denmark.
8000 French murdered at the Sicilian veſpers.
Academy de la Cruſca founded.
1284 Edward II. born at Caernarvon, is the firſt prince of Wales.
1285 Alexander III. king of Scotland, dies, and that kingdom is diſputed by twelve candidates, who ſubmit their claims to the arbitration of Edward king of England; which lays the foundation of a long and deſolating war between both nations.
1290 The univerſity of Liſbon founded.
1291 Ptolemais taken by the Turks. End of the cruſades.
1293 There is a regular ſucceſſion of Engliſh parliaments from this year, being the 22d of Edward I.
1294 Parliament eſtabliſhed in Paris.
1298 The preſent Turkiſh empire begins in Bithynia under Ottoman.
Silver-hafted knives, ſpoons, and cups, a great luxury.
Tallow-candles ſo great a luxury, that ſplinters of wood were uſed for lights.
Wine ſold by apothecaries as a cordial.
The Scots defeated by the Engliſh at Falkirk.
1299 An earthquake in Germany
Spectacles invented by a monk of Piſa.
The year of jubilee inſtituted by Boniface VIII.
1302 The mariner's compaſs invented, or improved, by Giovia of Naples.
The univerſity of Avignon founded.
1307 The beginning of the Swiſs cantons.
Coal firſt uſed in England.
1308 The popes removed to Avignon in France for 70 years.
1310 Lincoln's Inn ſociety eſtabliſhed.
The knights of St John take poſſeſſion of the iſle of Rhodes.
1314 The battle of Bannockburn between Edward II. and Robert Bruce, which eſtabliſhes the latter on the throne of Scotland.
The cardinals ſet fire to the conclave and ſeparate.
A vacancy in the papal chair for two years.
1315 Germany afflicted with famine and peſtilence.
1319 The univerſity of Dublin founded.
1320 Gold firſt coined in Chriſtendom; 1344 ditto in England.
An earthquake in England.
1323 A great eruption of Mount Ætna.
1325 The firſt treaty of commerce betwixt England and Venice.
1330 Gunpowder invented by a monk of Cologne.
1332 The pope accuſed of hereſy.
1336 Two Brabant weavers ſettled at York, which, ſays Edward III. may prove of great benefit to us and our ſubjects.
1337 The firſt comet whoſe courſe is deſcribed with an aſtronomical exactneſs.
Europe infeſted by locuſts.
1340 Heralds college inſtituted in England.
Copper money firſt uſed in Scotland and Ireland.
1344 The firſt creation to titles by patents uſed by Edward III.
1345 Edward III. had four pieces of cannon, which gained him the battle of Creſſy.
1347 The battle of Durham, in which David, king of Scots, is taken priſoner.

1349

After Christ.

1349 The order of the Garter instituted in England by Edward III. altered in 1557, and consists of 26 knights.
1352 The Turks first enter Europe.
1353 Asia and Africa desolated by locusts.
1354 The money in Scotland till now the same as in England.
1356 The battle of Poictiers, in which King John of France and his son are taken prisoners by Edward the Black Prince.
1357 Coals first brought to London.
1358 Arms of England and France first quartered by Edward III.
University of Cologne founded.
Tamerlane began to reign in Persia.
1362 The law pleadings in England changed from French to English in favour of Edward III. to his people.
The military order of Janizaries established among the Turks.
1365 The universities of Vienna and Geneva founded.
1369 John Wickliffe an Englishman begins to call in question the doctrines of the church of Rome about this time, whose followers are called Lollards.
1370 The office of grand visier established.
1377 Inundation of the sea in Flanders.
1378 Greenland discovered by a Venetian.
1381 Bills of exchange first used in England.
1384 The first act of navigation in England; no goods to be exported or imported by Englishmen in foreign bottoms.
1383 A company of linen weavers from the Netherlands established in London.
Windsor castle built by Edward III.
1387 The first lord high admiral of England instituted.
1388 The battle of Otterburn between Hotspur and the earl of Douglas.
Bombs invented at Venloo.
1391 Cards invented in France for the king's amusement.
1399 Westminster abbey rebuilt and enlarged.—Westminster hall ditto.
Order of the Bath instituted at the coronation of Henry IV. renewed in 1725, consisting of 84 knights.
1402 Tamerlane defeats and takes prisoner Bajazet the Turkish sultan.
1405 The Canary islands discovered by Bathencourt a Norman.
1410 Guildhall, London, built.
Painting in oil-colours invented at Bruges by John Van-eyck.
1411 The university of St Andrew's in Scotland founded.
1412 Algebra brought from Arabia into Europe.
1415 The battle of Agincourt gained over the French by Henry V. of England.
1420 The island of Madeira discovered by the Portuguese.
1421 The revenue of England amounted to 55,754l.
1428 The siege of Orleans, the first blow to the English power in France.
1431 A great earthquake at Lisbon.
1432 Great inundations in Germany.
1427 The obliquity of the ecliptic observed by Ulug Beg to be 23° 30′ 17″.
1440 Printing invented by L. Koster at Haerlem in Holland; brought into England by W. Caxton, a mercer of London, 1471.
1446 The Vatican library founded at Rome.
The sea breaks in at Dort in Holland and drowns 100,000 people.
1453 Constantinople taken by the Turks, which ends the eastern empire, 1123 years from its dedication by Constantine the Great, and 2206 years from the foundation of Rome.
1454 The university of Glasgow in Scotland founded.
1457 Glass first manufactured in England.
1460 Engraving and etching on copper invented.
The obliquity of the ecliptic observed by Purbachius and Regiomontanus to be 23° 29′.
1473 The study of the Greek language introduced into France.
1477 The university of Aberdeen in Scotland founded.
1479 Union of the kingdoms of Arragon and Castile.
1482 The coast of Guinea discovered by the Portuguese.
A court of inquisition erected in Seville.
1485 Richard III. king of England, and last of the Plantagenets, is defeated and killed at the battle of Bosworth, by Henry (Tudor) VII. which put an end to the civil wars between the houses of York and Lancaster, after a contest of 30 years, and the loss of 100,000 men.
1487 Henry establishes fifty yeomen of the guards, the first standing army.
1489 Maps and sea charts first brought to England by Barth. Columbus.
1490 William Groceyn introduces the study of the Greek language into England.
The Moors, hitherto a formidable enemy to the native Spaniards, are entirely subdued by Ferdinand, and become subjects to that prince on certain conditions, which are ill observed by the Spaniards, whose clergy use the inquisition in all its tortures; and in 1609, near one million of the Moors were driven from Spain to the opposite coast of Africa, from whence they originally came.
1492 America first discovered by Columbus, a Genoese in the service of Spain.
The Moors expelled from Granada, which they had possessed upwards of 800 years.
1495 The venereal disease introduced into Europe.
1496 The Jews and Moors banished out of Portugal.
1497 The Portuguese first sail to the East Indies by the Cape of Good Hope.
South America discovered by Americus Vespusius, from whom unjustly it has its name.
1499 North America discovered, for Henry VII. by Cabot, a Venetian.
1508 Maximilian divides the empire of Germany into six circles, and adds four more in 1512.
Brazil discovered by the Portuguese. Florida discovered by John Cabot an Englishman.
Painting in chiaro-obscuro discovered.
A great plague in England.
1505 Shillings first coined in England.

1507

After Christ.

1507 The island of Madagascar discovered by the Portuguese.
1509 Gardening introduced into England from the Netherlands, from whence vegetables were imported hitherto.
1510 The obliquity of the eliptic observed by Wernenus to be 23° 28′ 30″.
1513 The battle of Flowden, in which James IV. king of Scotland is killed, with the flower of his nobility.
1514 Cannon bullets of stone still in use.
1515 The first Polyglot Bible printed at Alcala.
The kingdom of Navarre annexed to that of Castile by Ferdinand.
1516 The kingdom of Algiers seized by Barbarossa.
1517 Martin Luther began the reformation.
Egypt is conquered by the Turks.
The kingdom of the Mamelukes in Egypt overthrown by the Turks.
1518 Discovery of New Spain, and the Straits of Magellan.
1521 Henry VIII. for his writings in favour of popery, receives the title of Defender of the Faith from his Holiness.
1522 Rhodes taken by the Turks.
The first voyage round the world performed by a ship of Magellan's squadron.
1526 The inquisition established in Portugal.
Lutheranism established in Germany.
1527 Rome taken and plundered by the Imperial army.
1528 Popery abolished in Sweden.
1529 The name of Protestant takes its rise from the reformers protesting against the church of Rome, at the diet of Spires in Germany.
1530 Union of the Protestants at Smallcalde, December 22d.
Secretary of State's office established in England.
1531 A great earthquake at Lisbon.
1532 The Court of Session instituted in Scotland.
1533 Insurrection of the Anabaptists in Westphalia.
1534 The reformation takes place in England, under Henry VIII.
Barbarossa seized on the kingdom of Tunis.
1535 The reformation introduced into Ireland.
The society of Jesuits formed.
1539 The first English edition of the Bible authorised; the present translation finished in 1611.
About this time cannon began to be used in ships.
Six hundred and forty-five religious houses suppressed in England and Wales.
1540 The variation of the compass discovered by Sebastian Cabot.
The obliquity of the ecliptic observed by Copernicus to be 23° 28′ 8″.
Society of Jesuits established, September 27.
1543 Silk stockings first worn by the French king; first worn in England by Queen Eliz. 1561; the steel frame for weaving invented by the Rev. Mr Lee, of St John's College, Cambridge, 1589.
Pins first used in England, before which time the ladies used skewers.
Iron cannon and mortars made in England.
1544 Good lands let in England at one shilling per acre.
1545 The famous council of Trent begins, and continues 18 years.
1547 First law in England establishing the interest of money at 10 per cent.
1548 The reformation gained ground in Poland.
1549 Lords lieutenants of counties instituted in England.
1550 Horse guards instituted in England.
The bank of Venice established about this time.
1552 Books of geography and astronomy destroyed in England, as being infected with magic.
The book of Common Prayer established in England by act of parliament.
1554 The kingdom of Astracan conquered by the Russians.
1555 The Russian company established in England.
1558 Queen Elizabeth begins her reign.
1560 The reformation in Scotland completed by John Knox.
1561 Livonia ceded to Poland.
1563 Knives first made in England.
1565 Revolt of the Low Countries.
Malta attacked by the Turks.
1566 The 39 articles of the church of England established.
1568 Queen Mary imprisoned in England.
Liberty of professing the reformed religion granted to the Low Countries.
1569 Royal exchange first built.
1571 The island of Cyprus taken by the Turks.
They are defeated at Lepanto.
1572 The great massacre of Protestants at Paris.
A new star in Cassiopeia observed by Cornelius Gemma. It appeared in November, and disappeared in March.
1576 The profession of the Protestant religion authorised in France. This toleration followed by a civil war.
1578 The first treaty of alliance betwixt England and the States General, January 7.
1579 The Dutch shake off the Spanish yoke, and the republic of Holland begins.
English East India company incorporated—established 1600.
——— Turkey company incorporated.
1580 Sir Francis Drake returns from his voyage round the world, being the first English circumnavigator.
Parochial register first appointed in England.
The kingdom of Portugal seized by Philip of Spain.
1581 Copper first used in France.
1582 Pope Gregory introduces the New Style in Italy; the 5th of October being counted the 15th.
1583 Tobacco first brought from Virginia into England.
The first proposal of settling a colony in America.
1587 Mary Queen of Scots is beheaded by order of Elizabeth, after 18 years imprisonment.
1588 The Spanish Armada destroyed by Drake and other English admirals.
Henry IV. passes the edict of Nantes, tolerating the Protestants.

After Christ.

1588 Duelling with fmall fwords introduced into England.

1589 Coaches firft introduced into England; hackney act 1693; increafed to 1000 in 1770.

1590 Band of penfioners inftituted in England.

Telefcopes invented by Janfen, a fpectacle-maker in Germany.

1591 Trinity College, Dublin, founded.

1593 A great plague in London.

1594 The Jefuits expelled from France.

The obliquity of the ecliptic obferved by Byrgius to be 23° 30′.

1595 The fame obferved by Tycho-Brahe to be 23° 29′ 25″.

1596 A great earthquake at Japan.

1597 Watches firft brought into England from Germany.

1598 The edict of Nantes by Henry IV. of France.

1602 Decimal arithmetic invented at Bruges.

1603 Queen Elizabeth (the laft of the Tudors) dies, and nominates James VI. of Scotland as her fucceffor; which unites both kingdoms under the name of Great Britain.

1605 The Gunpowder-plot difcovered at Weftminfter; being a project to blow up the king and both houfes of parliament.

1606 Oaths of allegiance firft adminiftered in Britain.

1608 Colonies fent from Britain to Virginia.

1609 The independency of the United States acknowledged by Spain.

1610 Galileo, of Florence, firft difcovers the fatellites about the planet Jupiter, by the telefcope, lately invented in Germany.

Henry IV. is murdered at Paris, by Ravaillac, a prieft.

Thermometers invented by Drebel, a Dutchman.

1611 Baronets firft created in Britain by James I. May 22.

An earthquake in Conftantinople; 200,000 perfons died there of the plague.

1612 The north-weft paffage to China attempted in vain by the Britifh.

1614 Napier of Marchefton, in Scotland, invents the logarithms.

Sir Hugh Middleton brings the new river to London from Ware.

1616 The firft permanent fettlement in Virginia.

1619 W. Harvey, an Englifhman, confirms the doctrine of the circulation of the blood, which had been firft broached by Servetus, a French phyfician, in 1553.

1620 The broad filk manufacture from raw filk, introduced into England.

Barbadoes difcovered by Sir William Courteen.

Navarre united to France.

Copper-money firft introduced in England.

1621 New England planted by the Puritans.

The two parties of Whigs and Tories formed in Britain.

1622 The Palatinate reduced by the Imperialifts.

1623 The Knights of Nova Scotia inftituted.

1624 Maffacre of the Englifh at Amboyna.

1625 King James dies, and is fucceeded by his fon, Charles I.

1625 The ifland of Barbadoes, the firft Britifh fettlement in the Weft Indies, is planted.

1631 The tranfit of Mercury over the fun's difk, firft obferved by Gaffendi.

A great eruption of Vefuvius.

1632 The battle of Lutzen, in which Guftavus Adolphus, king of Sweden, and head of the Proteftants in Germany, is killed.

1633 Galileo condemned by the inquifition at Rome.

Louifiana difcovered by the French.

1635 Province of Maryland planted by Lord Baltimore.

Regular pofts eftablifhed from London to Scotland, Ireland, &c.

1636 A tranfit of Mercury over the fun's difk obferved by Caffini.

1639 A tranfit of Venus over the fun's difk, firft obferved by Mr Horrox, November 24. O. S. 3 h. 15′ P. M.

1640 King Charles difobliges his Scottifh fubjects; on which their army, under General Lefley, enters England, and takes Newcaftle, being encouraged by the malecontents in England.

The maffacre in Ireland, when 40,000 Englifh Proteftants were killed.

The independency of Portugal recovered by John duke of Braganza.

1642 King Charles impeaches five refractory members, which begins the civil wars in England.

1643 Excife on beer, ale, &c. firft impofed by parliament.

Barometers invented by Torricelli.

1648 A new ftar obferved in the tail of the Whale by Fabricius.

1649 Charles I. beheaded by Cromwell at Whitehall, January 30. aged 49.

Pendulums firft applied to clocks by Huygens.

1651 The fect called *Quakers* appeared in England.

1652 The Dutch colony at the Cape of Good Hope eftablifhed.

1653 Cromwell affumes the protectorfhip.

The air-pump is invented by Otto Guericke of Magdeburg.

1655 The Englifh under Admiral Penn, take Jamaica from the Spaniards.

One of Saturn's fatellites obferved by Huygens.

1658 Cromwell dies, and is fucceeded in the protectorfhip by his fon Richard.

1660 King Charles II. is reftored by Monk, commander of the army, after an exile of twelve years in France and Holland.

The people of Denmark, being oppreffed by the nobles, furrendered their privileges to Frederic III. who becomes abfolute.

1661 The obliquity of the ecliptic obferved by Hevelius to be 23° 29′ 7″.

1662 The royal fociety eftablifhed at London by Charles II.

1663 Carolina planted: 1728, divided into two feparate governments.

Pruffia declared independent of Poland.

1664 The New Netherlands in North America conquered from the Swedes and Dutch by the Englifh.

After Christ.

1665 The plague rages in London, and carries off 68,000 perſons.
The magic lantern invented by Kircher.

1666 The great fire of London began Sept. 2. and continued three days, in which were deſtroyed 13,000 houſes and 400 ſtreets.
Tea firſt uſed in England.

1667 The peace of Breda, which confirms to the Engliſh the New Netherlands, now known by the names of Pennſylvania, New York, and New Jerſey.

1668 ——— ditto, Aix la-Chapelle.
St James's Park planted and made a thoroughfare for public uſe by Charles II.

1669 The iſland of Candia taken by the Turks.

1670 The Engliſh Hudſon's Bay company incorporated.
The obliquity of the ecliptic obſerved by Mengoli to be 23° 28′ 24″.

1672 Louis XIV. overruns great part of Holland, when the Dutch open their ſluices, being determined to drown their country, and retire to their ſettlements in the Eaſt Indies.
African company eſtabliſhed.
The obliquity of the ecliptic obſerved by Richer to be 23° 28′ 54″.

1677 The micrometer invented by Kircher.

1678 The peace of Nimeguen.
The habeas corpus act paſſed.
A ſtrange darkneſs at noonday, Jan. 12.

1680 A great comet appeared, and from its nearneſs to our earth alarmed the inhabitants. It continued viſible from Nov. 3. to March 9.
William Penn, a Quaker, receives a charter for planting Pennſylvania.

1683 India ſtock ſold from 360 to 500 per cent.

1685 Charles II. dies, aged 55, and is ſucceeded by his brother James II.
The duke of Monmouth, natural ſon to Charles II. raiſes a rebellion, but is defeated at the battle of Sedgmore, and beheaded.
The edict of Nantes is revoked by Louis XIV. and the Proteſtants are greatly diſtreſſed.

1686 The Newtonian philoſophy publiſhed.

1687 The palace of Verſailles, near Paris, finiſhed by Louis XIV.

1688 The revolution in Great Britain begins Nov. 5. King James abdicates, and retires to France, December 23.
King William and Queen Mary, daughter and ſon-in-law to James, are proclaimed February 13.
Viſcount Dundee ſtands out for James in Scotland, but is killed by General Mackay at the battle of Killycrankie; upon which the Highlanders, wearied with repeated misfortunes, diſperſe.
Smyrna deſtroyed by an earthquake.

1689 The land-tax paſſed in England.
The toleration act paſſed in ditto.
William Fuller, who pretended to prove the prince of Wales ſpurious, was voted by the commons to be a notorious cheat, impoſtor, and falſe accuſer.
Several biſhops are deprived for not taking the oaths to William.

1689 Epiſcopacy aboliſhed in Scotland.

1690 The battle of the Boyne gained by William againſt James, in Ireland.

1691 The war in Ireland finiſhed by the ſurrender of Limeric to William.
The obliquity of the ecliptic obſerved by Flamſtead to be 23° 28′ 32″.

1692 The Engliſh and Dutch fleets, commanded by Admiral Ruſſel, defeat the French fleet off La Hogue.
The maſſacre of Glencoe in Scotland, Jan. 31. O. S.
Earthquakes in England and Jamaica, September 8.
Hanover made an electorate of the empire.

1693 Bayonets at the end of loaded muſkets firſt uſed by the French againſt the confederates in the battle of Turin.
Bank of England eſtabliſhed by King William.
The firſt public lottery was drawn this year.

1694 Queen Mary dies at the age of 33, and William reigns alone.
Stamp-duties inſtituted in England.

1697 The peace of Ryſwick.

1699 The Scots ſettled a colony at the iſthmus of Darien in America, and called it *Caledonia.*

1700 Charles XII. of Sweden begins his reign.

1701 King James II. dies at St Germains, in the 68th year of his age.
Pruſſia erected into a kingdom.
Society for the propagation of the goſpel in foreign parts eſtabliſhed.

1702 King William dies, aged 50, and is ſucceeded by Queen Anne, daughter to James II. who, with the emperor and ſtates general, renews the war againſt France and Spain.
The French ſent colonies to the Miſſiſſippi.

1703 The obliquity of the ecliptic obſerved by Bianchini to be 23° 28′ 25″.

1704 Gibraltar taken from the Spaniards by Admiral Rooke.
The battle of Blenheim won by the duke of Marlborough and allies againſt the French.
The Court of Exchequer inſtituted in England.

1706 The treaty of union betwixt England and Scotland, ſigned July 22.
The battle of Ramillies won by Marlborough and the allies.

1707 The firſt Britiſh parliament.
The allies defeated at Almanza.

1708 Minorca taken from the Spaniards by General Stanhope.
The battle of Oudenarde won by Marlborough and the allies.

1709 Peter the Great, czar of Moſcovy, defeats Charles XII. at Poltowa, who flies to Turkey.
The battle of Malplaquet won by Marlborough and the allies.

1710 Queen Anne changes the Whig miniſtry for others more favourable to the intereſt of her brother the late pretender.
The cathedral church of St Paul, London, rebuilt by Sir Chriſtopher Wren in 37 years, at one million expence, by a duty on coals.
The Engliſh South-ſea company began.

After Chrift.

1712 Duke of Hamilton and Lord Mohun killed in a duel in Hyde-park.
1713 The peace of Utrecht, whereby Newfoundland, Nova Scotia, New Britain, and Hudfon's Bay in North America, were yielded to Great Britain; Gibraltar and Minorca in Europe were alfo confirmed to the faid crown by this treaty.
1714 Queen Anne dies at the age of 50, and is fucceeded by George I.
Intereft reduced to five per cent.
1715 Louis XIV. dies, and is fucceeded by his great-grandfon Louis XV.
The rebellion in Scotland begins in September, under the earl of Mar, in favour of the Pretender. The action of Sheriffmuir, and the furrender of Prefton, both in November, when the rebels difperfe.
The obliquity of the ecliptic obferved by Louville to be 23° 28′ 24″.
1716 The Pretender married the princefs of Sobiefka, grand-daughter of John Sobiefki, late king of Poland.
An act paffed for feptennial parliaments.
1718 Sardinia erected into a kingdom, and given to the duke of Savoy.
1719 The Miffiffippi fcheme at its height in France.
Lomb's filk-throwing machine, containing 26,586 wheels, erected at Derby: takes up one-eighth of a mile; one water-wheel moves the reft; and in twenty-four-hours it works 318,504,960 yards of organzine filk-thread.
1720 The South-fea fcheme in England begun April 7. was at its height at the end of June, and quite funk about September 29.
A great earthquake in China.
1724 An earthquake in Denmark.
1727 King George dies, in the 68th year of his age; and is fucceeded by his only fon, George II.
Inoculation firft tried on criminals with fuccefs.
Ruffia, formerly a dukedom, is now eftablifhed as an empire.
The aberration of the fixed ftars difcovered and accounted for by Dr Bradley.
1732 Kouli Khan ufurps the Perfian throne, conquers the Mogul empire, and returns with two hundred and thirty-one millions fterling.
Several public-fpirited gentlemen begin the fettlement of Georgia in North America.
1733 The Jefuits expelled from Paraguay.
1739 Captain Porteous having ordered his foldiers to fire upon the populace at the execution of a fmuggler, is himfelf hanged by the mob at Edinburgh.
A tranfit of Mercury obferved by Caffini.
1737 A dreadful hurricane at the mouth of the Ganges, October 10.
1738 Weftminfter bridge, confifting of 15 arches, begun; finifhed in 1750 at the expence of 389,000l. defrayed by parliament.
The order of St Januarius eftablifhed at Naples.
1739 Letters of marque iffued out in Britain againft Spain, July 21. and war declared, Oct. 23.
The empire of Indoftan ruined by Kouli Khan.
An intenfe froft in Britain.
1743 The battle of Dettingen won by the Englifh and allies in favour of the queen of Hungary.
1744 A dreadful plague in Sicily.
1744 War declared againft France.—Commodore Anfon returns from his voyage round the world.
1745 The allies lofe the battle of Fontenoy.
The rebellion breaks out in Scotland, and the Pretender's army defeated by the duke of Cumberland at Culloden, April 16. 1746.
1746 Britifh Linen Company erected.
Lima deftroyed by an earthquake.
1747 Kouli Khan murdered.
1748 The peace of Aix la-Chapelle, by which a reftitution of all places taken during the war was to be made on all fides.
1749 The intereft on the Britifh funds reduced to three per cent.
Britifh herring-fifhery incorporated.
The colony of Nova Scotia founded.
1750 Earthquake in England.
1751 Frederic prince of Wales, father to his prefent majefty, died.
Antiquarian Society at London incorporated.
1752 The new ftile introduced into Great Britain; the 3d of September being counted the 14th.
1753 The Britifh Mufeum erected at Montague-houfe.
Society of arts, manufactures, and commerce, inftituted in London.
1754 A dreadful eruption of Mount Ætna.
A great earthquake at Conftantinople, Cairo, &c. Sept. 2.
1755 Quito in Peru deftroyed by an earthquake, April 28.
Lifbon deftroyed by an earthquake, Nov. 1.
1756 146 Englifhmen are confined in the Black Hole at Calcutta in the Eaft Indies by order of the Nabob, and 123 found dead next morning.
Marine fociety eftablifhed at London.
The king of Pruffia commenced hoftilities in the month of Auguft in Saxony. Defeats the Auftrians at Lo.
1757 Damien attempted to affaffinate the French king.
The king of Pruffia invades Bohemia. Defeats the Auftrians at Reichenberg, April 21. and at Prague, May 6. Repulfed by Count Daun at Kolin, June 18.
The allies defeated by the French at Haftenbeck, July 26.
Convention of Clofter-Seven, Sept. 8.
The king of Pruffia defeats the French and Auftrians at Rofbach, Nov. 5. The Pruffians defeated near Breflaw, Nov. 22. The Auftrians defeated at Liffa, Dec. 5.
1758 Senegal taken by the Britifh, May 1. They take Louifbourg, July 27.
The king of Pruffia defeats the Ruffians at Zorndorf, Aug. 25. Is defeated by Count Daun at Hoch-kirchen, Oct. 14.
Goree taken by Commodore Keppel, Dec. 29.
Attempt to affaffinate the king of Portugal, Dec. 3.
1759 General Wolfe is killed in the battle of Quebec, which is gained by the Britifh.
The French defeated by Prince Ferdinand at Bergen, April 13.
Guadaloupe taken by the Britifh, May 1.
King of Pruffia defeated by the Ruffians at Cunerfdorf, Aug. 12.

After Christ.

1759 The French fleet defeated by Admiral Hawke, Nov. 20.
Balbec and Tripoli destroyed by an earthquake, Dec. 5.

1760 King George II. dies, Oct. 25. in the 77th year of his age, and is succeeded by his present majesty, who, on the 22d September 1761, married the princess Charlotte of Mecklenburgh Strelitz.
Blackfriars bridge, consisting of 9 arches, begun; finished 1770, at the expence of 152,840l. to be discharged by a toll.

1761 A transit of Venus over the sun, June 6.
Earthquakes in Syria, Oct. 13.
The king of Prussia defeats the Austrians at Torgau, Nov. 3.
Pondicherry taken by Col. Coote, Jan 15.
Belleisle surrendered to the British, Feb. 4.

1762 War declared against Spain.
Peter III. emperor of Russia, is deposed, imprisoned, and murdered.
American philosophical society established in Philadelphia.
George Augustus Frederic, prince of Wales, born, August. 12.
Martinico surrendered to the British, Feb. 4.
Havannah surrendered to ditto, Aug. 12.
Manilla taken by ditto, Oct. 6.

1763 The definitive treaty of peace between Great Britain, France, Spain, and Portugal, concluded at Paris, February 10th; which confirms to Great Britain the extensive province of Canada, East and West Florida, and part of Louisiana, in North America; also the islands of Grenada, St Vincent, Dominica, and Tobago, in the West Indies.
The Jesuits expelled from France.

1764 The parliament granted 10,000l. to Mr Harrison for his discovery of the longitude by his time-piece
Famine and pestilence in Italy.
An earthquake at Lisbon.

1765 His majesty's royal charter passed for incorporating the society of artists.
An act passed annexing the sovereignty of the island of Man to the crown of Great Britain.

1766 April 21st, a spot or macula of the sun, more than thrice the bigness of our earth, passed the sun's centre.
The American stamp-act repealed, March 18.
A great earthquake at Constantinople.
The Jesuits expelled from Bohemia and Denmark.

1767 The Jesuits expelled from Spain, Venice, and Genoa, April 2d.
Martinico almost destroyed by an earthquake.
The Protestants tolerated in Poland, Nov. 2d.

1768 Academy of painting established in London.
The Turks imprison the Russian ambassador, and declare war against that empire.
The Jesuits expelled from Naples, Malta, and Parma.

1769 Paoli fled from Corsica, June 13. The island then reduced by the French.

1770 An earthquake at St Domingo.

1771 Dr Solander and Mr Banks, in his majesty's ship the Endeavour, Lieut. Cook, return from a voyage round the world, having made several important discoveries in the South Seas.
An emigration of 500,000 Tourgouths from the coasts of the Caspian sea to the frontiers of China.

1772 The king of Sweden changes the constitution from aristocracy to a limited monarchy.
The Pretender marries a princess of Germany, grand-daughter of Thomas late earl of Aylesbury.
The emperor of Germany, empress of Russia, and the king of Prussia, strip the king of Poland of a great part of his dominions, which they divide among themselves, in violation of the most solemn treaties.

1773 Captain Phipps is sent to explore the North Pole; but having made 81 degrees, is in danger of being locked up by the ice, and his attempt to discover a passage in that quarter proves fruitless.
The English East India Company having, by conquest or treaty, acquired the extensive provinces of Bengal, Orixa, and Bahar, containing 15 millions of inhabitants, great irregularities are committed by their servants abroad; upon which government interferes, and sends out judges, &c. for the better administration of justice.
The war between the Russians and the Turks proves disgraceful to the latter, who lose the islands in the Archipelago, and by sea are everywhere unsuccessful.
The society of Jesuits suppressed by the pope's bull, Aug. 25.

1774 Peace is proclaimed between the Russians and the Turks.
The British parliament having passed an act laying a duty of 3d. per pound upon all teas imported into America, the colonists, considering this as a grievance, deny the right of the British parliament to tax them.
The American colonies send deputies to Philadelphia, who assume the title of *The Congress of the Thirteen United Provinces*, and all the powers of government.

1775 The American war commences. Action at Bunker's Hill, June 7.
The Spaniards land near Algiers, and are defeated, July 8.

1776 The congress declare the United States of America independent of the crown and parliament of Great Britain.
The Americans receive a dreadful defeat at Long Island, Aug. 27.

1777 Philadelphia taken by the British, Oct. 3.
General Burgoyne with his army surrenders to the Americans.

1778 A most extraordinary eruption of Vesuvius, August 8.
The siege of Gibraltar begun by the Spaniards, July 8.

After Christ.

1780 Jan. 14th, 6h. A. M. the thermometer fuſpended in the open air at Glaſgow, ſtood at 46° below 0.
The Spaniſh fleet defeated by Admiral Rodney, Jan. 16th.
Charleſtown ſurrendered to the Britiſh, May 12th.
A dreadful inſurrection in London, and riots in many other places of the kingdom.
A great number of Britiſh ſhips taken by the combined fleets of France and Spain.
Lord Cornwallis defeats the Americans at Camden.
A dreadful hurricane in the Leeward iſlands, Oct. 9th.
An extraordinary ſtorm of wind in England.
War declared againſt the Dutch, Dec. 20.

1781 A terrible engagement between the Dutch and Britiſh fleets near the Dogger bank, Auguſt 5th.
Lord Cornwallis with his army ſurrenders to the united forces of France and America, Oct. 18th.

1782 Minorca ſurrendered to the Spaniards, February 4th.
The French fleet under De Graſſe defeated and almoſt deſtroyed by Admiral Rodney, April 12th.
The Spaniſh floating batteries before Gibraltar entirely deſtroyed, Sept. 12.

1783 Preliminaries of a general peace ſigned. America declared independent, Jan. 20th.
A dreadful earthquake, attended with many extraordinary circumſtances, in Italy and Sicily.
The ſun obſcured by a kind of fog during the whole ſummer.
A volcanic eruption in Iceland ſurpaſſing any thing recorded in hiſtory. The lava ſpouted up in three places to a great height in the air, and continued flowing for two months; during which time it covered a tract of ground to a great extent, and in ſome places more than 100 feet deep.
A large meteor appears to the northward of Shetland, and takes its direction ſouthward, with a velocity little inferior to that of the earth in its annual courſe round the ſun. Its track obſerved for more than 1000 miles.
Algiers bombarded by the Spaniards.
A great tumult at Philadelphia between the inhabitants and French ſoldiery.
An extraordinary aurora borealis ſeen at London.
Bednore taken by the Engliſh.
Magazine at Bencoolen blown up.
Bottles made of the lava of volcanoes.
Byrne, the Iriſh giant, eight feet four inches, dies by intemperance.
Famine in the Carnatic.
Charles Guſtavus prince of Sweden dies.
A father kills three of his children with the thigh-bone of a horſe, after hearing a ſermon on the happineſs of thoſe who die young.
Sir Eyre Coote defeats Hyder Ally.
Cremnitz in Hungary deſtroyed by lightning.
Dartmouth Eaſt Indiaman loſt.

1783 Definitive treaties between Britain and France, Spain and America, concluded.
The Eaſt India houſe robbed.
Thanks to General Elliot voted by the houſe of commons.
Embargo on ſalt in Ireland taken off.
A foreſt in Poland ſuddenly diſappears.
Iſland of Formoſa deſtroyed by an earthquake.
Gold and ſilver lace prohibited in Denmark.
A conſpiracy againſt the Grand Signior diſcovered.
Groſvenor Indiaman loſt.
Mangalore ſurrenders to the Britiſh.
Five meteors or fire-balls ſeen at different places in England.
Serious mutinies at Portſmouth, Jerſey, Guernſey, Dublin, &c.
A plague breaks out at Conſtantinople.
Powder mills at Ewell blown up.
A man in Moſcow has 84 children alive out of 87 by three wives.
Queen Charlotte delivered of a princeſs.

1784 General Cornwallis made conſtable of the Tower.
Sluices at Lillo opened by the Dutch.
Great earthquakes in Iceland, Grenoble, &c.
Fort Frederick at Grenada blown up.
Commodore Lindſay viſited by the king and queen of Naples.
Pennſylvania in extreme diſtreſs.
A general thankſgiving for peace with America, &c.
Allan Ramſay, Eſq. ſon of the celebrated poet of the ſame name, dies at Dover.
St Auguſtine in Florida declared a free port.
A gang of deſperate robbers apprehended at Glaſgow.
A volcano diſcovered in the moon.

1785 Melancholy fate of two aëronauts.
A ſingular calamity at Barbadoes, by the ſinking of the ſurface in different places.
A new comet diſcovered.
The queen of France is delivered of a ſon.
A remarkable accident happens at the court of king's bench.
A dreadful inundation happens at Vienna in Germany.

1786 The Halſewell Eaſt Indiaman ſtruck on the rocks of Purbeck, and about 100 of the crew periſhed, Jan. 6th.
Joiner's works performed by a blind man in ſuch a maſterly manner as to aſtoniſh the ableſt judges, at Hermanſtadt in Tranſilvania.
The king of Pruſſia makes a handſome proviſion during life for the widow and children of Colonel Vantroſcke, a deſerving officer. April.
The weſt tower of Hereford church, 125 feet high, built in the 12th century, fell down on the evening of 17th April, but none of the people then in the church-yard received any injury.
M. Blanchard aſcends in a balloon 96 miles in as many minutes. Writes a letter in the air, dated April 18th, to the editors of the Paris Journal.

1786

After Christ.

1786 To the number of 6398 boys and girls clothed, educated, and supported by voluntary contributions, assemble under the dome of St Paul's cathedral.

A small prayer-book composed by Queen Elizabeth, and in her own hand-writing, sold in London for 100 guineas, June 7th.

The prince of Wales orders his whole stud to be disposed of by auction, to enable him to liquidate his debts.

1787 The king of Prussia establishes a court of honour for the purpose of suppressing duelling.

A meeting of notables convened by the king of France for reforming abuses relating to the subject of finance, January 10th.

Two ships sailed from Gravesend with black people on board, for a new settlement at Sierra Leone, January 9th.

The king of Poland has an interview with her imperial majesty at Kiow, March 7th.

Nine ships sailed for Botany Bay from Spithead with convicts, 21st.

A motion in parliament for repealing the test and corporation acts, 28th.

M. de Calonne is dismissed from office, April 10th.

Mr Hastings impeached at the bar of the house of lords, May 10th.

——— petitions to be admitted to bail, 22d.

The sum of 161,000l. voted for the liquidation of the prince of Wales's debts, 24th.

The Hartwell East Indiaman lost off the island of Bona Vista, 24th.

Two satellites belonging to Georgium Sidus discovered by Dr Herschel, June 7th.

The Russian ambassador at Constantinople imprisoned, August 16th.

The Prussian troops under the duke of Brunswick take possession of Utrecht, Sept. 17th.

Twenty-three sail of the line put into commission, and seventeen new admirals appointed, Sept. 24th.

The Prussians gain possession of Amsterdam, October 11th.

A most remarkable aurora borealis appears, 13th.

Lord George Gordon apprehended and committed to Newgate, December 7th.

1788 Died at Bryngwyn in Radnorshire six persons during the month of January, whose united ages made up 644 years.

A new copper coinage of halfpence begins to circulate in Britain, July 19th.

William Brodie and George Smith tried for breaking into the general excise office for Scotland, and sentenced to be executed, September 1st.

A dreadful hurricane at Martinico laid many parishes waste, and deprived multitudes of their existence, August 14th.

The king of France abolished the torture, and ordained that every accused person shall have counsel immediately assigned him, October 18th. He ordered also, that a majority of one may acquit the accused, while three are required to condemn.

An iron barge built by John Wilkison, Esq. at Wilby wharf Shrewsbury, was launched, drawing only eight inches water, and moving very easily on that element, November 7th.

His Britannic majesty is seized with a severe indisposition, October 17th.

A new comet in the constellation of Ursa Major, discovered by M. Messier astronomer at Paris, November 26th.

1789 Coins bearing date 1057 were found beneath the foundation of the old market-house at Farnham.

Another satellite discovered by Dr Herschel belonging to Saturn.

Earthquake at Comrie, November 3d.

Foundation stone of that magnificent structure, the university of Edinburgh, laid by the Right Honourable Francis Lord Napier, grand master-mason of Scotland, November 16th.

Phipps (father and son) hanged for forgery, September 5th.

Revolution of France is begun and gradually advanced.

General Washington makes a splendid entrance into the city of Philadelphia, where a sumptuous entertainment is provided for him by the joyful citizens, April 22d.

An excellent and cheap dye invented in Germany.

Dr Withers sentenced to 12 months imprisonment, to pay a fine of 50l. and to find security for five years, himself in 500l. and two others in 250l. each, for defaming the character of Mrs Fitzherbert, November 21st.

The sum of 261l. 3s. voted to Brook Watson, Esq. to defray the expences of a new invented method of cultivating hemp, December 14th.

1790 Exile of the duke de Orleans.

Bed of justice instituted in France.

Calamitous state of affairs in that country.

The archbishop of Toulouse dismissed from office.

A convention signed at the Escurial between his Britannic majesty and the king of Spain, October 28th.

A memorial of the court of Spain delivered to Mr Fitzherbert, June 13th.

M. Montmorin's letter to the national assembly of France.

Louis XVI. delivers a speech to the national assembly.

A blackbird's nest with four eggs found December 25th, near Nuneham in Oxfordshire.

1791 Serious riots at Paris.

The Tiers Etat constitute themselves a national assembly.

Paris is surrounded by the military at the desire of the king.

Prisons set open by the mob, and a great famine in Paris, whether real or artificial is involved in obscurity.

M. Necker is dismissed from office, and the Bastile demolished.

M. La Fayette appointed commander in chief of the national guard.

M. Necker is recalled with every demonstration of joy.

After Christ.

1791 A moſt horrid inſurrection takes place on the 5th of October.

The royal family comes from Verſailles to Paris.

The abolition of orders decreed by the aſſembly.

The iſland of Corſica united to France.

The unpopular and oppreſſive tax on ſalt aboliſhed.

M. Necker again reſigns, about which time a riot breaks out at Paris, and a ſerious mutiny in the harbour of Breſt.

Foreign powers combine againſt France.

The king of France flies, is apprehended, and returns.

The city of Paris put under martial law.

The Netherlands revolt from Germany.

Peace is concluded between Auſtria and Pruſſia, and between Pruſſia and Sweden.

The grand vizier is diſgraced, and dies.

A peace concluded between Ruſſia and Conſtantinople.

A convention is entered into with Spain relative to Nootka Sound.

War carried on in India with Tippoo Saib.

The Britiſh parliament is diſſolved, and the new parliament is ſoon after opened by a ſpeech from the throne.

A bill is preſented in the Britiſh parliament for the relief of Proteſtant Catholics.

The French conſtitution ſettled by the aſſembly, and preſented to the king, September 3d.

Accepted of by the king, 13th.

1792 Waſhington's ſpeech to both houſes of congreſs, October 25th.

A treaty between Britain and Pruſſia relative to the marriage of the duke of York with Frederica Charlotte.

Guſtavus III. of Sweden is aſſaſſinated by Ankarſtrom.

General Dillon is inhumanly murdered by his own ſoldiers.

M. Rochambeau reſigns the command of the French army in the north, and is ſucceeded by M. Luckner.

Horrible outrages are committed in Paris on the 20th June.

The French arms are victorious in the Netherlands.

A petition is preſented to the aſſembly, praying for the depoſition of Louis XVI.

The palace is abandoned by the royal family of France, and attacked by the federates, at which time the Swiſs guards are maſſacred.

Louis is depoſed, and he and his family impriſoned.

War proclaimed by the aſſembly of France againſt the king of Hungary and Bohemia, April 20th.

The king of the French writes a confidential letter to the king of Great Britain.

A manifeſto againſt the French revolution by the emperor of Germany and the king of Pruſſia.

The French national aſſembly proceeds to the trial of the king. He is condemned and executed, Jan. 21. after which M. Chauvelin is diſmiſſed from London.

Dumourier arreſts the commiſſioners ſent to bring him to the bar of the convention, and ſends them as priſoners to the Auſtrians. He finally abandons the cauſe of France as hopeleſs and deſperate. He is ſucceeded by General Dampier.

The Briſſotine party is denounced by the people of Paris.

Marat is committed to the Abbey, but ſoon releaſed, and aſſaſſinated at laſt by a female from Normandy.

An expedition is undertaken againſt Dunkirk, which is rendered abortive.

General Cuſtine, the queen, the deputies of the Gironde, Manuel, Houchard, Bailly, Barnave, Rabaut, the duke of Orleans and Madame Roland, are condemned and executed.

Earl Moira makes an unſucceſsful deſcent on the coaſt of France.

Toulon ſurrenders to the Britiſh, but is retaken by the French.

1794 Earl Stanhope moves that the French republic be acknowledged by Britain.

Mr Adam propoſes to amend the criminal law of Scotland, which gives riſe to intereſting debates.

The firſt reading of a bill for ſuſpending the Habeas Corpus act is proteſted againſt, May 22.

Proteſt againſt the vote of thanks to Lord Hood, June 17.

The king of Pruſſia withdraws from the coalition.

A bill is brought into parliament for the abolition of the ſlave-trade, and rejected by the lords.

General Fitzpatrick moves for an inquiry into the reaſons of M. la Fayette's impriſonment.

A motion for peace with France is made by the duke of Bedford and Mr Fox.

Thanks are voted by both houſes to Lord Howe, Sir Charles Grey, and Sir John Jervis.

That valuable inſtrument the *telegraph* is invented by the French.

The bold eloquence of Billaud Varennes, and Tallien, opens the eyes of France reſpecting the ambitious views of that ſanguinary monſter Maximilian Robeſpierre, who is condemned and executed (28th June), with about 20 of his diabolical coadjutors.

General Clairfait is defeated, and Louvain and Namur are taken by the French.

A treaty is entered into between Sweden and Denmark, and neutral powers oblige Britain to indemnify them for their loſſes.

1795 La Pique of 38 guns captured by Vice-admiral Caldwell, Jan. 4.

Admiral Hothman captures two French ſhips, Ca-ira of 80, and the Cenſeur of 74 guns, March 16.

Warren Haſtings acquitted of the ſerious charges preferred againſt him, by a majority of the houſe of peers, April 25.

The Boyne of 98 guns is blown up at Spithead, but

but not so much damage done to adjacent vessels as there was reason to dread, all her guns being loaded, May 4.

Captain Anthony James Pye Molloy dismissed from the command of the Cæsar of 74 guns, for neglect of duty.

Some ships of war belonging to the French taken by the fleet under the command of Admiral Bridport, 23d June.

Leopold brother to the emperor of Germany died August 10.

La Minerve of 42 guns captured by Captain Towry, June 24.

The beautiful church of St Paul's, Covent-garden, totally consumed by fire, Sept. 19.

A shock of an earthquake felt through most of the town of Birmingham, Nov. 23.

1796 A stone was thrown at his Britannic majesty's carriage on his way from Pall-mall to Buckingham-house, which broke a window and greatly alarmed Lady Harrington, Feb. 1. A reward of 1000l. was offered for the apprehension of the criminal, but without effect.

Admiral Cornwallis is tried on board the Orion, for acting contrary to orders received from the admiralty, and acquitted, April 17.

Sir Sidney Smith taken by the French at Havre, April.

L'Unité, a French frigate of 38 guns, taken by Captain Cole, and La Virginie of 44 by Sir Edward Pellew, April 13. and 20.

Crossfield, for attempting to assassinate his majesty, was tried and acquitted, May 20.

Les Trois Coleurs of 10, and La Blonde of 16 guns, captured by Sir Edward Pellew, May 18.; and La Tribune of 44 guns by Captain Martin, same month.

Two houses fell down in Clare-market, in the ruins of which 17 persons were unfortunately buried, June 27.

The Amphion frigate of 32 guns blown up at Plymouth, when about 260 lives were lost, Sept. 22.

The empress Catharine II. of Russia died at her palace of an apoplectic fit, Nov. 17.

1797 Part of a French fleet came to anchor in Bantry bay, having on board an army of 25,000 men, under the command of General Hoche; but afterwards weighed and stood out to sea, January 2.

The steeple of a church near Norwich fell down while the bell was ringing for public worship, Jan. 8.

La Musette of 22, and Deux Amis of 14 guns, captured by the British and sent into Cork, Jan. 14.

The city of Savannah nearly consumed to ashes by fire.

Sir John Jervis, with a fleet of 15 sail, engages a Spanish fleet of 27 sail of the line, which he defeats, taking the Salvador del Mundo and San Josef of 112 guns each; the San Nicolas of 80 and San Ysidro of 74 guns, February 14.

The island of Trinidad surrenders to the British forces under the command of Sir Ralph Abercrombie.

Alarming symptoms of a mutiny appear among the seamen of the British fleet, May 7.

The nuptial ceremonies are solemnized between the prince of Wirtemberg Stutgard and Charlotte Augusta Matilda, eldest daughter of his Britannic majesty George III. May 18.

Lord Malmsbury appointed minister plenipotentiary from the court of Britain to France for negotiating a treaty of peace, July 1.

About 30 French war vessels of different dimensions taken or destroyed by the squadron under Sir J. B. Warren, between 17th July and 6th of September.

A desperate engagement off Camperdown between Admirals Duncan and De Winter, when the latter is totally defeated by the former, with the loss of 11 ships.

1798 Le Duguay Trouin, a French privateer, captured by Captain Frazer of his majesty's ship Shannon, Feb. 3.

A powder-mill belonging to Mr Harvey is blown up, which demolishes several adjacent buildings, and kills three of the workmen, April 25.

L'Hercule a French ship of 74 guns, captured by the Mars, April 21.

Rebels in the Curragh of Kildare, Ireland, lay down their arms, May 29.

Wexford rebels defeated with great loss and slaughter, June 10.

Proposals of the Irish rebels rejected by General Lake, June 22.

The Princess Amelia East Indiaman accidentally burnt on the coast of Malabar, and 40 of her crew perished, April 5.

An engagement at Castlebar between General Lake and a party of French landed in Ireland, August 27.

A dreadful engagement between the British fleet under the command of Sir Horatio Nelson, and the French fleet commanded by Admiral Bruys, off the mouth of the Nile, when nine sail of the line belonging to the French were taken, three burnt, one sunk, and four escaped, Aug. 1.

The yellow-fever, which carried off 3000 people in New-York, in a few months, happily ceased to rage, Nov. 15.

1799 A dreadful shock of an earthquake was felt at Guernsey on the night of the 6th.

A desperate battle fought between the Archduke Charles and General Jourdan at Stockash, March 25.

La Vigie of 14, and Anacreon privateer of 16 guns, taken by his Britannic majesty's ship Champion, Captain Graham commander, July 2.

Three frigates captured by the Centaur, J. Wood commander, June 19.

Mantua surrenders to the Austrians, June 30.

The British forces destined to invade Holland begin to disembark, 27th August.

Seven

Seven ships of war, and 13 Indiamen and transports, taken in the Nieuve Diep by Admiral Mitchell, August 27.

Seringapatam surrenders to the British forces, when Tippoo Sultan is slain, 4th May.

A Spanish frigate called Thetis, with a valuable cargo on board, surrenders to Captain Young of the Ethalion, 16th October.

British and Russian forces obliged to evacuate Holland, November.

La Furet of 14 guns strikes to the Viper cutter, Lieutenant Pengelly commander, 26th December.

1800 Three French privateers and one Spanish captured by the Aristocrat, Lieutenant Wray, January.

A French letter of marque with 12 four pounders and 30 men taken by a British long boat.

His Britannic majesty's ship Repulse of 64 guns lost, and a number of the crew perished, 9th March.

A convention between the ambassadors of the Ottoman Porte and General Desaix, signed at El Arisch, 24th January, by which the French troops were permitted to return to their own country.

His Britannic majesty's ship Danae carried into Brest by the mutineers on board, 27th March.

Genereux of 74 guns captured by the Northumberland and Foudroyant, February 18.

A French privateer of 22 guns captured by the Amethyst, Captain Cook commander, 31st March.

His Britannic majesty shot at in the theatre, May 16th, by a maniac of the name of Hadfield.

The Queen Charlotte of 100 guns is burnt off Leghorn, and the gallant crew perish, 17th March.

The French ship of war Guillaume Tell of 86 guns and 1000 men surrenders to the Lion, Penelope, and Foudroyant, March 30.

Le Cerbere of seven guns and 87 men taken by a boat's crew of 20 men, commanded by Lieutenant Coghlan.

A number of vessels with valuable cargoes captured by La Girone French privateer, August.

Unsuccessful expedition against Ferrol, August.

The French garrison of La Valette surrendered to the allied forces at Malta, 4th September.

His Britannic majesty's ship Marlborough of 74 guns, was completely wrecked off Belleisle, 4th November.

La Venus of 32 guns captured by the Indefatigable and Fisgard, October 24.

A most dreadful storm at London, which unroofed many houses, blew down others, tore up numbers of trees by the roots, and by the effects of which some lives were lost, 9th November.

1801 An embargo laid on all Russian, Danish, and Swedish vessels in the ports of Great Britain, 14th January.

The united parliament of Great Britain and Ireland met for the first time, January 22.

The Invincible of 74 guns ran aground on the coast of Norfolk, and was totally lost, when about 400 souls perished, March.

A dreadful engagement off Copenhagen, between the Danish line and the British fleet under Admiral Parker; in which 943 of the British were killed and wounded, April 2.

Aboukir surrenders to the British under the command of Sir Ralph Abercrombie, who received a mortal wound on the 21st March, of which that great officer died on the 28th.

The French attacked at Rahmanieh, compelled to retreat towards Cairo, and pursued by General Hutchinson, March 9.

General Hutchinson takes 550 camels, and 600 French prisoners.

In an engagement between a French and British squadron in the bay of Algeziras, the Hannibal unfortunately fell into the hands of the enemy by taking the ground. The British squadron rendered useless two of 84, one of 74 guns, and a large frigate, July 5.

A cessation of arms by sea and land between Britain and the French republic, resulting from the signing of preliminaries of peace by Lord Hawkesbury, and M. Otto, October 1.

Alexandria surrenders to General Hutchinson on the 2d September.

The Swiftsure captured by Admiral Gantheaume, who treated the crew with the utmost humanity and tenderness.

1802 Joseph Wall, governor of the island of Goree in 1782, was executed for ordering a serjeant to receive 800 lashes, of which he died, January 28.

Mr Moore arrived with the definitive treaty of peace signed at Amiens on the 27th March, at four in the afternoon.

The flour mills at Bromley, the property of Messrs Metcalf and company, were burnt to the ground, April 8.

A dreadful fire broke out (May 13.) in the town of Bedford, which destroyed 72 houses, and deprived about 700 persons of their all.

Intercourse forbidden at Wilmington, Delaware, September 5, with Philadelphia and New York, on account of the yellow fever.

A decision obliging booksellers to publish no books without the name of the printer at the beginning and end of them, was ratified, 20th October.

General Andreosi, as ambassador from France, arrived at Calais 3d of November, where he was received with discharges of artillery. Has an audience of his Britannic majesty, 17th.

Lord Whitworth presented to Bonaparte his letters of credence as minister plenipotentiary from his Britannic majesty, December 5.

1803 A serious rebellion suppressed in China, occasioned by the efforts of Ong Fong, a daring chief, at the head of 50,000 men.

One

After Chrift.

One of the queens of the Rajah at Tanjore burns herfelf on the funeral pile of her deceafed hufband, in fpite of the tears and intreaties of all her relations.

1804 Active meafures taken in Dublin to fecure the country againft invafion.

A fhip of 1200 tons caft afhore.

Admiral Story with two captains declared difgraced, perjured, and infamous, degraded from their pofts, and banifhed the republic, not to return on the pain of death, January 16.

A fplendid meteor feen at Perth, February 7.

Duke D'Enghien and other emigrants feized, fent to France, and executed, March 15.

The French fleet under Admiral Linois engaged and purfued by a fleet of Eaft Indiamen, commanded by Captain Dance.

Chronometer.

CHRONOMETER, in general, denotes any inftrument or machine ufed in meafuring time; fuch are dials, clocks, watches, &c. See DIAL, &c.

The term *chronometer*, however, is generally ufed in a more limited fenfe, for a kind of clock fo contrived as to meafure a fmall portion of time with great exactnefs, even to the fixteenth part of a fecond; of fuch a one there is a defcription in Defagulier's experimental philofophy, invented by the late ingenious Mr George Graham; which muft be allowed to be of great ufe for meafuring fmall portions of time in aftronomical obfervations, the time of the fall of bodies, the velocity of running waters, &c. But long fpaces of time cannot be meafured by it with fufficient exactnefs, unlefs its pendulum be made to vibrate in a cycloid; becaufe otherwife it is liable to err confiderably, as all clocks are which have fhort pendulums that fwing in large arches of a circle.

There have been feveral machines contrived for meafuring time, under the name of *chronometers*, upon principles very different from thofe on which clocks and watches are conftructed.

Plate CXXXVII. Vol. V. fig. 1. reprefents an air-chronometer, which is conftructed in the following manner: Provide a glafs tube of about an inch in diameter, and three or four feet long: the diameter of the infide of this tube muft be precifely equal in every part: at the bottom muft be a fmall hole, clofely covered with a valve. In the tube place a pifton, E, fig. 2. which is made to fit it exactly, and muft be oiled, that it may move in the tube with the greateft freedom; in this pifton there is a cock that fhuts quite clofe; and from the top of it there goes a cord F, which paffes through the handle G. The cock of the pifton being clofed, it is to be let down to the bottom of the tube, and being then drawn up to the top, the air will then rufh in by the valve at the bottom of the tube, and fupport the pifton. You are then to turn the cock, fo as to make a very fmall vent; and the air paffing flowly through that vent, the pifton will gradually defcend and fhow the hour, either by lines cut in the tube with a diamond, or marked with paint, or by fmall flips of paper painted on the glafs. If this chronometer fhould go too faft or too flow, it may be eafily regulated by altering the pofition of the cock in the pifton, as it is on that the whole depends.

If, inftead of marking the tube, you would have the time fhown by a dial, it may be eafily effected by placing an axis, to which the hand of the dial is fixed directly over the tube, and winding the ftring to which the pifton is joined round that axis; for then as the pifton defcends, the axis will gradually turn the hand, and fhow the hour; but it muft be obferved, that as the defcent of the pifton is not conftantly regular, on account of the decreafe of refiftance from the quantity of the fubjacent air as the pifton defcends, the axis therefore muft not be a regular cylinder, but conical like the fufee of a watch, as in fig. 3. by which means the motion of the hand of the dial will be conftant and regular.

Fig. 4. reprefents a lamp-chronometer. It confifts of a chamber lamp A, which is a cylindrical veffel about three inches high, and one inch diameter, placed in the ftand B. The infide of this veffel muft be everywhere exactly of the fame diameter. To the ftand B is fixed the handle C, which fupports the frame DEFG, about 12 inches high, and four wide. This frame is to be covered with oiled paper, and divided into twelve equal parts by horizontal lines; at the end of which are wrote the numbers for the hours, from 1 to 12, and between the horizontal lines are diagonals that are divided into halves, quarters, &c. On the handle B, and clofe to the glafs, is fixed the ftyle or gnomon H. Now, as the diftance of the ftyle from the flame of the lamp is only half an inch, if the diftance of the frame from the ftyle is only fix inches, then, while the float that contains the light defcends by the decreafe of the oil one inch, the fhadow of the ftyle on the frame will afcend 12 inches, that is, its whole length, and fhow by its progreffion the regular increafe of the hours, with their feveral divifions. It is abfolutely neceffary, however, that the oil ufed in this lamp be always of the fame fort and quite pure, and that the wick alfo be conftantly of the fame fize and fubftance, as it is on thefe circumftances, and the uniform figure of the veffel, that the regular progrefs of the fhadow depends.

CHRONOMETER, among muficians, an inftrument invented by *Loulie*, a French mufician, for the purpofe of meafuring time by means of a pendulum. The form of the inftrument, as defcribed by him, is that of an Ionic pilafter, and is thus defcribed by Malcolm in his Treatife of Mufic, p. 407.—" The chronometer confifts of a large ruler or board, fix feet or 72 inches long, to be fet on end; it is divided into its inches, and the numbers fet fo as to count upwards; and at every divifion there is a fmall round hole through whofe centre the line of divifion runs. At the top of this ruler, about an inch above the divifion 72, and perpendicular to the ruler, is inferted a fmall piece of

wood,

wood, in the upper fide of which there is a groove, hollowed along from the end that ftands out to that which is fixed in the ruler, and near each end of it a hole is made: through thefe holes a pendulum cord is drawn, which runs in the groove: at that end of the cord which comes through the hole furtheft from the ruler, the ball is hung: and at the other end there is a fmall wooden pin, which can be put in any of the holes of the ruler: when the pin is in the uppermoft hole at 72, then the pendulum from the top to the centre of the ball muft be exactly 72 inches; and therefore, whatever hole of the ruler it is put in, the pendulum will be juft fo many inches as that figure at the hole denotes. The manner of ufing the machine is this: The compofer lengthens or fhortens his pendulum, till one vibration be equal to the defigned length of his bar, and then the pin ftands at a certain divifion, which marks the length of the pendulum; and this number being fet with the cliff at the beginning of the fong, is a direction for others how to ufe the chronometer in meafuring the time according to the compofer's defign: for with the number is fet the note, crotchet, or minim, whofe value he would have the vibration to be; which in brifk duple time is beft, a minim or half bar; or even a whole bar, when that is but a minim; and in flow time a crotchet. In triple time, it would do well to be the third part or half, or fourth part of a bar; and in the fimple triples that are allegro, let it be a whole bar. And if, in every time that is allegro, the vibration is applied to a whole or half bar, practice will teach us to fubdivide it juftly and equally. Obferve, that, to make this machine of univerfal ufe, fome canonical meafure of the divifions muft be agreed upon, that the figure may give a certain direction for the length of the pendulum.

CHROSTASIMA, in *Natural Hiftory*, a genus of pellucid gems, comprehending all thofe which appear of one fimple and permanent colour in all lights; fuch are the diamond, carbuncle, ruby, garnet, amethyft, fapphire, beryl, emerald, and the topaz. See DIAMOND, CARBUNCLE, &c.

CHRYSA, in *Ancient Geography*, a town of Myfia, on the finus Adramyttenus; extinct in Pliny's time: it had a temple of Apollo Smintheus, (Homer, Strabo). The country of the fair Chryfeis, who gave firft rife to the quarrel between Agamemnon and Achilles.

CHRYSALIS, or AURELIA, in *Natural Hiftory*, a ftate of reft and feeming infenfibility, which butterflies, moths, and feveral other kinds of infects, muft pafs through, before they arrive at their winged or moft perfect ftate.

In this ftate, no creatures afford fo beautiful a variety as the butterfly kinds, and they all pafs through this middle ftate without one exception. The figure of the aurelia or chryfalis generally approaches to that of a cone; or at leaft the hinder part of it is in this fhape; and the creature, while in this ftate, feems to have neither legs nor wings, nor to have any power of walking. It feems indeed to have hardly fo much as life. It takes no nourifhment in this ftate, nor has it any organs for taking any; and indeed its pofterior part is all that feems animated, this having a power of giving itfelf fome motions. The external covering of the chryfalis is cartilaginous, and confiderably large, and is ufually fmooth and gloffy: but fome few of them have a few hairs; fome are alfo as hairy as the caterpillars from which they are produced; and others are rough, and, as it were, fhagreened all over.

In all thefe there may be diftinguifhed two fides; the one of which is the back, the other the belly, of the animal. On the anterior part of the latter, there may always be diftinguifhed certain little elevations running in ridges, and refembling the fillets wound about mummies: the part whence thefe have their origin, is efteemed the head of the animal. The other fide, or back, is fmooth, and of a rounded figure in moft of the chryfalifes; but fome have ridges on the anterior part, and fides of this part; and thefe ufually terminate in a point, and make an angular appearance on the chryfalis.

From this difference is drawn the firft general diftinction of thefe bodies. They are by this divided into two claffes; the round and the angular kinds. The firft are, by the French naturalifts, called *feves;* from the common cuftom of calling the chryfalis of the filkworm, which is round, by this name.

There is fomething more regular in this diftinction than might at firft be conceived; for the divifion is continued from the fly-ftate: the rounded chryfalifes being almoft all produced by the *phalenæ* or moths; and the angular ones by the *papilios*, or day-flies. There are feveral fubordinate diftinctions of thefe kinds; but, in general, they are lefs different from one another than the caterpillars from whence they are produced.

The head of thofe of the firft clafs ufually terminates itfelf by two angular parts, which ftand feparate one from the other, and refemble a pair of horns. On the back, eminences and marks are difcovered, which imagination may form into eyes, nofe, chin, and other parts of the human face.

There is a great variety and a great deal of beauty in the figures and arrangement of the eminences and fpots on the other parts of the body of the chryfalifes of different kinds. It is a general obfervation, that thofe chryfalifes which are terminated by a fingle horn, afford day-butterflies of the kind of thofe which have buttoned antennæ, and whofe wings, in a ftate of reft, cover the under part of their body, and which ufe all their fix legs in walking, thofe of many other kinds ufing only four of them. Thofe chryfalifes which are terminated by two angular bodies, and which are covered with a great number of fpines, and have the figure of a human face on their back in the greateft perfection, afford butterflies of the day kind; and of that clafs the characters of which are, their walking on four legs, and ufing the other two, that is, the anterior part, in the manner of arms or hands. The chryfalifes which have two angular bodies on their heads, but fhorter than thofe of the preceding, and whofe back fhows but a faint fketch of the human face, and which have fewer fpines, and thofe lefs fharp, always turn to that fort of butterfly, the upper wings of which are divided into fegments, one of which is fo long as to reprefent a tail, and whofe under wings are folded over the upper part of the back. A careful obfervation will eftablifh many more rules of this kind, which are not fo perfect as to be free from all exceptions; yet are of great ufe, as they teach us in general

Chryſalis. ral what ſort of fly we are to expect from the chryſalis, of which we know not the caterpillar, and therefore can only judge from appearances.

Theſe are the principal differences of the angular chryſaliſes; the round ones alſo have their different marks not leſs regular than thoſe.

The greater number of the round chryſaliſes have the hinder part of their body of the figure of a cone; but the upper end, which ought to be its circular plane baſe, is uſually bent and rounded into a ſort of knee: this is uſually called the head of the chryſalis; but there are alſo ſome of this kind, the head of which is terminated by a nearly plane ſurface: ſome of the creeping ten-legged caterpillars give chryſaliſes of this kind, which have each of them two eminences that ſeem to bring them towards the angular kind.

Among the angular chryſaliſes there are ſome whoſe colours ſeem as worthy our obſervation as the ſhapes of the others. Many of them appear ſuperbly clothed in gold. Theſe elegant ſpecies have obtained the name of *chryſalis* and *aurelia*, which are derived from Greek and Latin words, ſignifying gold; and from theſe all other bodies of the ſame kind have been called by the ſame names, though leſs, or not at all, entitled to them. As ſome kinds are thus gilded all over, ſo others are ornamented with this gay appearance in a more ſparing manner, having only a few ſpots of it in different places on their back and belly. Theſe obvious marks, however, are not to be depended upon as certain characters of diſtinction; for accidents in the formation of the chryſalis may alter them; and thoſe which naturally would have been gilded all over, may be ſometimes only ſo in part; and either theſe or the others may, by accident, be ſo formed, as to ſhow nothing of this kind at all, but be only of a duſky brown. Thoſe, however, which have neither ſilver nor gold to recommend them to your eyes, do not want other colours, and thoſe beautifully variegated. Some of them are all over of an elegant green, as in the chryſalis of the fennel caterpillar; others of an elegant yellow; and ſome of a bright greeniſh tinge, variegated with ſpots of a ſhining black; we have a very beautiful inſtance of this laſt kind in the chryſalis of the elegant cabbage-caterpillar. The general colour of the chryſalis of the common butterflies, however, is brown.

Some are alſo of a fine deep black; and of theſe many are ſo ſmooth and gloſſy, that they are equal to the fineſt Indian japan. The common caterpillar of the fig-tree gives an inſtance of one of theſe moſt beautiful gloſſy ones; the caterpillar of the vine affords another of theſe fine black chryſaliſes.

The rounded chryſaliſes do not afford any thing of that variety of colouring ſo remarkably beautiful in the angular ones; they are uſually of a duſky yellow, in different ſhades, and are often variouſly ſpotted with black; but theſe, as well as all other chryſaliſes before they arrive at their fixed colour, paſs through ſeveral other temporary ones; ſome being of a different colour when firſt produced from the caterpillar, from what they are a few days afterwards; and ſome varying ſo greatly, though only in degree, as not to be diſtinguiſhable, even by the moſt converſant eye, from what they were when firſt produced. The green rough caterpillar of the cabbage has a chryſalis which is green at firſt; and from that gradually goes through all the ſhades of green to a faint yellow, which is its laſting colour; and one of the oak caterpillars yields a chryſalis beautifully ſpotted with red at its firſt appearance; but theſe ſpots change to brown for their fixed colour: the third day from their formation uſually fixes their laſting colours; and if they are obſerved to turn black in any part after this time, it is a ſign that they are dead or dying.

The ſeveral ſpecies of inſects, as a fly, ſpider, and an ant, do not differ more evidently from one another in regard to appearance, than do a caterpillar, its chryſalis, and a butterfly produced from it; yet it is certain, that theſe are all the product of the ſame individual egg; and nothing is more certain, than that the creature which was for a while a caterpillar, is after a certain time, a chryſalis, and then a butterfly. Theſe great changes produced in ſo ſudden a manner, ſeem like the *metamorphoſes* recorded in the fables of the ancients; and indeed it is not improbable that thoſe fables firſt took their origin from ſuch changes.

The parts being diſtinguiſhable in the chryſalis, we eaſily find the difference of the ſpecies of the fly that is to proceed from it. The naked eye ſhows whether it be one of thoſe that have, or of thoſe that have not, a trunk; and the aſſiſtance of a microſcope ſhows the antennæ ſo diſtinctly, that we are able to diſcern whether it belongs to the day or night claſs; and often to what genus, if not the very ſpecies: nay, in the plumoſe horned kinds, we may ſee, by the antennæ, whether a male or female phalæna is to be produced from the chryſalis; the horns of the female being in this ſtate evidently narrower, and appearing leſs elevated above the common ſurface of the body, than thoſe of the male.

All theſe parts of the chryſalis, however, though ſeen very diſtinctly, are laid cloſe to one another, and ſeem to form only one maſs; each of them is covered with its own peculiar membrane in this ſtate, and all are ſurrounded together by a common one; and it is only through theſe that we ſee them; or rather we ſee on theſe the figures of all the parts moulded within, and therefore it requires attention to diſtinguiſh them. The chryſalis is ſoft when firſt produced, and is wetted on the front with a viſcous liquor; its ſkin, though very tender at firſt, dries and hardens by degrees; but this viſcous liquor, which ſurrounds the wings, legs, &c. hardens almoſt immediately; and in conſequence faſtens all thoſe limbs, &c. into a maſs, which were before looſe from one another: this liquor, as it hardens, loſes its tranſparence, and becomes brown; ſo that it is only while it is yet moiſt that theſe parts are to be ſeen diſtinct.

It is evident, from the whole, that the chryſalis is no other than a butterfly, the parts of which are hid under certain membranes which faſten them together; and when the limbs are arrived at their due ſtrength, they become able to break through theſe membranes, and then expand and arrange themſelves in their proper order.

The firſt metamorphoſis, therefore, differs nothing from the ſecond, except that the butterfly comes from the

Chryfalis.

the body of the caterpillar in a weak ftate, with limbs unable to perform their offices, whereas it comes from the chryfalis perfect.

Hift. of Infects, vol. i. p. 2.—28.

M. Reaumur has given us many curious obfervations on the ftructure and ufes of the feveral coverings that attend the varieties of the caterpillar kind in this ftate.

The creatures in general remain wholly immoveable in this ftate, and feem to have no bufinefs in it but a patient attendance on the time when they are to become butterflies; and this is a change that can happen to them, only as their parts, before extremely foft and weak, are capable of hardening and becoming firm by degrees, by the tranfpiration of that abundant humidity which before kept them foft: and this is proved by an experiment of M. Reaumur, who, inclofing fome chryfalifes in a glafs tube, found, after fome time, a fmall quantity of water at the bottom of it; which could have come there no other way, but from the body of the inclofed animal. This tranfpiration depends greatly on the temperature of the air; it is increafed by heat, and diminifhed by cold; but it has alfo its peculiarities in regard to the feveral fpecies of butterfly to which the chryfalis belongs.

According to thefe obfervations, the time of the duration of the animal in the chryfalis ftate muft be, in different fpecies, very different; and there is indeed this wide difference in the extremes, that fome fpecies remain only eight days in this ftate, and others eight months.

We know that the caterpillar changes its fkin four or five times during its living in that ftate; and that all thefe fkins are at firft produced with it from the egg, lying clofely over one another. It parts with, or throws off, all thefe one by one, as the butterfly, which is the real animal, all this time within, grows more and more perfect in the feveral firft changes. When it throws off one, it appears in another fkin exactly of the fame form; but at its final change from this appearance, that is, when it throws off the laft fkin, as the creature within is now arrived at fuch a degree of perfection as to need no farther taking of nourifhment, there is no farther need of teeth, or any of the other parts of a caterpillar. The creature, in this laft change, proceeds in the very fame manner as in all the former, the fkin opening at the back, and the animal making its way out in this fhape. If a caterpillar, when about to throw off this laft fkin, be thrown into fpirits of wine, and left there for a few days, the membranes within will harden, and the creature may be afterwards carefully opened, and the chryfalis taken out, in which the form of the tender butterfly may be traced in all its lineaments, and its eyes, legs, &c. evidently feen. It is not neceffary, however, to feize upon this exact time for proving the exiftence of the chryfalis or butterfly in the caterpillar: for if one of thefe animals be thrown into fpirit of wine, or into vinegar, fome days before that time, and left there for the flefh to harden, it may afterwards be diffected, and all the lineaments of the butterfly traced out in it; the wings, legs, antennæ, &c. being as evident here, and as large, as in the chryfalis.

It is very plain from this, that the change of the caterpillar into chryfalis is not the work of a moment; but is carrying on for a long time before, even from the very hatching of the creature from the egg. The parts of the butterfly, however, are not difpofed exactly in the fame manner while in the body of the caterpillar, as when left naked in the form of the chryfalis: for the wings are proportionally longer and narrower, being wound up into the form of a cord; and the antennæ are rolled up on the head; the trunk is alfo twifted up and laid upon the head; but this in a very different manner from what it is in the perfect animal, and very different from that in which it lies within the chryfalis; fo that the firft formation of the butterfly in the caterpillar, by time arrives at a proper change of the difpofition of its parts, in order to its being a chryfalis. The very eggs, hereafter to be depofited by the butterfly, are alfo to be found, not only in the chryfalis, but in the caterpillar itfelf, arranged in their natural, regular order. They are indeed in this ftate very fmall and tranfparent; but after the change into the chryfalis, they have their proper colour.

As foon as the feveral parts of the butterfly, therefore, are arrived at a ftate proper for being expofed to the more open air, they are thrown out from the body of the caterpillar furrounded only with their membranes; and as foon as they are arrived after this at a proper degree of ftrength and folidity, they labour to break through thefe thinner coverings, and to appear in their proper and natural form. The time of their duration in this ftate of chryfalis is very uncertain, fome remaining in it only a few days, others feveral months, and fome almoft a year in appearance. But there is a fallacy in this that many are not aware of. It is natural to think, that as foon as the creature has inclofed itfelf in its fhell, be that of what matter it will, it undergoes its change into the chryfalis ftate. And this is the cafe with the generality: yet there are fome which are eight or nine months in the fhell before they become chryfalifes, fo that their duration in the real chryfalis ftate is much fhorter than it naturally appears to be. M. Reaumur carefully watched the auriculated caterpillar of the oak in its feveral changes, and particularly from its chryfalis, which is of this laft kind, into the fly; and has given an account of the method of this, as an inftance of the general courfe of nature in thefe operations.

The membranes which envelope the creature in this chryfalis ftate are at firft tough and firm, and immediately touch the feveral parts of the inclofed animal; but by degrees, as thefe parts harden, they become covered, fome with hairs, and others with fcales. Thefe, as they continue to grow, by degrees fall off the feveral particular membranes which cover the parts on which they are placed, to a greater diftance, and by degrees loofen them from the limbs. This is one reafon why thofe membranes dry and become brittle.

The middle of the upper part of the CORSELET is ufually marked with a line which runs in a longitudinal direction; and this part is always more elevated than the reft, even in the conic kinds, which are no otherwife angular. This line is in fome very bold and plain; in others, it is fo faint as not to be diftinguifhable without glaffes; but it is always in the midft of that line that the fhell begins to open. The motion of the

head

Chryfalis.

head of the butterfly backwards firft occafions this crack; and a few repetitions of the fame motion open it the whole length of the line.

The clearing itfelf, however, entirely is a work of more time in this cafe, than is the paffing of the chryfalis out of the body of the caterpillar. In that cafe there is a crack fufficiently large in the fkin of the back, and the whole chryfalis being loofe comes out at once. But in this cafe, every particular limb, and part of the body, has its feparate cafe; and thefe are almoft inconceiveably thin and tender, yet it is neceffary that every part be drawn out of them before it appear naked to the open air. As foon as all this is effected, and the animal is at full liberty, it either continues fome time upon the remains of its covering, or creeps a little way diftant from it, and there refts. The wings are what we principally admire in this creature. Thefe are at this time fo extremely folded up, and placed in fo narrow a compafs, that the creature feems to have none at all; but they by degrees expand and unfold themfelves; and finally, in a quarter of an hour, or half an hour at the utmoft, they appear at their full fize, and in all their beauty. The manner of this fudden unfolding of the wings is this: the fmall figure they make when the creature firft comes out of its membranes, does not prevent the obferving that they are at that time confiderably thick. This is owing to its being a large wing folded up in the niceft manner, and with folds fo arranged as to be by no means fenfible to the eye, for the wing is never feen to unfold; but, when obferved in the moft accurate manner, feems to grow under the eye to this extent. When the creature is firft produced from the fhell, it is everywhere moift and tender; even its wings have no ftrength or ftiffnefs till they expand themfelves; but they then dry by degrees, and, with the other parts, become rigid and firm. But if any accident prevents the wings from expanding at their proper time, that is, as foon as the creature is out of its fhell, they never afterwards are able to extend themfelves; but the creature continues to wear them in their contracted and wholly ufelefs ftate; and very often, when the wings are in part extended before fuch an accident happens, it ftops them in a partial extenfion, and the creature muft be contented to pafs its whole life with them in that manner.

M. Reaumur has proved, that heat and cold make great differences in the time of hatching the butterfly from its chryfalis ftate: and this he particularly tried with great accuracy and attention, by putting them in veffels in warm rooms, and in ice-houfes; and it feemed wholly owing to the haftening or retarding the evaporation of the abundant humidity of the animal in the chryfalis ftate, that it fooner or later appeared in the butterfly form. He varnifhed over fome chryfalifes, in order to try what would be the effect of thus wholly preventing their tranfpiration; and the confequence was, that the butterfly came forth from thefe two months later than their natural time. Thus was the duration of the animal in this ftate lengthened; that is, its exiftence was lengthened: but without any advantage to the creature, fince it was in the time of its ftate of inaction, and probably of infenfibility.

Though this was of no confequence, M. Reaumur deduces a hint from it that feems to be of fome ufe. He obferves, that hen's eggs, of which we make fo many ufes, and eat in fo many forms, are properly a fort of chryfalis of the animal; their germ, after they are impregnated by the cock, containing the young animal alive; and waiting only a due degree of warmth to be hatched, and appear in its proper form. Eggs tranfpire notwithftanding the hardnefs of their fhells; and when they have been long kept, there is a road found near one of their ends, between the fhell and the internal membrane, which is a mark of their being ftale, and is the effect of an evaporation of part of their humidity: and the fame varnifh which had been ufed to the chryfalis, being tried on eggs, was found to preferve them for two years, as frefh as if laid but the fame day, and fuch as the niceft palate could not diftinguifh from thofe that were fo. See EGGS.

Chryfanthemum ‖ Chryfogonum.

It is not yet known how much farther this ufeful fpeculation might be carried, and whether it might not be of great ufe even to human life, to invent fomething that fhould act in the manner of this varnifh, by being rubbed over the body, as the *athletæ* did of old, and the favages of the Weft Indies do at this time, without knowing why. But to return to the infects which are the fubjects of this article; their third ftate, that in which they are winged, is always very fhort, and feems deftined for no other action but the propagation of the fpecies. See ENTOMOLOGY *Index*.

CHRYSANTHEMUM, CORN-MARYGOLD: A genus of the polygamia fuperflua order, belonging to the fyngenefia clafs of plants. See BOTANY *Index*.

CHRYSES, the prieft of Apollo, father of Aftynome, called from him *Chryfeis*. When Lyrneffus was taken, and the fpoils divided among the conquerors, Chryfeis fell to the fhare of Agamemnon. Chryfes upon this went to the Grecian camp to folicit his daughter's reftoration; and when his prayers were fruitlefs, he implored the aid of Apollo, who vifited the Greeks with a plague, and obliged them to reftore Chryfeis.

CHRYSIPPUS, a Stoic philofopher, born at Solos in Cilicia, was difciple to Cleanthus, Zeno's fucceffor. He wrote many books, feveral of which related to logic. None of the philofophers fpoke in ftronger terms of the fatal neceffity of every thing, nor more pompoufly of the liberty of man, than the Stoics, Chryfippus in particular. He was fo confiderable among them, as to eftablifh it into a proverb, that if it had not been for Chryfippus, the porch had never been. Yet the Stoics complained, as Cicero relates, that he had collected fo many arguments in favour of the fceptical hypothefis, that he could not anfwer them himfelf; and thus had furnifhed Carneades, their antagonift, with weapons againft them. There is an apophthegm of this philofopher preferved, which does him honour. Being told that fome perfons fpoke ill of him, "It is no matter (faid he), I will live fo that they fhall not be believed."

CHRYSIS, or GOLDEN-FLY. See ENTOMOLOGY *Index*.

CHRYSITRIX. See BOTANY *Index*.

CHRYSOBOLANUS, COCOA PLUM. See BOTANY *Index*.

CHRYSOCOMA, GOLDY-LOCKS. See BOTANY *Index*.

CHRYSOGONUM. See BOTANY *Index*.

CHRYSOLARUS,

CHRYSOLARUS, EMANUEL, one of thofe learned men in the 14th century who brought the Greek literature into the weft. He was a man of rank; and defcended from an ancient family, faid to have removed with Conftantine from Rome to Byzantium. He was fent into Europe by the emperor of the eaft to implore the affiftance of Chriftian princes. He afterwards taught at Florence, Venice, Pavia, and Rome; and died at Conftantinople, in 1415, aged 47. He wrote a Greek grammar, and fome other fmall pieces.

CHRYSOLITE, or YELLOWISH-GREEN TOPAZ; a precious ftone of a grafs-green colour, found in the Eaft Indies, Brazil, Bohemia, Saxony, Spain, in Auvergne and Bourbon in France, and in Derbyfhire in England. Some are likewife found with volcanic lavas, as in the Vivarais, where fome large lumps have been feen of 20 or 30 pounds weight; but it is remarkable, that fome of thefe chryfolites are partly decompofed into an argillaceous fubftance. All chryfolites, however, are far from being of the fame kind. The oriental is the fame with the peridot, and differs only by its green hue from the fapphires, topazes, and rubies of the fame denomination. This becomes electric by being rubbed; has a prifmatic form of fix, or fometimes of five, ftriated faces; and does not lofe its colour or tranfparency in the fire, which the common chryfolite often does; becoming either opaque, or melting entirely in a ftrong heat. The inftant it melts, it emits a phofphoric light like the bafis of alum and gypfeous fpar: with borax it produces a thin colourlefs glafs. Its fpecific gravity is between 3.600 and 3.700; according to Briffon it is 2.7821, or 2.6923; and that of the Spanifh chryfolite 3.0989.

The fubftance of this precious ftone is lamellated in the direction of the axis of its primitive form; but the chryfolite from Saxony is foliated in a perpendicular direction to the fame axis. The chryfolite of the ancients was the fame gem which is now called *topaz*, and the name, of itfelf, indicates that it ought to be fo.—Pliny fays that the colour of the chryfolite is yellow like gold.

CHRYSOLITE-Pafte, a kind of glafs made in imitation of natural chryfolite, by mixing two ounces of prepared cryftal with ten ounces of red lead, adding 12 grains of crocus martis made with vinegar; and then baking the whole for 24 hours, or longer, in a well luted cucurbit.

CHRYSOMELA, a genus of infects belonging to the order of coleoptera. See ENTOMOLOGY *Index*.

CHRYSOPHYLLUM, or BULLY-TREE. See BOTANY *Index*.

CHRYSOPLENIUM. See BOTANY *Index*.

CHRYSOPRASUS, or CHRYSOPRASIUS, the 10th of the precious ftones mentioned in the Revelation, as forming the foundation of the heavenly Jerufalem. The chryfoprafius is by mineralogifts reckoned to be a variety of the chryfolite, and by Cronftedt called the *yellowifh green and cloudy topaz*. He conjectures that it may perhaps be the fubftance which ferves as a matrix to the chryfolite; as thofe that he had feen were like the clear-veined quartz, called in Sweden *milk cryftal*, which is the firft degree of cryftallization.

The chryfoprafus, according to M. Magellan, is of a green colour, deeper than the chryfolite, but with a yellowifh tinge inclining to blue like the green leek. M. Achard fays that it is never found cryftallized, and that it is femi-tranfparent. By others it is reckoned among the quartz, and its colour is fuppofed to be owing to the mixture of cobalt, as it gives a fine blue glafs when melted with borax, or with fixed alkali. M. Achard, however, found the glafs of a deep yellow when the fufion was made with borax; and that it really contains fome calx of copper inftead of cobalt. M. Dutens fays, that fome gold has been found in this kind of ftone; but this laft belongs in all probability, fays M. Magellan, to another clafs of fubftances, viz. the vitreous fpars.

To the latter belongs moft probably the aventurine, whofe colour is generally a yellow brown red; though fometimes it inclines more to the yellow, or greenifh, than to the red. Thefe ftones are not quite tranfparent: fome indeed fhine with fuch a brilliancy, as to render them of confiderable value, but they are very rare. The common aventurine is but an artificial glafs of various colours, with which powder of gold has been mixed; and thefe imitated aventurines fo frequently excel the native ones in fplendour, that the efteem of the latter is now much lowered. With regard to the chryfoprafus, its name, from πρασον, fhows it to be of a greenifh blue colour, like the leaves of a leek; it only differs from the chryfolite in its bluifh hue.

CHRYSOSTOM, ST JOHN, a celebrated patriarch of Conftantinople, and one of the moft admired fathers of the Chriftian church, was born of a noble family at Antioch, about the year 347. He ftudied rhetoric under Libavius, and philofophy under Andragathus, after which he fpent fome time in folitude in the mountains near Antioch; but the aufterities he endured having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius. Flavian, Meletius's fucceffor, raifed him to the office of prefbyter five years after: when he diftinguifhed himfelf fo greatly by his eloquence, that he obtained the furname of *Golden Mouth*. Nectarius patriarch of Conftantinople dying in 397, St Chryfoftom, whofe fame was fpread throughout the whole empire, was chofen in his room by the unanimous confent of both the clergy and the people. The emperor Arcadius confirmed this election, and caufed him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained bifhop on the 26th of February 398; when he obtained an order from the emperor againft the Eunomians and Montanifts; reformed the abufes which fubfifted amongft his clergy; retrenched a great part of the expences in which his predeceffors had lived, in order to enable him to feed the poor and build hofpitals, and preached with the utmoft zeal againft the pride, luxury, and avarice of the great. But his pious liberty of fpeech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him depofed and banifhed; but he was foon recalled. After this, declaiming againft the dedication of a ftatue erected to the emprefs, fhe banifhed him into Cucufus in Armenia, a moft barren inhofpitable place; afterwards, as they were removing him from Petyus, the foldiers treated him fo roughly, that he died by the way, A. D. 407. The beft edition of his works is that publifhed at Paris in 1718, by Montfauçon.

CHRYSTAL. See CRYSTAL.

CHUB, or CHUBB, in *Ichthyology*. See CYPRINUS, ICHTHYOLOGY *Index*.

The reforts of this fifh are eafily found, for they are generally holes overfhadowed by trees, and this fifh will be feen floating in fuch almoft on the furface of the water in a hot day in great numbers. They are but a poor fifh for the table, and are very full of bones; but they entertain the angler very much, and are of the number of thofe that are eafily taken.

CHUBB, THOMAS a noted polemical writer, born at Eaft Harnham, a village near Salifbury, in 1679. He was put apprentice to a glover at Salifbury, and afterwards entered into partnerfhip with a tallow chandler. Being a man of ftrong natural parts, he employed all his leifure in reading; and though a ftranger to the learned languages, became tolerably verfed in geography, mathematics, and other branches of fcience. His favourite ftudy was divinity; and he formed a little fociety for the purpofe of debating upon religious fubjects, about the time that the Trinitarian controverfy was fo warmly agitated between Clarke and Waterland. This fubject, therefore, falling under the cognizance of Chubb's theological affembly, he at their requeft drew up and arranged his fentiments on it, in a kind of differtation; which was afterwards publifhed under the title of *The Supremacy of the Father afferted*, &c. In this piece Mr Chubb fhowed great talents in reafoning, and acquired fo much reputation, that the late Sir Jofeph Jekyll, mafter of the rolls, took him into his family to enjoy his converfation: but though he is faid to have been tempted to remain with him by the offer of a genteel allowance, he did not continue with him many years; but chofe to return to his friends at Salifbury. He publifhed afterwards a 4to volume of tracts, which Mr Pope informs his friend Gay, he "read through with admiration of the writer, though not always with approbation of his doctrine." He died a fingle man in the 68th year of his age, and left behind him two vols. of pofthumous tracts, in which he appears to have had little or no belief in revelation. But however licentious his way of thinking may be deemed, nothing irregular or immoral has been fairly imputed to him in his life and actions.

CHUDLEIGH, LADY MARY, was born in 1656, and married to Sir George Chudleigh, Baronet, by whom fhe had feveral children: her poems and effays have been much admired for delicacy of ftyle. She died in 1710; and is faid to have written feveral dramatic pieces, which, though not printed, are preferved in the family.

CHUPMESSAHITES, a fect among the Mahometans, who believe that Jefus Chrift is God, and the true Meffiah, the Redeemer of the world; but without rendering him any public or declared worfhip. The word in the Turkifh language fignifies *Protector of the Chriftians*. Recaut fays that there is abundance of thefe Chupmeffahites among the people of fafhion in Turkey, and fome even in the feraglio.

CHURCH, has different fignifications, according to the different fubjects to which it is applied.

1. It is underftood of the collective body of Chriftians, or all thofe over the face of the whole earth who profefs to believe in Chrift, and acknowledge him to be the Saviour of mankind. This is what the ancient writers call the *catholic* or *univerfal church*. Sometimes the word church is confidered in a more extenfive fenfe, and divided into feveral branches; as the church militant, is the affembly of the faithful on the earth; the church triumphant, that of the faithful already in glory; to which the Papifts add the church patient; which, according to their doctrines, is that of the faithful in purgatory.

2. Church is applied to any particular congregation of Chriftians, who affociate together and concur in the participation of all the inftitutions of Jefus Chrift, with their proper paftors and minifters. Thus we read of the church of Antioch, the church of Alexandria, the church of Theffalonica, and the like.

3. Church denotes a particular fect of Chriftians diftinguifhed by particular doctrines and ceremonies. In this fenfe, we fpeak of the Romifh church, the Greek church, the Reformed church, the church of England, &c.

The Latin or Weftern church, comprehends all the churches of Italy, France, Spain, Africa, the north, and all other countries whither the Romans carried their language. Great Britain, part of the Netherlands of Germany, and of the North, have been feparated from hence ever fince the time of Henry VIII.; and conftitute what we call the Reformed Church, and what the Romanifts call the Weftern fchifm.

The Greek or Eaftern church, comprehends the churches of all the countries anciently fubject to the Greek or eaftern empire, and through which their language was carried; that is, all the fpace extended from Greece to Mefopotamia and Perfia, and thence into Egypt. This church has been divided from the Roman ever fince the time of the emperor Phocas.

The Gallican church, denotes the church of France, under the government and direction of their refpective bifhops and paftors. This church has always enjoyed certain franchifes and immunities; not as grants from popes, but as derived to her from her firft original, and which fhe has taken care never to relinquifh. Thefe liberties depend upon two maxims; the firft, that the pope has no authority or right to command or order any thing, either in general or in particular, in which the temporalties and civil rights of the kingdom are concerned; the fecond, that, notwithftanding the pope's fupremacy is owned in cafes purely fpiritual, yet in France his power is limited and regular by the decrees and canons of ancient councils received in that realm.

4. The word *church* is ufed to fignify the body of ecclefiaftics, or the clergy, in contradiftinction to the laity. See CLERGY.

5. Church is ufed for the place where a particular congregation or fociety of Chriftians affemble for the celebration of divine fervice. In this fenfe churches are varioufly denominated, according to their rank, degree, difcipline, &c. as Metropolitan church, Patriarchal church, Cathedral church, Parochial church, Collegiate church, &c. See METROPOLIS, PATRIARCH, &c.

In ecclefiaftical writers we meet with *grand church*, for the chief church of a place; particularly in the Greek liturgy, for the church of St Sophia at Conftantinople, the fee of the patriarch, founded by Con-

ftantine, and confecrated under Juftinian. It was at that time fo magnificent, that Juftinian is faid to have cried out in the confecration thereof, Ενικησα σε, Σολομον; *I have outdone thee, Solomon*. The dome, which is faid to have been the firft that was built, is 330 feet diameter.

The firft church publicly built by the Chriftians, fome authors maintain to be that of St Saviour at Rome founded by Conftantine; others contend, that feveral churches abroad, called by the name of *St Peter Vivus*, were built in honour of that apoftle during his lifetime.

CHURCH, with regard to architecture, Daviler defines a large oblong edifice, in form of a fhip, with nave, choir, aifles, chapel, belfry, &c. See each part under its proper head.

CHURCH, Simple, is that which has only a nave and a choir.

CHURCH with Aifles, that which has a row of porticoes, in form of vaulted galleries, with chapels in its circumference.

CHURCH in a Greek crofs, that where the length of the traverfe part is equal to that of the nave; fo called becaufe moft of the Greek churches are built in this form.

CHURCH in a Latin crofs, that whofe nave is longer than the crofs part, as in moft of the Gothic churches.

CHURCH in Rotundo, that whofe plan is a perfect circle, in imitation of the Pantheon.

For the form of the ancient Greek churches, when they had all their parts, it was as follows: firft was a porch, or portico, called the *vaunt-nave*, πρoναος; this was adorned with columns on the outfide, and on the infide furrounded with a wall; in the middle whereof was a door, through which they paffed into a fecond portico. The firft of thefe porticoes was deftined for the *energumeni*, and penitents in the firft ftage of their repentance; the fecond was much longer, deftined for penitents of the fecond clafs, and the catechumens, and hence called ναρθης, *ferula*, becaufe thofe placed in it began to be fubject to the difcipline of the church. Thefe two porticoes took up about one third of the fpace of the church. From the fecond portico they paffed into the nave, ναος, which took up near another third of the church. In the middle, or at one fide of the nave, was the ambo, where the deacons and priefts read the gofpel and preached. The nave was deftined for the reception of the people, who here affifted at prayers.

Near the entrance of this was the baptiftery or font. Beyond the nave was the choir, χορος, fet with feats, and round: the firft feat on the right, next the fanctuary, being for the chantor, or *choragus*.

From the choir they afcended by fteps to the fanctuary, which was entered at three doors. The fanctuary had three upfides in its length; a great one in the middle, under which was the altar, crowned with a baldachin, fupported by four columns. Under each of the fmall upfides, was a kind of table or cupboard, in manner of a beaufet.

Though, of the Greek churches now remaining, few have all the parts above defcribed, moft of them having been reduced to ruins or converted into mofques.

HIGH Church was a denomination originally given to thofe otherwife called *Nonjurors*, who refufed to acknowledge the title of William III. to the crown of Great Britain, under a notion that James II. though excluded, was ftill their rightful fovereign. This appellation was given them, becaufe they entertained high notions of the dignity and power of the church, and the extent of its prerogatives and jurifdiction. And thofe, on the contrary, were called *low-church-men*, who difapproved of the fucceffion and obftinacy of the nonjurors, diftinguifhing themfelves by their moderation towards diffenters, and were lefs ardent in extending the limits of church authority. The denomination of *high-church-men* is now more generally applied to all who form pompous and ambitious conceptions of the authority and jurifdiction of the church, and who would raife it to an abfolute independence on all human power.

CHURCH-Ale. See *WHITSUN-Ale*.

CHURCH Reeves, the fame with *CHURCH-Wardens*.

CHURCH-Scot, or *Churcheffet*, a payment or contribution, by the Latin writers frequently called *primitiæ feminum*; being, at firft, a certain meafure of wheat, paid to the prieft on St Martin's day, as the firft fruits of harveft. This was enjoined by the laws of King Malcolm IV. and Canute, c. 10. But after this, *Church fcot* came to fignify a referve of corn-rent paid to the fecular priefts, or to the religious; and fometimes was taken in fo general a fenfe as to include poultry, or any other provifion that was paid in kind to the religious. See TITHE.

CHURCH-Wardens (*ecclefiæ guardiani*), in the Englifh ecclefiaftical polity, are the guardians or keepers of the church, and reprefentatives of the body of the parifh. They are fometimes appointed by the minifter, fometimes by the parifh, fometimes by both together, as cuftom directs. They are taken, in favour of the church, to be, for fome purpofes, a kind of corporation at the common law; that is, they are enabled, by that name, to have a property in goods and chattels, and to bring actions for them, for the ufe and profit of the parifh. Yet they may not wafte the church goods, but may be removed by the parifh, and then called to account by actions at common law: but there is no method of calling them to account but by firft removing them; for none can legally do it but thofe who are put in their place. As to lands, or other real property, as the church, churchyard, &c. they have no fort of intereft therein; but if any damage is done thereto, the parfon only or vicar fhall have the action. Their office alfo is to repair the church, and make rates and levies for that purpofe: but thefe are recoverable only in the ecclefiaftical courts. They are alfo joined with the overfeers in the care and maintenance of the poor. They are to levy a fhilling forfeiture on all fuch as do not repair to church on Sundays and holidays; and are empowered to keep all perfons orderly while there; to which end it has been held that a church-warden may juftify the pulling off a man's hat, without being guilty of either an affault or a trefpafs. There are alfo a multitude of other petty parochial powers committed to their charge by divers acts of parliament.

CHURCHILL, SIR WINSTON, the father of the great duke of Marlborough, was defcended from an ancient and honourable family in Dorfetfhire. He was born at Wotton Glanville in that county in 1610; and

Churchill. and educated at St. John's college at Oxford. He engaged in the cause of his unfortunate sovereign Cha. I. for which he suffered severely in his fortune; and having married, while young, Elizabeth, the daughter of Sir John Drake of Ashe in Devonshire, she was forced to seek a refuge in her father's house, when Mr Churchill's misfortunes left him none that he could call his own; and there most of his children were born. After the restoration, he was elected a burgess to serve in parliament for the borough of Weymouth; and, in 1669, his majesty was pleased to confer on him the honour of knighthood. The next year he was made one of the commissioners of claims in Ireland; and upon his return from thence, was constituted one of the clerks comptrollers of the green cloth: but writing a kind of political essay upon the History of England, which gave great offence to the parliament, he was, in 1678, dismissed from his post. He was, however, soon restored to it again; and lived to see his eldest surviving son raised to the peerage, and the rest of his children in a fair way to promotion. He died in 1688.

CHURCHILL, *John*, duke of Marlborough, and prince of the holy Roman empire, a most renowned general and statesman, was born at Ashe in Devonshire in 1650. He was eldest son of Sir Winston Churchill who carried him to court while very young, and where he was particularly favoured by James duke of York, afterwards King James II. when only twelve years of age. In 1666, he was made an ensign of the guards during the first Dutch war; and afterwards improved himself greatly in the military art at Tangier. In 1672, Mr Churchill attended the duke of Monmouth, who commanded a body of auxiliaries in the French service, and was soon after made a captain in the duke's own regiment. At the siege of Nimeguen, which happened in that campaign, he distinguished himself so much that he was taken notice of by the celebrated Marshal Turenne, who bestowed on him the name of the *handsome Englishman*.—In 1673, he was at the siege of Maestricht, where he gained such applause, that the king of France made him a public acknowledgement of his service; and the duke of Monmouth, who had the direction of the attack, told King Charles II. that he owed his life to Mr Churchill's bravery. In 1681, he married Sarah, daughter and co-heiress (with her sister the countess of Tyrconnel) of Richard Jennings, Esq. of Sandrich, in Hertfordshire. The duke of York recommended him in a very particular manner to the king; who, in 1682, created him baron of Eyemouth in the county of Berwick, in Scotland, and made him colonel of the third troop of guards. A little after King James's accession, he was created Baron Churchill of Sandrich in the county of Hertford, and made brigadier-general of his majesty's army in the west; where, when the duke of Monmouth came to surprise the king's army while the earl of Feversham and the majority of the officers were in their beds, he kept the enemy in play, till the king's forces had formed themselves, and thereby saved the whole army. When James showed an intention of establishing the Catholic religion in Britain, Lord Churchill, notwithstanding the great obligations he owed him, thought it his duty to abandon the royal cause; but even then did not leave him without acquainting him by letter with the reason of his so doing. Lord Churchill was graciously received by the prince of Orange; and was by him employed first to re-assemble the troop of guards at London, and afterwards to reduce some lately raised regiments, and to new-model the army; for which purpose he was invested with the rank and title of lieutenant general. In 1689, he was sworn one of the privy council, and one of the gentlemen of the king's bed-chamber; and on the 9th of April following, was raised to the dignity of earl of Marlborough in the county of Wilts. He assisted at the coronation of their majesties; and was soon after made commander in chief of the English forces sent over to Holland; and here he first laid the foundation of that fame which was afterwards spread over all Europe. In 1690, he was made general of the forces sent to Ireland; where he made the strong garrisons of Cork and Kinsale prisoners of war. The year following, King William showed the good opinion he had of his conduct, by sending him to Flanders to put all things in readiness, and to draw the army together before his arrival. In 1692, he was dismissed from all his employments; and, not long after, was with some other peers committed to the Tower on an accusation of high treason; which, however, was afterwards found to be a false and malicious report, the authors of which were punished. Marlborough was soon restored to favour, and in 1698 was appointed governor to the earl of Gloucester; with this extraordinary compliment from King William, "My lord, make him but what you are, and my nephew will be all I wish to see him." The same day he was again sworn one of the privy council; and in July following was declared one of the lords justices of England, for the administration of the government, in which great trust he was three times successively in the king's absence. In 1701 he was appointed general of the foot, commander in chief of the English forces, and ambassador extraordinary and plenipotentiary at the Hague. Upon the accession of Queen Anne to the throne, he was elected into the order of the Garter, declared captain-general of all her majesty's forces, and sent ambassador extraordinary and plenipotentiary to Holland. After several conferences about a war, he put himself at the head of the army, where all the other generals had orders to obey him. His exploits in the field have been taken notice of under the article BRITAIN, N° 344—370: we shall therefore only take notice in this place of the rewards and honours conferred upon him for these exploits. After his first campaign he was created marquis of Blandford and duke of Marlborough, with a pension of 5000l. out of the post office, to devolve, for ever upon those enjoying the title of duke of Marlborough. In 1703, he met Charles III. late emperor, going to Spain, who presented him with a sword set with diamonds. In 1704, having forced the enemy's lines at Schellenberg, he received a letter of thanks from the emperor Leopold, written with his own hand; an honour seldom done to any but sovereign princes. After the battle of Blenheim, he received congratulatory letters from most of the potentates in Europe, particularly from the states-general, and from the emperor, who desired him to accept of the dignity of a prince of the empire, which with the queen's leave was conferred upon him

S 2 by

Churchill.

by the title of *Prince of Mildenheim in the province of Suabia.* After the campaign was ended, he visited the court of Prussia, where he laid such schemes as suspended the disputes with the Dutch about King William's estate; which wise conduct caused the whole confederacy to acknowledge that he had done the greatest service possible to the common cause. Upon his return to England, the queen, to perpetuate his memory, granted the interest of the crown in the honour and manor of Woodstock and hundred of Wotton to him and his heirs for ever. In 1705 he made a tour to Vienna, upon the invitation of the emperor Joseph; who highly caressed him, and made him a grant of the lordship of Mildenheim. After the campaign of 1708, the speaker of the house of commons was sent to Brussels on purpose to compliment him; and on his return to England he was again complimented in the house of lords by Lord Chancellor Cowper. All his services, however, and all the honours conferred upon him, were not sufficient to preserve him from being disgraced. After the change of the ministry in 1710, his interest daily declined; and in 1712, on the first day of the new year, he was removed from all his places. Finding all arts used to render him obnoxious in his native country, he visited his principality of Mildenheim, and several towns in Germany; after which he returned to England, and arrived there on the day of the queen's death. After being welcomed by the nobility and foreign ministers, he attended on King George I. in his public entry through London, who appointed him captain-general, colonel of the first regiment of foot-guards, one of the commissioners for the government of Chelsea hospital, and master-general of the ordnance. Some years before his death, he retired from public business. He died at Windsor-lodge in 1722, aged 73; leaving behind him a very numerous posterity, allied to the noblest and greatest families in these kingdoms. Upon his demise all parties united in doing honour, or rather justice, to his merit, and his corpse was interred the 9th of August following, with all the solemnity due to a person who had deserved so highly of his country, in Westminster-abbey. The noble pile near Woodstock, which bears the name of Blenheim-house, may be justly styled his monument: but without pretending to the gift of prophecy, one may venture to foretel, that his glory will long survive that structure; and that so long as our histories remain, or indeed the histories of Europe, his memory will live and be the boast of Britain, which by his labours was raised to be the first of nations, as during the age in which he lived he was deservedly esteemed the first of men. If he had foibles, as these are inseparable from human nature, they were so hidden by the glare of his virtues as to be scarcely perceived, or were willingly forgotten. A certain parasite, who thought to please Lord Bolingbroke by ridiculing the avarice of the duke, was stopt short by his lordship; who said, "He was so very great a man, that I forgot he had that vice."

Out of a variety of anecdotes and testimonies concerning this illustrious personage, collected in the new edition of the *Biographia Britannica*, the following selection may serve to illustrate more particularly his disposition and manners.

One of the first things which he did, when very young, was to purchase a box to put his money in; an indication this of the economical, not to say avaricious, temper that accompanied him through life. Dr Joseph Warton relates, that, on the evening of an important battle, the duke was heard to chide his servant for having been so extravagant as to light four candles in his tent when Prince Eugene came to confer with him. Mr Tyers, on the other hand, mentioned a circumstance, which, if well founded, redounds to his grace's generosity; though in a different respect it is much to his discredit: It is, that during the rebellion in 1715, he sent 10,000l. to the earl of Mar. We consider the story only as a traditional report, which has not in itself any great degree of probability; and therefore we are by no means convinced of its truth. The late Mr Richardson junior, the painter, hath recorded a pleasing instance of the duke's calmness of disposition; for which, indeed, he was always remarkable. "The duke of Marlborough (says the writer), riding out once with Commissary Marriot, near the commissary's house in the country, it began to rain, and the duke called for his cloak; Marriot having his put on by his servant immediately. The duke's servant not bringing the cloak, he called for it again; but the man was still puzzling about the straps and buckles. At last, it raining now very hard, the duke called again, and asked him, "what he was about that he did not bring his cloak?" 'You must stay (grumbles the fellow), if it rains cats and dogs, till I can get at it.' The duke only turned to Marriot and said, "I would not be of that fellow's temper." The duke of Marlborough (adds Mr Richardson) did by nature and constitution, what Seneca judged by philosophy ought to be done. *Quid est quare ego servi mei hilarius responsum, et contumaciorem vultum, flagellis et compedibus expiem?*

Dr Swift, in one of his letters to Stella, relates the following particulars concerning the duke of Marlborough. "I was early this morning with Secretary St John, and gave him a memorial to get the queen's letter for the first-fruits, who has promised to do it in a very few days. He told me 'he had been with the duke of Marlborough, who was lamenting his former wrong steps in joining with the Whigs, and said he was worn out with age, fatigue, and misfortunes.' I swear it pitied me; and I really think they will not do well in too much mortifying that man, although indeed it is his own fault. He is covetous as hell, and ambitious as the prince of it: he would fain have been general for life, and has broken all endeavours for peace, to keep his greatness and get money. He told the queen 'he was neither covetous nor ambitious.' She said, 'if she could conveniently have turned about, she would have laughed, and could hardly forbear it in his face.' He fell in with all the abominable measures of the late ministry, because they gratified him for their own designs. Yet he has been a successful general, and I hope he will continue his command."

Various characters have been drawn of the duke of Marlborough; most of which we shall omit, as either already sufficiently known, or as not meriting particular notice. That which is given of him by Dr Swift, in his "History of the four last years of the queen," has all the malignity and meanness of a party pamphlet. It is even so foolish as to insinuate, that the duke's

duke's military accomplifhments were problematical, and that he was deftitute of perfonal courage. Mr Macpherfon's character of his grace is very elaborately compofed, and difplays no fmall degree of ability and penetration; though it is not, perhaps, entirely free from prejudice. The hiftorian confiders it as a fact, that Lord Churchill, at the time of the revolution, had a defign of placing his unfortunate mafter King James II. a prifoner in the hands of his rival the prince of Orange. But this ftory muft be regarded as wholly unworthy of credit. It is founded upon fuggeftions and informations fo grounndlefs and even ridiculous, that it cannot deferve a formal refutation. On the other hand, Mr Macpherfon has done juftice to the duke of Marlborough's profecution of the war in Flanders, and hath fhown that he conducted it upon the principles of found wifdom and good policy.

There are two teftimonies to the honour of the duke's memory, by two celebrated noble writers, which cannot be paffed over. One is by Lord Bolingbroke, in his letters on the Study and Ufe of Hiftory. Speaking of the conflernation raifed among the allies of the grand confederacy by the death of King William, and of the joy which that event gave to the French, his lordfhip obferves, that "a fhort time fhowed how vain the fears of fome and the hopes of others were. By his death, the duke of Marlborough was raifed to the head of the army, and indeed of the confederacy: where he, a new, a private man, a fubject, acquired, by merit and by management, a more deciding influence than high birth, confirmed authority, and even the crown of Great Britain, had given to King William. Not only all the parts of that vaft machine, the grand alliance, were kept more compact and entire, but a more rapid and vigorous motion was given to the whole: and inftead of languifhing out difaftrous campaigns, we faw every fcene of the war full of action. All thofe wherein he appeared, and many of thofe wherein he was not then an actor, but abettor however of their action, were crowned with the moft triumphant fuccefs. I take, with pleafure, this opportunity of doing juftice to that great man, whofe faults I knew, whofe virtues I admired; and whofe memory, as the greateft general, and as the greateft minifter, that our country, or perhaps any other, has produced, I honour."

The other teftimony to the duke's accomplifhments is by the earl of Chefterfield, in his Letters to his Son. "Of all the men (fays his lordfhip) that ever I knew in my life (and I knew him extremely well), the late duke of Marlborough poffeffed the graces in the higheft degree, not to fay engroffed them: and indeed he got the moft by them; for I will venture (contrary to the cuftom of profound hiftorians, who always affign deep caufes for great events) to afcribe the better half of the duke of Marlborough's greatnefs and riches to thofe graces. He was eminently illiterate; wrote bad Englifh, and fpelled it ftill worfe. He had no fhare of what is commonly called *parts*; that is, he had no brightnefs, nothing fhining in his genius. He had had, moft undoubtedly, an excellent good plain underftanding, with found judgment. But thefe alone would probably have raifed him but fomething higher than they found him, which was page to King James II.'s queen. There the graces protected and promoted him: for while he was an enfign of the guards, the duchefs of Cleveland, then favourite miftrefs to King Charles II. ftruck by thofe very graces, gave him 5000l.; with which he immediately bought an annuity for his life of 500l. of my grandfather Halifax; which was the foundation of his fubfequent fortune. His figure was beautiful; but his manner was irrefiftible by either man or woman. It was by this engaging graceful manner that he was enabled, during all his wars, to connect the various and jarring powers of the grand alliance, and to carry them on to the main object of the war, notwithftanding their private and feparate views, jealoufies, and wrongheadednefs. Whatever court he went to (and he was often obliged to go himfelf to fome tefty and refractory ones,) he as conftantly prevailed, and brought them into his meafures. The penfionary Heinfius, a venerable old minifter, grown gray in bufinefs, and who had governed the republic of the United Provinces for more than 40 years, was abfolutely governed by the duke of Marlborough, as that republic feels to this day. He was always cool; and nobody ever obferved the leaft variation in his countenance: he could refufe more gracefully than other people could grant; and thofe who went away from him the moft diffatisfied as to the fubftance of their bufinefs, were yet perfonally charmed with him, and in fome degree comforted by his manner. With all his gentlenefs and gracefulnefs, no man living was more confcious of his fituation, nor maintained his dignity better."

A perufal of the above paffage will convince us of the frivolous turn of the earl of Chefterfield's mind. His lordfhip, in his zeal to exalt the duke of Marlborough's external accomplifhments, either forgets or depreciates the far greater talents of which he was poffeffed. There is an obfervation upon the fubject in the Britifh Biography, with which we entirely concur. "That the duke of Marlborough (fays the writer) was eminently diftinguifhed for the gracefulnefs of his manners, cannot be queftioned; but the earl of Chefterfield appears to have attributed too much to their influence, when he afcribes—the better half of the duke of Marlborough's greatnefs and riches to thofe graces. That the uncommon gracefulnefs of his manners facilitated his advancement, and contributed to the fuccefs of his negociations, may readily be admitted; but furely it muft have been to much higher qualities that he owed the efteem of King William and of Prince Eugene, his reputation throughout all Europe, and his many victories and conquefts. It was not by a polite exterior that he obtained his laurels at Schellenberg, at Oudenarde, at Ramillies, and at Blenheim."

How much the duke of Marlborough has been celebrated by our poets, is well known by Addifon's "Campaign;" and by Philips's "Blenheim." Mr Addifon, in his Rofamond, has properly affumed another and voluntary occafion of paying a fine compliment to his grace's military exploits, and the glory by which they would be followed. Upon the duke's removal from his places, an ode was infcribed to him by Mr Somerville, animated with all the zeal of whiggifh enthufiafm, and containing fome paffages that are truly poetical. Another ode, not much inferior in fpirit,

Churchill. was addreffed to his grace, on occafion of his embarking for Oftend in the year 1712.

The duke of Marlborough's Scots title of Baron Eyemouth, being to heirs male, died with himfelf; but his Englifh title going to his daughters and their heirs-male, went into the Spencer family, who retain their own furname of Spencer.

CHURCHILL, *Charles*, a celebrated fatirift, the fon of Mr Charles Churchill, curate and lecturer of St John's, Weftminfter, was educated at Weftminfter fchool, and received fome applaufe for his abilities from his tutors in that famous feminary. His capacity, however, was greater than his application, fo that he acquired the character of a boy that could do good if he would. As the flighteft accounts of perfons fo noted are agreeable, it may not be amifs to obferve, that having one day got an exercife to make, and from idlenefs or attention having failed to bring it at the time appointed, his mafter thought proper to chaftife him with fome feverity, and even reproached his ftupidity: what the fear of ftripes could not effect, the fear of fhame foon produced, and he brought his exercife the next day, finifhed in fuch a manner, that he received the public thanks of all the mafters. Still, however, his progrefs in the learned languages was but flow; nor is it to be wondered at, if we confider how difficult it was for a ftrong imagination, fuch as he was poffeffed of, to conform and walk tamely forward in the trammels of a fchool education; minds like his are ever ftarting afide after new purfuits; defirous of embracing a multiplicity of amufing objects; eager to come at an end, without the painful inveftigation of the means. In fhort, for want of proper fkill in thefe languages, he was rejected from Oxford, whither his father had fent him; and probably this might have given occafion to the frequent invectives we find in his works againft that moft refpectable univerfity. Upon his return from thence, he again applied to his ftudies in Weftminfter fchool, where, at 17 years of age, he contracted an intimacy with a lady, to whom he was married, and their mutual regard for each other continued for feveral years. At the ufual age of going into orders, Mr Churchill was ordained by the late bifhop of London, and obtained a fmall curacy in Wales of 30l. a-year. Thither he carried his wife; they took a fmall houfe; and he paffed through the duties of his ftation with affiduity and cheerfulnefs. Happy had it been for him had he continued there to enjoy the fruits of piety, peace, and fimplicity of manners. He was beloved and efteemed by his parifhioners; and though his fermons were rather above the level of his audience, they were commended and followed. But endeavouring to advance his fortune, by keeping a cyder cellar, it involved him in difficulties which obliged him to leave Wales and come to London. His father dying foon after, he ftepped into the church in which he had officiated; and in order to improve his income, which fcarcely produced 100l. a-year, he taught young ladies to read and write Englifh at a boarding fchool, kept by Mrs Dennis, where he behaved with that decency and decorum which became his profeffion. His method of living, however, bearing no proportion to his income, he contracted feveral debts in the city; which being unable to pay, a jail, the terror of indigent genius, feemed ready to complete his misfortunes; but from this ftate of wretchednefs he was relieved by the benevolence of Mr Lloyd, father to the poet of that name. Meanwhile, Mr Lloyd, the fon, wrote a poetical epiftle called the *Actor*, which being read and approved by the public, gave the author a diftinguifhed place among the writers of his age. This induced Mr Churchill to write the *Rofciad*. It firft came out without the author's name; but the juftnefs of the remarks, and the feverity of the fatire, foon excited public curiofity. Though he never difowned his having written that piece, and even openly gloried in it; yet the public, unwilling to give fo much merit to one alone, afcribed it to a combination of wits; nor were Meffrs Lloyd, Thornton, or Colman, left unnamed upon this occafion. This mifplaced praife foon induced Mr Churchill to throw off the mafk, and the fecond edition appeared with his name at full length. As the Rofciad was the firft of this poet's performances, fo many are of opinion that it is the beft. In it we find a very clofe and minute difcuffion of the particular merit of each performer; their defects pointed out with candour, and their merits praifed without adulation. This poem, however, feems to be one of thofe few works which are injured by fucceeding editions; when he became popular, his judgment became intoxicated with applaufe; and we find, in the later editions, men blamed whofe merit was inconteftable, and others praifed that were at that time in no degree of efteem with the judicious. His next performance was his *Apology to the Critical Reviewers*. This work is not without its peculiar merit; and as it was written againft a fet of critics whom the world was willing enough to blame, the public read it with their ufual indulgence. In this performance he fhowed a particular happinefs of throwing his thoughts, if we may fo exprefs it, into poetical paragraphs; fo that the fentence fwells to the break or conclufion, as we find in profe.

But while his writings amufed the town, his actions difgufted it. He now quitted his wife, with whom he had cohabited many years; and refigning his gown and all clerical functions, commenced a complete *man of the town*, got drunk, frequented ftews; and, giddy with falfe praife, thought his talents a fufficient atonement for all his follies. In fome meafure to palliate the abfurdities of his conduct, he now undertook a poem called *Night*, written upon a general fubject indeed, but upon falfe principles; namely, that whatever our follies are, we fhould never attempt to conceal them. This, and Mr Churchill's other poems, being fhown to Dr Johnfon, and his opinion being afked, he allowed them but little merit; which being told to the author, he refolved to requite this private opinion with a public one. In his next poem, therefore, of the *Ghoft*, he has drawn this gentleman under the character of Pompofo; and thofe who difliked Dr Johnfon allowed it to have merit. Dr Johnfon's only reply to Churchill's abufe was, "that he thought him a fhallow fellow in the beginning, and could fay nothing worfe of him ftill." The poems of Night and the Ghoft had not the rapid fale the author expected; but his *Prophecy of Famine* foon made ample amends for the late paroxyfm in his fame. In this piece, written in the fpirit of the famous North Briton,

ton, he exerted his virulent pen against the whole Scottish nation, adopting the prejudices of the mob, and dignifying scurrility by the aid of a poetic imagination. It had a rapid and extensive sale, as prophesied by Mr Wilkes; who said before its publication that he was sure it must take, as it was at once personal, poetical, and political. After its appearance, it was asserted by his admirers, that Mr Churchill was a better poet than Pope. This exaggerated adulation, as it had before corrupted his morals, began now to impair his mind: several succeeding pieces were published, which, being written without effort, are read without pleasure. His *Gotham*, *Independence*, *The Times*, seem merely to have been written by a man who desired to avail himself of the avidity of the public curiosity in his favour, and are rather aimed at the pockets than the hearts of his readers. Mr Churchill died in 1764, of a miliary fever, with which he was seized at Boulogne in France, whither he had gone on a visit to Mr Wilkes. After his death his poems were collected and printed together in two volumes 8vo.

CHURCHING OF WOMEN AFTER CHILDBIRTH, took its rise from the Jewish rite of purification. In the Greek church it was limited to the 40th day after delivery; but in the western parts of Europe no certain time was observed. There is an office in the liturgy for this purpose.

CHURCHYARD, a piece of ground adjoining to a church, set apart for the interment or burial of the dead.—In the church of Rome they are blessed or consecrated with great solemnity. If a churchyard, which has been thus consecrated, shall afterwards be polluted by any indecent action, or profaned by the burial of an infidel, a heretic, an excommunicated or unbaptized person, it must be *reconciled;* and the ceremony of the reconciliation is performed with the same solemnity as that of the blessing or consecration.

CHURCHYARD, *Thomas*, a poet who flourished in the reigns of Henry VIII. Edward VI. Queen Mary, and Queen Elizabeth, was born at Shrewsbury; and inherited a fortune which he soon exhausted in a fruitless attendance on the court, by which he only gained the favour of being retained a domestic in the family of Lord Surrey: when, by his lordship's encouragement, he commenced poet. Upon his patron's death, he betook himself to arms; was in many engagments; was frequently wounded, and was twice made prisoner. He published 12 pieces, which he afterwards printed together in one volume, under the title of *Churchyard's Chips;* and also the tragedy of Thomas Moubray duke of Norfolk. He died in 1570.

CHURLE, CEORLE, or CARL, in the Saxon times, signified a tenant at will, who held of the thanes or nobles on condition of rent and service. They were of two sorts; one rented the estate like our farmers; the other tilled and manured the demesnes, and were called ploughmen. See CEORLE.

CHURNING, in country affairs, the operation of making butter by agitating milk in a well known vessel called a *churn*. For accelerating this operation, a correspondent in the Bath Society papers recommends a little distilled vinegar to be poured into the churn; and the butter will be produced in an hour afterwards. He acknowledges, however, that his experiments have not as yet ascertained the exact quantity of the acid which is necessary to the proper effect, nor the precise time of its being mixed with the cream. But he apprehends a table spoonful or two to a gallon of cream will be sufficient; nor would he recommend it to be applied till the cream has undergone some considerable agitation. His first trial was after the first churning had been going forward half a day: whether he observed the same rule afterwards he does not say; but all his trials proved successful, the butter being uniformly obtained in about an hour after the mixture. See AGRICULTURE and CHEMISTRY *Index*.

CHUS, *Chusch*, (Bible). It is a tradition of an ancient standing, that the *Chus* of the Scriptures denotes *Ethiopia*, and *Chuschi* an *Ethiopian:* the Septuagint and Vulgate constantly translate it so; and in this they are followed by most interpreters, and by Josephus and Jerome. And yet what Bochart urges to the contrary is of no inconsiderable weight, from Ezekiel xxix. 10. in which the two opposite extremes of Egypt are designed; and therefore *Chus*, which is opposite to Syene, must be Arabia: but this is more strongly pointed out by Xenophon, by whom Ethiopia is said to be the south boundary of Cyrus's empire: and Herodotus distinguishes between the Ethiopians of Asia and Africa, conjoining the former with the Arabians.

CHYLE, in the animal economy, a milky fluid secreted from the aliments by means of digestion. See ANATOMY and CHEMISTRY *Index*.

CHYLIFICATION, the formation of the chyle, or the act whereby the food is changed into chyle.

The chyle has by some authors been thought to have a great resemblance in its nature and chemical analysis to milk. The subject, however, hath as yet been but little inquired into. See the article MILK.

CHYME, or CHYMUS, in the common signification of the word, denotes every kind of humour which is incrassated by concoction; under which notion it comprehends all the humours fit or unfit for preserving and nourishing the body, whether good or bad. It frequently imports the finest parts of the chyle, when separated from the fæces, and contained in the lacteal and thoracic duct.

CHYMISTRY. See CHEMISTRY.

CHYMOLOGI, an appellation given to such naturalists as have employed their time in investigating the properties of plants from their taste and smell.

CHYMOSIS, in *Medicine*, the act of making or preparing chyme. The word comes from χυμος, *succus*, of χεω, *fundo*, "I pour out." Chymosis, according to some, is the second of the concoctions made in the body; being a repeated preparation of the most impure and gross parts of the chyle, which being rejected by the lacteals, is imbibed by the meseraics, and thence carried to the liver, to be there elaborated, purified, and subtilized afresh. It is of this, according to Rogers, that the animal spirits are formed.

CHYMOSIS is also a distortion of the eye-lids, arising from an inflammation; also an inflammation of the tunica cornea in the eye.

CHYTLA, in antiquity, a liquor made of wine and oil, and sometimes used in divination.

CHYTRI, among the Athenians, a festival in honour of Bacchus and Mercury, kept on the 13th of the month Anthesterion.

CHYTRIUM, in *Ancient Geography*, a place in Ionia, in which formerly ftood Clazomene; the Clazomenians, through fear of the Perfians, removing from the continent to an adjacent ifland (Paufanias). Alexander reduced the ifland, by a mole or caufeway, to a peninfula.

CHYTRUS, in *Ancient Geography*, an inland town of Cyprus, to the north of Citium; famous for its excellent honey.

CIANUS SINUS, in *Ancient Geography*, a bay of Bithynia, named from the town and river Cius.

CIBALÆ, or CIBALIS, in *Ancient Geography*, a town of Pannonia Inferior, on an eminence, near the lake Hiulka, to the north-weft of Sirmium; the country of the emperor Gratian, where he was brought up to rope-making: a place rendered famous for the furprifal and defeat of Licinius by Conftantine.

CIBBER, COLLEY, a celebrated comedian, dramatic writer, and poet laureat to the king, was born at London in 1671. His father Caius Gabriel Cibber, was a native of Holftein, and a fkilful ftatuary, who executed the baffo relievo on the pedeftal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlehem Hofpital in Moorfields. Colley, who derived his Chriftian name from the furname of his mother's family, was intended for the church, but betook himfelf to the ftage, for which he conceived an early inclination; and he was fome time before he acquired any degree of notice, or even a competent falary. His firft effay in writing, was the comedy of *Love's laft Shift*, acted in 1695, which met with fuccefs; as did his own performance of the character of the fop in it. From that time, as he fays himfelf, "My mufe and my fpoufe were fo equally prolific, that the one was feldom the mother of a child, but in the fame year the other made me the father of a play. I think we had a dozen of each fort between us; of both which kinds fome died in their infancy, and near an equal number of each were alive when we quitted the theatre." The *Carelefs Hufband*, acted in 1704, met with great applaufe, and is reckoned his beft play: but none was of more importance to him than the *Nonjuror*, acted in 1717, and levelled againft the Jacobites. This laid the foundation of the mifunderftanding between him and Mr Pope, raifed him to be the hero of the Dunciad, and made him poet-laureat in 1730. He then quitted the ftage, except a few occafional performances; and died in 1757. Cibber neither fucceeded in writing nor in acting tragedy; and his odes were not thought to partake of the genius or fpirit he fhowed in his comedies.

His fon *Theophilus*, alfo a comic actor after him, was born during a great ftorm in 1703; and after paffing a life of extravagance, diftrefs, and perplexity, perifhed in another ftorm in 1758, in the paffage between Dublin and England. Theophilus married the fifter of Thomas Auguftine Arne, the famous mufical compofer; who became a celebrated tragic actrefs, and whofe honour was facrificed to her hufband's extravagance.

CIBDELOPLACIA, an old term in *Natural Hiftory*; applied to fpars debafed by a very large admixture of earth: they are opaque, formed of thin crufts, covering vegetables and other bodies, by way of incruftations.

Of this genus we have the following fpecies: 1. A grayifh white one, with a rough furface. 2. A whitifh brown one: both thefe are friable. 3. A hard, pale brown kind, which is the ofteocolla of the fhops. 4. The whitifh-gray kind, with a fmooth furface: this is the unicornu foffil and ceratites of authors. 5. The whitifh brown coralloid kind.

CIBDELOSTRACIA, an old term in *Natural Hiftory*, including earthy fpars, deftitute of tranfparency, formed into thin plates, and ufually found coating over the fides of fiffures, and other cavities of ftones with congeries of them to great extent, and of plain or botryoid furfaces.

Of thefe there are ufually reckoned feven kinds: the firft the hard, brownifh-white cibdeloftracium, found in Germany: the fecond is the hard, whitifh cibdeloftracium, with thin crufts, and a fmoother furface, found alfo in the Harts-foreft in Germany: the third is the hard, pale-brown cibdeloftracium, with numerous very thin crufts, found in fubterranean caverns in many parts of England as well as Germany: the fourth is the white, light, and friable cibdeloftracium, found alfo in Germany, but very rarely in any part of England: the fifth is the light, hard, pale-brown cibdeloftracium, with a fmooth furface, found in almoft all parts of the world: the fixth is the whitifh, friable, cruftaceous cibdeloftracium, with a rougher furface, frequent in Germany and England; and the feventh is the brownifh-white friable cibdeloftracium, with a dufky furface, found in feveral parts of Ireland as well as Germany.

CIBORIA, in antiquity, the large hufks of Egyptian beans, which are faid to have been fo large as to ferve for drinking-cups: whence they had their name *ciborium*, fignifying a cup, in the Egyptian language.

CIBORIUM, in ecclefiaftical writers, the covering for the altar. This covering is fupported by four high columns, and forms a kind of tent for the euchariſt, in the Romifh churches. Some authors call it *turris geftatoria*, and others *pyxis*; but the pyxis is properly the box in which the eucharift is preferved.

CIBUS FERIALIS, in antiquity, an entertainment peculiar to a funeral; for which purpofe, beans, parfley, lettuce, bread, eggs, lentils, and falt, were in ufe.

CICADA, the FROG-HOPPER or FLEA-LOCUST, a genus of infects belonging to the order of hemiptera. See ENTOMOLOGY *Index*.

CICATRICULA, among natural hiftorians, denotes a fmall whitifh fpeck in the yolk of an egg, fuppofed to be the firft rudiments of the future chick.

CICATRIX, in *Surgery*, a little feam or elevation of callous flefh rifing on the fkin, and remaining there after the healing of a wound or ulcer. It is commonly called a *fcar*.

CICATRIZANTS, in *Pharmacy*, medicines which affift nature to form a cicatrix. Such are Armenian bole, powder of tutty, &c.

Cicatrizants are otherwife called *efcharotics*, *epulotics*, *incarnatives*, *agglutinants*, &c.

CICCA, in *Botany*, a genus of the tetrandria order, belonging to the monœcia clafs of plants. The male calyx is tetraphyllous; there is no corolla: the female calyx triphyllous; no corolla; four ftiles; the capfule quadricoccous or four-berried.

CICELY, in *Botany*, the Englifh name of a fpecies of

of chærophyllum. See CHÆROPHYLLUM, BOTANY *Index*.

CICER, or CHICK-PEA. See BOTANY *Index*.

CICERO, MARCUS TULLIUS, the celebrated Roman orator, was born in the year of Rome 647, about 105 years before Chriſt. His father Marcus Tullius, who was of the equeſtrian order, took great care of his education, which was directed particularly with a view to the bar. Young Tully, at his firſt appearance in public, declaimed with ſuch vehemence againſt Sylla's party, that it became expedient for him to retire into Greece; where he heard the Athenian orators and philoſophers, and greatly improved both in eloquence and knowledge. Here he met with T. Pomponius, who had been his ſchool-fellow; and who, from his love to Athens, and ſpending a great part of his days in it, obtained the ſurname of *Atticus;* and here they revived and confirmed that noted friendſhip which ſubſiſted between them through life with ſo celebrated a conſtancy and affection. From Athens he paſſed into Aſia; and after an excurſion of two years came back again into Italy.

Cicero had now arrived at Rome; and, after one year more ſpent at the bar, obtained, in the next place, the dignity of queſtor. Among the cauſes which he pleaded before his queſtorſhip, was that of the famous comedian Roſcius, whom a ſingular merit in his art had recommended to the familiarity and friendſhip of the greateſt men in Rome. The queſtors were the general receivers or treaſurers of the republic, and were ſent annually into the provinces diſtributed to them, as they always were, by lot. The iſland of Sicily happened to fall to Cicero's ſhare; and that part of it, for it was conſiderable enough to be divided into two provinces, which was called *Lilybæum.* This office he received, not as a gift, but a truſt; and he acquitted himſelf ſo well in it, that he gained the love and admiration of all the Sicilians. Before he left Sicily, he made the tour of the iſland, to ſee every thing that was curious, and eſpecially the city of Syracuſe; where he diſcovered the tomb of Archimedes to the magiſtrates who were ſhowing him the curioſities of the place, but who, to his ſurpriſe, knew nothing of any ſuch tomb.

We have no account of the preciſe time of Cicero's marriage with Terentia; but it is ſuppoſed to have been celebrated immediately after his return from his travels to Italy, when he was about 30 years old. He was now diſengaged from his queſtorſhip in Sicily, by which firſt ſtep, in the legal gradation and aſcent of public honours, he gained an immediate right to the ſenate, and an actual admiſſion into it during life; and ſettled again in Rome, where he employed himſelf conſtantly in defending the perſons and properties of its citizens, and was indeed a general patron. Five years were almoſt elapſed ſince Cicero's election to the queſtorſhip, which was the proper interval preſcribed by law before he could hold the next office of ædile; to which he was now, in his 37th year, elected by the unanimous ſuffrages of all the tribes, and preferably to all his competitors. After Cicero's election to the ædileſhip, but before his entrance upon the office, he undertook the famed proſecution of C. Verres, the late prætor of Sicily, who was charged with many flagrant acts of injuſtice, rapine, and cruelty, during his triennial government of that iſland. This was one of the moſt memorable tranſactions of his life, for which he was greatly and juſtly celebrated by antiquity, and for which he will, in all ages, be admired and eſteemed by the friends of mankind. The reſult was, that, by his diligence and addreſs, he ſo confounded Hortenſius, though the reigning orator at the bar, and uſually ſtyled *the king of the forum*, that he had nothing to ſay for his client. Verres, deſpairing of all defence, ſubmitted immediately, without expecting the ſentence, to a voluntary exile; where he lived many years, forgotten and deſerted by all his friends. He is ſaid to have been relieved in this miſerable ſituation by the generoſity of Cicero; yet was proſcribed and murdered after all by Mark Antony, for the ſake of thoſe fine ſtatues and Corinthian veſſels of which he had plundered the Sicilians.

After the uſual interval of two years from the time of his being choſen ædile, Cicero offered himſelf a candidate for the prætorſhip; and, in three different aſſemblies convened for the choice of prætors, two of which were diſſolved without effect, he was declared every time the firſt prætor by the ſuffrages of all the centuries. He was now in the career of his fortunes, and in ſight, as it were, of the conſulſhip, the grand object of his ambition; and therefore, when his prætorſhip was at an end, he would not accept any foreign province, the uſual reward of that magiſtracy, and the chief fruit which the generality propoſed from it. He had no particular love for money, nor genius for arms; ſo that thoſe governments had no charms for him: the glory which he purſued was to ſhine in the eyes of the city as the guardian of its laws, and to teach the magiſtrates how to execute, and the citizens how to obey, them.

Being now in his 43d year, the proper age required by law, he declared himſelf a candidate for the conſulſhip along with ſix competitors, L. Sulpicius Galba, L. Sergius Catilina, C. Antonius, L. Caſſius Longinus, Q. Cornificius, and C. Licinius Sacerdos. The two firſt were patricians; the two next plebeians, yet noble; the two laſt the ſons of fathers who had firſt imported the public honours into their families: Cicero was the only *new man*, as he was called, among them, or one of the equeſtrian rank. Theſe were the competitors; and in this competition the practice of bribing was carried on as openly and as ſhamefully by Antonius and Catiline as it uſually is at our elections in Britain. However, as the election approached, Cicero's intereſt appeared to be ſuperior to that of all the candidates: for the nobles themſelves, though always envious and deſirous to depreſs him, yet out of regard to the dangers which threatened the city from many quarters, and ſeemed ready to burſt out into a flame, began to think him the only man qualified to preſerve the republic, and break the cabals of the deſperate by the vigour and prudence of his adminiſtration. The method of chooſing conſuls was not by an open vote, but by a kind of ballot, or little tickets of wood diſtributed to the citizens, with the names of the ſeveral candidates inſcribed upon each; but in Cicero's caſe the people were not content with this ſecret and ſilent way; but before they came to any ſcrutiny, loudly and univerſally proclaimed Cicero the firſt conſul, ſo that, as he himſelf ſays, "he was not choſen

by

by the votes of particular citizens, but the common ſuffrage of the city; nor declared by the voice of the crier, but of the whole Roman people."

Cicero had no ſooner entered upon his office than he had occaſion to exert himſelf againſt P. Servilius Rullus, one of the new tribunes, who had been alarming the ſenate with the promulgation of an agrarian law; the purpoſe of which was to create a decemvirate, or ten commiſſioners, with abſolute power for five years over all the revenues of the republic, to diſtribute them at pleaſure to the citizens, &c. Theſe laws uſed to be greedily received by the populace, and were propoſed therefore by factious magiſtrates as oft as they had any point to carry with the multitude againſt the public good; ſo that Cicero's firſt buſineſs was to quiet the apprehenſions of the city, and to baffle, if poſſible, the intrigues of the tribune. Accordingly, in an artful and elegant ſpeech from the roſtra, he gave ſuch a turn to the inclination of the people, that they rejected this law with as much eagerneſs as they had ever received one. But the grand affair of all, which conſtituted the glory of his conſulſhip, and has tranſmitted his name with ſuch luſtre to poſterity, was the ſkill he ſhowed, and the unwearied pains he took, in ſuppreſſing that horrid conſpiracy which was formed by Catiline and his accomplices for the ſubverſion of the commonwealth. For this great ſervice he was honoured with the glorious title of *pater patriæ*, "the father of his country," which he retained for a long time after.

Cicero's adminiſtration was now at an end; but he had no ſooner quitted his office, than he began to feel the weight of that envy which is the certain fruit of illuſtrious merit. He was now, therefore, the common mark, not only of all the factious, againſt whom he had declared perpetual war, but of another party not leſs dangerous, the envious too, whoſe united ſpleen never left him from this moment till they had driven him out of that city which he had ſo lately preſerved. Cicero, upon the expiration of his conſulſhip, took care to ſend a particular account of his whole adminiſtration to Pompey, who was finiſhing the Mithridatic war in Aſia, in hopes to prevent any wrong impreſſions there from the calumnies of his enemies, and to draw from him ſome public declaration in praiſe of what he had been doing. But Pompey being informed by Metellus and Cæſar of the ill humour that was riſing againſt Cicero in Rome, anſwered him with great coldneſs, and inſtead of paying him any compliment, took no notice at all of what had paſſed in the affair of Catiline, upon which Cicero expoſtulates with him in a letter which is ſtill extant.

About this time Cicero bought a houſe of M. Craſſus on the Palatine-hill, adjoining to that in which he had always lived with his father, and which he is now ſuppoſed to have given up to his brother Quintius. The houſe coſt him near 30,000l. and ſeems to have been one of the nobleſt in Rome. It was built about 30 years before by the famous tribune M. Livius Druſus; on which occaſion we are told, that when the architect promiſed to build it for him in ſuch a manner that none of his neighbours ſhould overlook him; "But if you have any ſkill (replied Druſus), contrive it rather ſo, that all the world may ſee what I am doing." The purchaſe of ſo expenſive a houſe raiſed ſome cenſure on his vanity; and eſpecially as it was made with borrowed money. This circumſtance he himſelf does not diſſemble, but ſays merrily upon it, that "he was now plunged ſo deeply in debt, as to be ready for a plot, only that the conſpirators would not truſt him."

The moſt remarkable event that happened in this year, which was the 45th of Cicero's life, was the pollution of the myſteries of the *bona dea* by P. Clodius, which, by an unhappy train of conſequences, involved Cicero in a great and unexpected calamity. Clodius had an intrigue with Cæſar's wife Pompeia, who, according to annual cuſtom, was now celebrating in her houſe thoſe awful ſacrifices of the goddeſs, to which no male creature ever was admitted, and where every thing maſculine was ſo ſcrupulouſly excluded, that even pictures of that ſort were covered during the ceremony. It flattered Clodius's imagination greatly to gain acceſs to his miſtreſs in the midſt of her holy miniſtry; and with this view he dreſſed himſelf in a woman's habit, that by the benefit of his ſmooth face, and the introduction of one of the maids, he might paſs without diſcovery; but by ſome miſtake between him and his guide, he loſt his way when he came within the houſe, and fell unluckily among the other female ſervants. Here he was detected by his voice, and the ſervants alarmed the whole company by their ſhrieks, to the great amazement of the matrons, who threw a veil over their ſacred myſteries, while Clodius found means to eſcape. The ſtory was preſently ſpread abroad, and raiſed a general ſcandal and horror throughout the city. The whole defence which Clodius made when, by order of the ſenate, he was brought to trial, was to prove himſelf abſent at the time of the fact, for which purpoſe he produced two men to ſwear that he was then at Interamna, about two or three days journey from the city. But Cicero being called upon to give his teſtimony, depoſed, that Clodius had been with him that very morning at his houſe in Rome. Irritated by this, Clodius formed a ſcheme of revenge. This was to get himſelf choſen tribune, and in that office to drive Cicero out of the city, by the publication of a law, which, by ſome ſtratagem or other, he hoped to obtrude upon the people. But as all patricians were incapable of the tribunate, by its original inſtitution, ſo his firſt ſtep was to make himſelf a plebeian, by the pretence of an adoption into a plebeian houſe, which could not yet be done without the ſuffrage of the people. The firſt triumvirate was now formed, which was nothing elſe in reality but a traitorous conſpiracy of three of the moſt powerful citizens of Rome, to extort from their country by violence what they could not obtain by law. Pompey's chief motive was to get his acts confirmed by Cæſar in his conſulſhip, which was now coming on; Cæſar, by giving way to Pompey's glory, to advance his own; and Craſſus, to gain that aſcendence by the authority of Pompey and Cæſar, which he could not ſuſtain alone. Cicero might have made what terms he pleaſed with the triumvirate, and been admitted even a partner of their power, and a fourth in their league; but he would not enter into any engagements with the three whoſe union he and all the friends of the republic abhorred. Clodius, in the mean time, had been puſhing

ing on the bufinefs of his adoption, which at laft he effected, and began foon after to threaten Cicero with all the terrors of his tribunate, to which he was now advanced without any oppofition. Both Cæfar and Pompey fecretly favoured his fcheme; not that they intended to ruin Cicero, but only to keep him under the lafh; and if they could not draw him into their meafures, or make him at leaft keep quiet, to let Clodius loofe upon him. Cæfar, in particular, wanted to diftrefs him fo far as to force him to a dependence on himfelf; for which end, while he was privately encouraging Clodius to purfue him, he was propofing expedients to Cicero for his fecurity. But though his fortunes feemed now to be in a tottering condition, and his enemies to gain ground daily upon him, yet he was unwilling to owe the obligation of his fafety to any man, far lefs to Cæfar, whofe defigns he always fufpected, and whofe fchemes he never approved. This ftiffnefs in Cicero fo exafperated Cæfar, that he refolved immediately to affift Clodius with all his power to opprefs him; while Pompey was all the time giving him the ftrongeft affurances that there was no danger, and that he would fooner be killed himfelf than fuffer him to be hurt.

Clodius, in the mean time, was obliging the people with feveral new laws, contrived chiefly for their advantage; the defign of all which was only to introduce, with a better grace, the ground-plot of the plan, the banifhment of Cicero. In fhort, having caufed a law to be enacted, importing, that any who had condemned a Roman citizen, unheard, fhould himfelf be banifhed, he foon after impeached Cicero upon it. It was in vain that this great man went up and down the city foliciting his caufe in the habit of a fuppliant, and attended by many of the firft young noblemen whom he had taught the rules of eloquence; thofe powers of fpeaking which had fo often been fuccefsful in defending the caufe of others, feemed totally to forfake his own: he was banifhed by the votes of the people 400 miles from Italy; his houfes were ordered to be demolifhed, and his goods fet up to fale. It cannot be denied, that in this great calamity he did not behave himfelf with that firmnefs which might reafonably be expected from one who had borne fo glorious a part in the republic, confcious of his integrity, and fuffering in the caufe of his country; for his letters are generally filled with fuch lamentable expreffions of grief and defpair, that his beft friends, and even his wife, were forced fometimes to admonifh him to roufe his courage, and remember his former character, Atticus was conftantly putting him in mind of it; and fent him word of a report that was brought to Rome by one of Caffius's freed-men, that his affliction had difordered his fenfes. He was now indeed attacked in his weakeft part; the only place in which he was vulnerable. To have been as great in affliction as he was in profperity, would have been a perfection not given to man; yet his very weaknefs flowed from a fource which rendered him the more amiable in all the other parts of his life; and the fame tendernefs of difpofition which made him love his friends, his children, and his country, more paffionately than other men, made him feel the lofs of them more fenfibly. When he had been gone a little more than two months, a motion was made in the fenate by one of the tribunes, who was his friend, to recal him, and repeal the laws of Clodius, to which the whole houfe readily agreed. Many obftructions, as may be eafily imagined, were given to it by the Clodian faction; but this made the fenate only more refolute to effect it. They paffed a vote, therefore, that no other bufinefs fhould be done till Cicero's return was carried; which at laft it was, and in fo fplendid and triumphant a manner, that he had reafon, he fays, to fear, left people fhould imagine that he himfelf had contrived his late flight for the fake of fo glorious a reftoration.

Cicero, now in his 50th year, was reftored to his former dignity, and foon after to his former fortunes; fatisfaction being made to him for the ruin of his eftates and houfes, which laft were again built up by himfelf with more magnificence than before. But he had domeftic grievances about this time which touched him very nearly, and which, as he fignifies obfcurely to Atticus, were of too delicate a nature to be expreffed in a letter: they arofe chiefly from the petulant humour of his wife, which began to give him frequent occafions of chagrin, and, by a feries of repeated provocations, confirmed in him that fettled difguft which at laft ended in a divorce.

In the 56th year of his age, he was made proconful of Cilicia, and his adminiftration there gained him great honour. About this time the expectation of a breach between Cæfar and Pompey engaged the general attention. Craffus had been deftroyed with his army fome years before in the war with the Parthians; and Julia, the daughter of Cæfar, whom Pompey married, and who, while fhe lived, was the cement of their union, was alfo dead in child-bed. Cæfar had put an end to the Gallic war, and reduced the whole province to the Roman yoke; but though his commiffion was near expiring, he feemed to have no thoughts of giving it up and returning to the condition of a private fubject. He pretended that he could not poffibly be fafe if he parted with his army, efpecially while Pompey held the province of Spain prolonged to him for five years. This difpofition to a breach Cicero foon learned from his friends, as he was returning from his province of Cilicia. But as he forefaw the confequences of a war more clearly and fully than any of them, fo his firft refolution was to apply all his endeavours and authority to the mediation of a peace; though, in the event of a breach, he was determined within himfelf to follow Pompey. He clearly forefaw, what he declared without fcruple to his friends, that which fide foever got the better, the war muft neceffarily end in a tyranny. The only difference, he faid, was, that if their enemies conquered, they fhould be profcribed; if their friends, they would be flaves.

He no fooner arrived at the city, however, than he fell, as he tells us, into the very flame of civil difcord, and found the war in effect proclaimed; for the fenate had juft voted a decree, that Cæfar fhould difband his army by a certain day, or be declared an enemy; and Cæfar's fudden march towards Rome effectually confirmed it. In the midft of all this hurry and confufion, Cæfar was extremely folicitous about Cicero; not fo much to gain him, for that was not to be expected, as to prevail with him to ftand neuter. He wrote to him feveral times to that effect, and

Cicero.

employed all their common friends to preſs him with letters on that ſubject; all which was done; but in vain, for Cicero was impatient to be gone to Pompey. In the mean time, theſe letters give us a moſt ſenſible proof of the high eſteem and credit in which Cicero flouriſhed at this time in Rome; when in a conteſt for empire, which force alone was to decide, we ſee the chiefs on both ſides ſo ſolicitous to gain a man to their party, who had no peculiar ſkill in arms or talents for war. Purſuing, however, the reſult of all his deliberations, he embarked at length to follow Pompey, who had been obliged to quit Italy ſome time before, and was then at Dyrrhachium; and arrived ſafely in his camp with his ſon, his brother, and his nephew, committing the fortunes of the whole family to the iſſue of that cauſe. After the battle of Pharſalia, in which Pompey was defeated, Cicero returned into Italy, and was afterwards received into great favour by Cæſar, who was now declared dictator the ſecond time, and Mark Antony his maſter of horſe. We may eaſily imagine, what we find indeed from his letters, that he was not a little diſconcerted at the thoughts of an interview with Cæſar, and the indignity of offering himſelf to a conqueror againſt whom he had been in arms; for though upon many accounts he had reaſon to expect a kind reception from Cæſar, yet he hardly thought his life, he ſays, worth begging, ſince what was given by a maſter might always be taken away again at pleaſure. But at their meeting he had no occaſion to ſay or do any thing that was below his dignity; for Cæſar no ſooner ſaw him than he alighted, ran to embrace him, and walked with him alone, converſing very familiarly, for ſeveral furlongs.

Cicero was now in his 61ſt year, and forced at laſt to part with his wife Terentia, whoſe humour and conduct had been long uneaſy to him. She was a woman of an imperious and turbulent ſpirit, and though he had borne her perverſeneſs in the vigour of health, and flouriſhing ſtate of his fortunes; yet, in declining life, ſoured by a continual ſucceſſion of mortifications from abroad, the want of eaſe and quiet at home was no longer tolerable to him. But he was immediately oppreſſed by a new and moſt cruel affliction, the death of his beloved daughter Tullia, who died in child-bed ſoon after her divorce from her third huſband Dolabella. She was about 32 years old at the time of her death; and, by the few hints which are left of her character, appears to have been an excellent and admirable woman. She was moſt affectionately and piouſly obſervant of her father, and, to the uſual graces of her ſex, having added the more ſolid accompliſhments of knowledge and polite letters, was qualified to be the companion and delight of his age; and was juſtly eſteemed not only as one of the beſt, but the moſt learned of the Roman ladies. His affliction for the death of this daughter was ſo great, that to ſhun all company as much as he could, he removed to Atticus's houſe, where he lived chiefly in his library, turning over every book he could meet with on the ſubject of moderating grief. But finding his reſidence here too public, and a greater reſort to him than he could bear, he retired to Aſturia, one of his ſeats near Antium; a little iſland on the Latian ſhore, at the mouth of a river of the ſame name, covered with wood and groves cut into ſhady walks; a ſcene of all others the fitteſt to indulge melancholy, and where he could give a free courſe to his grief. "Here (ſays he to Atticus) I live without the ſpeech of man; every morning early I hide myſelf in the thickeſt of the wood, and never come out till the evening. Next to yourſelf, nothing is ſo dear to me as this ſolitude; and my whole converſation is with my books." Indeed his whole time was employed in little elſe than reading and writing during Cæſar's adminiſtration, which he could never cheerfully ſubmit to; and it was within this period that he drew up one of the graveſt of thoſe philoſophical pieces which are ſtill extant in his works.

Upon the death of Cæſar, Octavius his nephew and heir coming into Italy, was preſented to Cicero by Hirtius and Panſa, with the ſtrongeſt profeſſions on the part of the young man that he would be governed entirely by his direction. Indeed Cicero thought it neceſſary to cheriſh and encourage Octavius, if for nothing elſe, yet to keep him at a diſtance from Antony; but could not yet be perſuaded to enter heartily into his affairs. He ſuſpected his youth and want of experience; and that he had not ſtrength enough to deal with Antony; and, above all, that he had no good diſpoſition towards the conſpirators. He thought it impoſſible he ſhould ever be a friend to them; and was perſuaded rather, that if ever he got the upper hand, his uncle's acts would be more violently enforced, and his death more cruelly revenged, than by Antony himſelf. And when Cicero did at laſt conſent to unite himſelf to Octavius's intereſts, it was with no other view but to arm him with a power ſufficient to oppreſs Antony; yet ſo checked and limited, that he ſhould not be able to oppreſs the republic.

In the midſt of all this political buſtle, he was ſtill proſecuting his ſtudies with his uſual application; and, beſides ſome philoſophical pieces, now finiſhed his book of offices, or the duties of man, for the uſe of his ſon: A work admired by all ſucceeding ages as the moſt perfect ſyſtem of Heathen morality, and the nobleſt effort and ſpecimen of what reaſon could do in guiding men through life with innocence and happineſs. However, he paid a conſtant attention to public affairs; miſſed no opportunities, but did every thing that human prudence could do for the recovery of the republic: for all that vigour with which it was making this laſt effort for itſelf, was entirely owing to his counſels and authority. This appears from thoſe memorable philippics which from time to time he publiſhed againſt Antony, as well as from other monuments of antiquity. But all was in vain; for though Antony's army was entirely defeated at the ſiege of Modena, which made many people imagine that the war was at an end, and the liberty of Rome eſtabliſhed; yet the death of the conſuls Panſa and Hirtius in that action gave the fatal blow to all Cicero's ſchemes, and was the immediate cauſe of the ruin of the republic.

Octavius having ſubdued the ſenate to his mind, marched towards Gaul to meet Anthony and Lepidus; who had already paſſed the Alps, and brought their armies into Italy, in order to have a perſonal interview with him; which had been privately concerted for ſettling the terms of a triple league, and dividing the power and provinces of Italy among themſelves.

themſelves. The place appointed for this interview was a ſmall iſland about two miles from Bononia, formed by the river Rhenus which runs near that city. Here they met, and ſpent three days in a cloſe conference to adjuſt the plan of their accommodation; and the laſt thing they adjuſted was the liſt of a proſcription which they were determined to make of their enemies. This, as the writers tell us, occaſioned much difficulty and warm conteſts among them, till each in his turn conſented to ſacrifice ſome of his beſt friends to the revenge and reſentment of his colleagues. Cicero was at his Tuſculan villa, when he firſt received the news of the proſcription, and of his being included in it. It was the deſign of the triumvirate to keep it a ſecret, if poſſible, to the moment of execution, in order to ſurpriſe thoſe whom they had deſtined to deſtruction, before they were aware of their danger, or had time to make their eſcape. But ſome of Cicero's friends found means to give him early notice of it; upon which he ſet forward to the ſea-ſide, with a deſign to tranſport himſelf out of the reach of his enemies. There, finding a veſſel ready, he immediately embarked; but the winds being adverſe, and the ſea uneaſy to him, after he had ſailed about two leagues along the coaſt, he was obliged to land, and ſpend the night on ſhore. From whence he was forced, by the importunity of his ſervants, on board again; but was ſoon afterwards obliged to land at a country-ſeat of his a mile from the ſhore, weary of life, and declaring he was reſolved to die in that country which he had ſo often ſaved. Here he ſlept ſoundly for ſome time, till his ſervants once more forced him away in a litter towards the ſhip, having heard that he was purſued by Antony's aſſaſſins. They had ſcarcely departed when the aſſaſſins arrived at his houſe; and, perceiving him to have fled, purſued him immediately towards the ſea, and overtook him in a wood that was near the ſhore. Their leader was one Popilius Lenas, a tribune of the army, whoſe life Cicero had formerly defended and ſaved. As ſoon as the ſoldiers appeared, the ſervants prepared to defend their maſter's life at the hazard of their own; but Cicero commanded them to ſet him down and make no reſiſtance. They ſoon cut off his head and his hands, returning with them to Rome as the moſt agreeable preſent to their cruel employer. Antony, who was then at Rome, received them with extreme joy, rewarding the murderer with a large ſum of money, and ordered the head to be fixed upon the roſtra between the two hands; a ſad ſpectacle to the city, and what drew tears from every eye, to ſee thoſe mangled members which uſed to exert themſelves ſo glorioully from that place in defence of the lives, the fortunes, and the liberties of the Roman people, ſo lamentably expoſed to the ſcorn of ſycophants and traitors. The deaths of the reſt, ſays an hiſtorian of that age, cauſed only a private and particular ſorrow; but Cicero's an univerſal one. It was a triumph over the republic itſelf; and ſeemed to confirm and eſtabliſh the perpetual ſlavery of Rome.

A modern writer *, however, is of opinion, that "poſterity has been too much ſeduced by the name of Cicero, and that better citizens were ſacrificed to the jealouſy of the triumvirs without exciting ſo much indignation. If we take an impartial ſurvey of Cicero's conduct and principles, avowed in his own epiſtolary correſpondence, and trace him through all the labyrinths of his contradictory letters, we ſhall find more to blame than to admire; and diſcover, that the deſire of advancing his fortunes, and making himſelf a name, were, from his outſet in life, the only objects he had in view. The good of his country, and the dictates of ſtern ſteady virtue, were not, as in Brutus and Cato, the conſtant ſprings of his actions. The misfortunes that befel him after his conſulſhip, developed his character, and ſhowed him in his true colours; from that time to his death, puſillanimity, irreſolution, and unworthy repining, tainted his judgment, and perplexed every ſtep he wiſhed to take. He flattered Pompey and cringed to Cæſar, while in his private letters he abuſed them both alternately. He acknowledges in a letter to his friend, the time-ſerving Atticus, that, although he was at preſent determined to ſupport the cauſe of Rome and liberty, and to bear misfortune like a philoſopher, there was one thing which would gain him over to the triumvirs, and that was their procuring for him the vacant augurſhip; ſo pitiful was the bribe to which he would have ſacrificed his honour, his opinion, and the commonwealth. By his wavering imprudent conduct, he contributed greatly towards its deſtruction. After reproaching the conſpirators for leaving him out of the ſecret, and loading them with the moſt flattering compliments on their delivering Rome from Cæſar's tyranny, he calls Caſca an *aſſaſſin*, to pay his court to the boy Octavius, by whom he was completely duped. His praiſes of this triumvir are in the higheſt ſtrain of panegyric. Mark Antony well knew, that the virulent abuſe which Cicero was continually pouring out againſt him, was not an effuſion of patriotic zeal or virtuous indignation, but merely the ebullitions of perſonal hatred. He therefore cauſed Cicero to be killed, as an angry man that has been ſtung, ſtamps on a venomous animal that comes within reach of his foot. The cloak he threw over the body of Brutus, and the ſpeech he pronounced at the ſight of that hero when dead, differ widely from the treatment he gave the remains of Cicero; and ſhow, that he made a diſtinction between a Roman who oppoſed him from political motives, and one whoſe enmity aroſe from private pique.

* Swinburne's Travels in Sicily, vol. ii. 502.

Cicero's death happened on the 7th of December, in the 64th year of his age, about ten days from the ſettlement of the firſt triumvirate; and with him expired the ſhort empire of eloquence among the Romans. As an orator he is thus characterized by Dr Blair: "In all his orations his art is conſpicuous. He begins commonly with a regular exordium, and with much addreſs prepoſſeſſes the hearers, and ſtudies to gain their affections. His method is clear, and his arguments are arranged with exact propriety. In a ſuperior clearneſs of method, he has an advantage over Demoſthenes. Every thing appears in its proper place. He never tries to move till he has attempted to convince; and in moving, particularly the ſofter paſſions, he is highly ſucceſsful. No one ever knew the force of words better than Cicero. He rolls them along with the greateſt beauty and magnificence; and in the ſtructure of his ſentences is eminently curious and exact. He is always full and flowing, never abrupt. He amplifies every thing; yet though his manner is generally diffuſe, it is often happily varied and accommodated to the ſubject. When

an important public object roused his mind, and demanded indignation and force, he departs considerably from that loose and declamatory manner to which he at other times is addicted, and becomes very forcible and vehement. This great orator, however, is not without his defects. In most of his orations there is too much art, even carried to a degree of ostentation. He seems often desirous of obtaining admiration rather than of operating conviction. He is sometimes, therefore, showy rather than solid, and diffuse where he ought to have been urgent. His sentences are always round and sonorous. They cannot be accused of monotony, since they possess variety of cadence; but from too great a fondness for magnificence, he is on some occasions deficient in strength. Though the services which he had performed to his country were very considerable, yet he is too much his own panegyrist. Ancient manners, which imposed fewer restraints on the side of decorum, may in some degree excuse, but cannot entirely justify, his vanity."

CICHORIUM, Succory. See Botany *Index*.

CICINDELA, the Sparkler, in *Zoology*, a genus of insects belonging to the order of coleoptera. See Entomology *Index*.

CICISBEO, an Italian term, which in its etymology signifies a *whisperer;* a term bestowed in Italy both on lovers, and those who to outward appearance act as such, waiting on married ladies with as much attention and respect as if they were their lovers. This Italian custom has been spoken of very reproachfully by some writers: Mr Baretti has taken great pains to vindicate it. He ascribes it to a spirit of gallantry, derived from the ages of chivalry, and much heightened and refined by the revival of the Platonic philosophy in Italy, about the thirteenth century; and by the verses of Petrarch in compliment to the beautiful Laura, and his numerous imitators.

CICLUT, or Cicluch, a strong frontier town of Dalmatia, situated on the river Narentha, in E. Long. 18. 22. N. Lat. 43. 29. It is surrounded with walls built in the ancient manner, and was taken by the Venetians from the Turks in 1694.

CICONES, a people of Thrace near the Hebrus. Ulysses at his return from Troy conquered them, and plundered their chief city Ismarus. They tore to pieces Orpheus for his obscene indulgencies.

CICUTA, properly signifies a hollow intercepted between two knots, of the stalks or reeds of which the ancient shepherds used to make their pipes. It is now, however, generally used to signify the water-hemlock, and also the common sort; but Linnæus has described the latter under the old name of Conium. See that article.

There are three species of water-hemlock; the virosa, the bulbifera, and the maculata. Of these the first is the only one remarkable, and that for the poisonous qualities of its roots, which have been often known to destroy children who ate them for parsnips.

Cicuta is also used, chiefly among the ancients, for the juice or liquor expressed from the above plant, being the common poison wherewith the state criminals at Athens were put to death: Though some have suggested, that the poisonous draught to which the Athenians doomed their criminals was an inspissated juice compounded of the juice of *cicuta* and some other corrosive herbs.

Socrates drank the *cicuta*.—Plato, in his dialogue on the immortality of the soul, observes, that "The executioner advised Socrates not to talk, for fear of causing the *cicuta* to operate too slowly." M. Petit, in his *Observationes Miscellaneæ*, remarks, that this advice was not given by the executioner out of humanity, but to save the *cicuta;* for he was only allowed so much poison per ann. which, if he exceeded, he was to furnish at his own expence. This construction is confirmed by a passage in Plutarch: the executioner who administered the *cicuta* to Phocion, not having enough, Phocion gave him money to buy more; observing by the way, "that it was odd enough, that at Athens a man must pay for every thing, even for his own death."

CID, Roderigo Dias le, a Castilian officer, who was very successful against the Moors, under Ferdinand II. king of Castile; but whose name would hardly have been remembered, if Corneille had not made his passion for Chimene the subject of an admired tragedy, founded on a simple but affecting incident. The Cid is desperately in love with Chimene, daughter of the count de Gomes; but he is at variance with the count, and being challenged by him, kills him in a duel. The conflict between love and honour in the breast of Chimene, who at length pardons and marries the Cid, forms the beauty of the piece. He died in 1098.

CIDARIS, in antiquity, the mitre used by the Jewish high-priests. The Rabbins say, that the bonnet used by priests in general was made of a piece of linen cloth 16 yards long, which covered their heads like a helmet or turban; and they allow no other difference between the high-priest's bonnet and that of other priests, than that the one is flatter, and more in the form of a turban; whereas that worn by ordinary priests rose something more in a point.

CIGNANI, Carlo, an Italian painter, was born at Bologna in 1628: and was the disciple of Albani. He was esteemed by Pope Clement XI. who nominated him prince of the academy of Bologna, and loaded him with favours. Cignani died at Forli in 1719. The cupola of la Madona del Fuoco at Forli, in which he represented Paradise, is an admirable work. His principal pictures are at Rome, Bologna, and Forli.

CIGOLI, or Civoli, the painter. See Civoli.

CILIA, the Eye-lashes. See Anatomy *Index*.

CILIATED leaf, among botanical writers, one surrounded with parallel filaments somewhat like the hairs of the eyelids.

CILICIA, an ancient kingdom of Asia, lying between the 36th and 40th degree of north latitude: bounded on the east by Syria, or rather by Mount Amanus, which separates it from that kingdom; by Pamphylia on the west; by Isauria, Cappadocia, and Armenia Minor, on the north; and by the Mediterranean sea on the south. It is so surrounded by steep and craggy mountains, chiefly Taurus and Amanus, that it may be defended by a handful of resolute men against a numerous army, there being but three narrow passes leading into it, commonly called *Pylæ Ciliciæ*, or the gates of Cilicia; one on the side of Cappadocia,

padocia, called the *Pafs of Mount Taurus;* and the other two called the *Pafs of Mount Amanus*, and the *Pafs of Syria.* The whole country was divided by the ancients into Cilicia Afpera, and Cilicia Campeftris; the former called by the Greeks *Trachæa* or *Stony*, from its abounding fo with ftones; and to this day the whole province is called by the Turks, *Tas Wileieth*, or *the Stony Province.*

According to Jofephus, Cilicia was firft peopled by Tarfhifh the fon of Javan, and his defcendants, whence the whole country was named *Tarfus.* The ancient inhabitants were in procefs of time driven out by a colony of Phœnicians, who under the conduct of *Cilix*, firft fettled in the ifland of Cyprus, and from thence paffed into the country which, from their leader, they called *Cilicia.* Afterwards feveral other colonies from different nations fettled in this kingdom, particularly from Syria and Greece; whence the Cilicians in fome places ufed the Greek tongue, in others the Syriac; but the former greatly corrupted by the Perfian, the predominant language of the country being a dialect of that tongue. We find no mention of the kings of Cilicia after their fettlement in that country, till the time of Cyrus, to whom they voluntarily fubmitted, continuing fubject to the Perfians till the overthrow of that empire; but governed to the time of Artaxerxes Mnemon, by kings of their own nation. After the downfal of the Perfian empire, Cilicia became a province of that of Macedon; and, on the death of Alexander, fell to the fhare of Seleucus, and continued under his defcendants till it was reduced to a Roman province by Pompey. As a proconfular province, it was firft governed by Appius Claudius Pulcher, and after him by Cicero, who reduced feveral ftrong holds on Mount Amanus, in which fome Cilicians had fortified themfelves, and held out againft his predeceffor. It was on this occafion that the divifion, formerly mentioned, into Trachæa and Campeftris, took place. The latter became a Roman province; but the former was governed by kings appointed by the Romans, till the reign of Vefpafian, when the family of Tracondementus being extinct, this part alfo made a province of the empire, and the whole divided into Cilicia *Prima*, Cilicia *Secunda*, and Ifauria; the firft took in all Cilicia Campeftris, the fecond the coaft of Cilicia Trachæa, and the laft the inland parts of the fame divifion. It is now a province of Afiatic Turkey; and is called *Caramania*, having been the laft province of the Caramanian kingdom which held out againft the Ottoman race.

That part of Cilicia called by the ancients *Cilicia Campeftris*, was, if we believe Ammianus Marcellinus, one of the moft fruitful countries of Afia; but the weftern part equally barren, though famous, even to this day, for an excellent breed of horfes, of which 600 are yearly fent to Conftantinople for the fpecial ufe of the Grand Signior. The air in the inland parts is reckoned wholefome; but that on the fea-coaft very dangerous, efpecially to ftrangers.

The rivers of any note are the Pyramus, which rifes on the north fide of Mount Taurus, and empties itfelf into the Mediterranean between Iffus and Magaraffus; and the Cydnus, which fprings from the Antitaurus, paffes through Tarfus, and difembogues itfelf into the Mediterranean. This laft is famous for the rapidity of its ftream, and the coldnefs of its waters, which proved very dangerous to Alexander the Great.

The Cilicians, if we believe the Greek and Roman hiftorians, were a rough unpolifhed race of people, unfair in their dealings, cruel, and liars even to a proverb. In the Roman times they became greatly addicted to piracy. They firft began, in the time of the Mithridatic war, to infeft the neighbouring provinces along with the Pamphylians; and, being emboldened with fuccefs, they foon ventured as far as the coafts of Greece and Italy, where they took a vaft number of flaves, whom they fold to the Cypriots and the kings of Egypt and Syria. They were, however, at laft defeated and entirely fuppreffed by Pompey the Great. See (*Hiftory of*) ROME.

CILICIA Terra, in the natural hiftory of the ancients, a bituminous fubftance, improperly called an earth, which, by boiling, became tough like bird-lime, and was ufed inftead of that fubftance to cover the ftocks of the vines for preferving them from the worms. It probably ferved in this office in a fort of double capacity, driving away thefe animals by its naufeous fmell, and entangling them if they chanced to get amongft it.

CILICIUM, in Hebrew antiquity, a fort of habit made of coarfe ftuff, formerly in ufe among the Jews in times of mourning and diftrefs. It is the fame with what the Septuagint and Hebrew verfions called fackcloth.

CILLEY, an ancient and famous town of Germany, in the circle of Auftria, and in Stiria. It is the capital of a country of the fame name, and is fituated on the river Saan, in E. Long. 15. 15. N. Lat. 46. 31.

CILURNUM, (Notitia); a town of Britain: thought to be Collerton, or Collerford, in Northumberland; but Walwic, or Scilicefter, according to Camden.

CIMA, or SIMA, in *Architecture*, the fame with Cymatium, or OGEE.

CIAMBUE, GIOVANI, a renowned painter, born at Florence in 1240, and the firft who revived the art of painting in Italy. He painted, according to the cuftom of thofe times, in frefco and in diftemper; colours in oil not being then found out. He excelled in architecture as well as in painting; and was concerned in the fabric of Sancta Maria del Fior at Florence, during which employment he died at the age of 60, and left many difciples.

CIMBRI, an ancient Celtic nation, inhabiting the northern parts of Germany. They are faid to have been defcended from the Afiatic *Cimmerians*, and to have taken the name of *Cimbri* when they changed their old habitations. When they firft became remarkable, they inhabited chiefly the peninfula, now called *Jutland*, and by the ancients *Cimbrica Cherfonefus.* About 113 years before Chrift, they left their peninfula with their wives and children; and joining the Teutones, a neighbouring nation, took their journey fouthward in queft of a better country. They firft fell upon the Boii, a Gaulifh nation, fituated near the Hercynian foreft. Here they were repulfed, and obliged to move nearer the Roman provinces. The republic being then alarmed at the approach of fuch multitudes of barbarians, fent an army againft them

under.

Cimbri. under the conſul Papirius Carbo. On the approach of the Roman army, the Cimbri made propoſals of peace. The conſul pretended to accept of it; but having thrown them into a diſadvantageous ſituation, treacherouſly attacked their camp. His perfidy was rewarded as it deſerved; the Cimbri ran to arms, and not only repulſed the Romans, but, attacking them in their turn, utterly defeated them, and obliged the ſhattered remains of their forces to conceal themſelves in the neighbouring foreſts. After this victory the Cimbri entered Tranſalpine Gaul, which they quickly filled with ſlaughter and deſolation. Here they continued five or ſix years, when another Roman army under the conſul Silanus marched againſt them. This general met with no better ſucceſs than Carbo had done. His army was routed at the firſt onſet; in conſequence of which, all Narbonne Gaul was expoſed at once to the ravages of theſe barbarians.

About 105 years before Chriſt, the Cimbri began to threaten the Roman empire itſelf with deſtruction. The Gauls marched from all parts with a deſign to join them, and to invade Italy. The Roman army was commanded by the proconſul Cæpio, and the conſul Mallius; but as theſe two commanders could not agree, they were adviſed to ſeparate, and divide their forces. This advice proved the ruin of the whole army. The Cimbri immediately fell upon a ſtrong detachment of the conſular army commanded by M. Aurelius Scaurus, which they cut off to a man, and made Scaurus himſelf priſoner. Mallius being greatly intimidated by this defeat, deſired a reconciliation with Cæpio, but was haughtily refuſed. He moved nearer the conſul, however, with his army, that the enemy might not be defeated without his having a ſhare in the action. The Cimbri, by this movement, imagining the commanders had made up their quarrel, ſent ambaſſadors to Mallius with propoſals of peace. As they could not help going through Cæpio's camp, he ordered them to be brought before him; but finding they were empowered to treat only with Mallius, he could ſcarce be reſtrained from putting them to death. His troops, however, forced him to confer with Mallius about the propoſals ſent by the barbarians: but as Cæpio went to the conſul's tent againſt his will, ſo he oppoſed him in every thing; contradicted with great obſtinacy, and inſulted him in the groſſeſt manner. The deputies on their return acquainted their countrymen that the miſunderſtanding between the Roman commanders ſtill ſubſiſted; upon which the Cimbri attacked the camp of Cæpio, and the Gauls that of Mallius. Both were forced, and the Romans ſlaughtered without mercy. Eighty thouſand citizens and allies of Rome, with 40,000 ſervants and ſutlers, periſhed on that fatal day. In ſhort, of the two Roman armies only 10 men, with the two generals, eſcaped to carry the news of ſo dreadful a defeat. The conquerors deſtroyed all the ſpoil, purſuant to a vow they had made before the battle. The gold and ſilver they threw into the Rhone, drowned the horſes they had taken, and put to death all the priſoners.

The Romans were thrown into the utmoſt conſternation on the news of ſo terrible an overthrow. They ſaw themſelves threatened with a deluge of Cimbri and Gauls, numerous enough to overrun the whole country. They did not, however, deſpair. A new army was raiſed with incredible expedition; no citizen whatever who was fit to bear arms being exempted. On this occaſion alſo, fencing-maſters were firſt introduced into the Roman camp; by which means the ſoldiers were ſoon rendered in a manner invincible. Marius, who was at that time in high reputation on account of his victories in Africa, was choſen commander, and waited for the Cimbri in Tranſalpine Gaul: but they had reſolved to enter Italy by two different ways; the Cimbri over the eaſtern, and the Teutones and other allies over the weſtern Alps. The Roman general, therefore, marched to oppoſe the latter, and defeated the Ambrones and Teutones with great ſlaughter *. The Cimbri, in the mean time, entered Italy, and ſtruck the whole country with terror. Catullus and Sylla attempted to oppoſe them; but their ſoldiers were ſo intimidated by the fierce countenances and terrible appearance of theſe barbarians, that nothing could prevent their flying before them. The city of Rome was now totally defenceleſs; and, had the Cimbri only marched briſkly forwards they had undoubtedly become maſters of it; but they waited in expectation of being joined by their allies the Ambrones and Teutones, not having heard of their defeat by Marius, till the ſenate had time to recal him to the defence of his country. By their order he joined his army to that of Catullus and Sylla; and upon that union was declared commander in chief. The Roman army conſiſted of 52,300 men. The cavalry of the Cimbri were no more than 15,000, but their foot ſeemed innumerable; for, being drawn up in a ſquare, they are ſaid to have covered 30 furlongs. The Cimbri attacked the Romans with the utmoſt fury; but, being unaccuſtomed to bear the heats of Italy, they ſoon began to loſe their ſtrength, and were eaſily overcome. But they had put it out of their power to fly; for, that they might keep their ranks the better, they had, like true barbarians, tied themſelves together with cords faſtened to their belts, ſo that the Romans made a moſt terrible havoc of them. The battle was therefore ſoon over, and the whole day employed only in the moſt terrible butchery. An hundred and twenty thouſand were killed on the field of battle, and 60,000 taken priſoners. The victorious Romans then marched to the enemy's camp, where they had a new battle to fight with the women, whom they found more fierce than even their huſbands had been. From their carts and waggons, which formed a kind of fortification, they diſcharged ſhowers of darts and arrows on friends and foes without diſtinction. They firſt ſuffocated their children in their arms, and then put an end to their own lives. The greateſt part of them hanged themſelves on trees. One was found hanging at a cart with two of her children at her heels. Many of the men, for want of trees and ſtakes, tied ſtrings in running knots about their necks, and faſtened them to the tails of their horſes, and the horns and feet of their oxen, in order to ſtrangle themſelves that way; and thus the whole multitude was deſtroyed.

* See *Ambrones* and *Teutones*.

The country of the Cimbri, which, after this terrible cataſtrophe, was left a mere deſert, was again peopled by the Scythians; who being driven by Pompey out of that vaſt ſpace between the Euxine and the Caſpian ſea, marched towards the north and weſt of Europe,

Europe, ſubduing all the nations they met with in their way. They conquered Ruſſia, Saxony, Weſtphalia, and other countries as far as Finland, Norway, and Sweden. It is pretended that Wodin their leader, traverſed ſo many countries, and endeavoured to ſubdue them, only with a view to excite the people againſt the Romans; and that the ſpirit of animoſity which he had excited operated ſo powerfully after his death, that the northern nations combined to attack it, and never ceaſed their incurſions till it was totally ſubverted.

CIMEX, or Bug, in *Zoology*, a genus of inſects belonging to the order of hemiptera. See Entomology *Index*.

The methods of expelling houſe bugs are various, as oil of turpentine, the ſmoke of corn-mint, of narrow-leaved wild creſs, of herb-robert, of the reddiſh agaric, of muſtard, Guinea pepper, peats, or turf, &c. See alſo Bug and Cimicifuga.

CIMICIFUGA. See Botany *Index*.

The cimicifuga fœtida has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away thoſe inſects; and the botaniſts of thoſe parts of Europe which are infeſted with them have long deſired to naturaliſe it in their ſeveral countries. Gmelin mentions that in Siberia the natives alſo uſe it as an evacuant in dropſy, and that its effects are violently emetic and draſtic.

CIMMERII, anciently a people near the Palus Mæotis. They invaded Aſia Minor 1284 years before Chriſt, and ſeized upon the kingdom of Cyaxares. After they had been maſters of the country for 28 years, they were driven back by Alyates king of Lydia. The name alſo of another nation on the weſtern coaſt of Italy. The country which they inhabited was ſuppoſed to be ſo gloomy, that to expreſs a great obſcurity, the expreſſion of *Cimmerian darkneſs* has proverbially been uſed; and Homer, according to Plutarch, drew his images of hell and Pluto from the gloomy and diſmal country where they dwelt.

CIMMERIUM, in *Ancient Geography*, a town at the mouth of the Palus Mæotis; from which the Boſphorus Cimmerius is named; that ſtrait which joins the Euxine and the Palus Mæotis. *Cimmerii* was the name of the people (Homer): and here ſtood the Promontorium Cimmerium (Ptolemy); and hence probably the modern appellation *Crim*.

Cimmerium, in *Ancient Geography*, a place near Baiæ, in Campania, where formerly ſtood the cave of the ſibyl. The people were called *Cimmerii*, who living in ſubterraneous habitations, from which they iſſued in the night to commit robberies and other acts of violence, never ſaw the light of the ſun (Homer). To give a natural account of this fable, Feſtus ſays, there was a valley ſurrounded with a pretty high ridge, which precluded the morning and evening ſun.

CIMOLIA terra, in *Natural Hiſtory*, a name applied by the ancients to an earth, at one time much employed in medicine; but which later ages have ſuppoſed to be no other than our tobacco-pipe clay and fullers earth.

The cimolia terra of the ancients was found in ſeveral of the iſlands of the Archipelago, particularly in the iſland of Cimolus, from whence it has its name. It was uſed with great ſucceſs in the eryſipelas, inflammations, and the like, being applied by way of cataplaſm to the part. They alſo uſed, as we do, what we call *cimolia*, or fullers earth, for the cleanſing of clothes. This earth of the ancients, though ſo long diſregarded, and by many ſuppoſed to be loſt, is yet very plentiful in Argentiere (the ancient Cimolus), Sphanto, and many of thoſe iſlands. It is a marl of a lax and crumbly texture, and a pure bright white colour, very ſoft to the touch. It adheres firmly to the tongue, and, if thrown into water, raiſes a little hiſſing and ebullition, and moulders to a fine powder. It makes a conſiderable effervеſcence with acids, and ſuffers no change of colour in the fire. Theſe are the characters of what the ancients called ſimply *terra cimolia*; but beſides this, they had from the ſame place another earth which they called by the ſame general name, but diſtinguiſhed by the epithet purple, *purpureſcens*. This they deſcribed to be fattiſh, cold to the touch, of a mixed purple colour, and nearly as hard as a ſtone. And this was evidently the ſubſtance we call *ſteatites*, or the *ſoap-rock*, common in Cornwall, and alſo in the iſland of Argentiere, or Cimolus.

CIMOLIA Alba, the officinal name of the earth of which we now make tobacco-pipes. Its diſtinguiſhing characters are, that it is a denſe, compact, heavy earth, of a dull white colour, and very cloſe texture; it will not eaſily break between the fingers, and ſlightly ſtains the ſkin in handling. It adheres firmly to the tongue; melts very ſlowly in the mouth, and is not readily diffuſible in water. It is found in many places. That of the iſle of Wight is much eſteemed for its colour. Great plenty of it is found near Pole in Dorſetſhire, and near Wedenſbury in Staffordſhire.

CIMOLIA Nigra, is of a dark lead colour, hard, dry, and heavy: of a ſmooth compact texture, and not viſcid: it does not colour the hands; crumbles when dry; adheres to the tongue; diffuſes ſlowly in water; and is not acted upon by acids. It burns perfectly white, and acquires a conſiderable hardneſs. The chief pits for this clay are near Northampton, where it is uſed in the manufacture of tobacco-pipes. It is alſo mixed with the critche clay of Derbyſhire, in the proportion of one part to three, in the manufacture of the hard reddiſh brown ware.

CIMOLUS, in *Ancient Geography*, one of the Cyclades, now called *Argentiere*.

CIMON, an Athenian, ſon of Miltiades and Hegiſipyle. He was famous for his debaucheries in his youth, and the reformation of his morals when arrived to years of diſcretion. He behaved with great courage at the battle of Salamis, and rendered himſelf popular by his munificence and valour. He defeated the Perſian fleet, took 200 ſhips, and totally routed their land army, the very ſame day, A. U. C. 284. The money that he had obtained by his victories was not applied for his own private uſe, but with it he fortified and embelliſhed the city. He ſome time after loſt all his popularity, and was baniſhed by the Athenians, who declared war againſt the Lacedæmonians. He was recalled from his exile, and at his return he made a reconciliation between Lacedæmon and his countrymen. He was afterwards appointed to carry on the war againſt Perſia in Egypt and Cyprus, with a fleet of 200 ſhips, and on the coaſt of Aſia he gave battle to the enemy, and totally ruined their fleet, A. U. C. 304.

He died as he was besieging the town of Citium in Cyprus. He may be called the last of the Greeks whose spirit and boldness defeated the armies of the barbarians. He was such an inveterate enemy to the Persian power, that he formed a plan of totally destroying it; and in his wars he had so reduced the Persians, that they promised in a treaty not to pass the Chelidonian islands with their fleet, or to approach within a day's journey of the Grecian seas. See ATTICA.

CINALOA, a province of Mexico in South America, abounding in corn, cattle, and cotton; and rendered extremely picturesque by a number of beautiful cascades of clear water that fall down from the mountains. It lies on the eastern coast of the sea of California, and has a town of the same name, situated in N. Lat. 26°.

CINARA, the ARTICHOKE. See CYNARA, BOTANY *Index*.

CINCHONA. See BOTANY *Index*.

According to some, the Peruvians learned the use of the bark of this tree by observing certain animals affected with intermittents instinctively led to it; while others say, that a Peruvian having an ague, was cured by happening to drink of a pool which, from some trees having fallen into it, tasted of cinchona; and its use in gangrene is said to have originated from its curing one in an aguish patient. About the year 1640, the lady of the Spanish viceroy, the Comitissa del Cinchon, was cured by the bark, which has therefore been called *Cortex* or *Pulvis Comitissæ Cinchonæ*, *Chinachina*, or *Chinchina*, *Kinakina* or *Kinkina*, *Quinaquina* or *Quinquina*; and from the interest which the cardinal de Lugo and the Jesuit fathers took in its distribution, it has been called *Cortex* or *Pulvis Cardinalis de Lugo*, *Jesuiticus*, *Patrum*, *&c.*

On its first introduction into Europe, it was reprobated by many eminent physicians; and at different periods long after, it was considered a dangerous remedy; but its character, in process of time, became very universally established. For a number of years, the bark which is rolled up into short thick quills, with a rough coat, and a bright cinnamon colour in the inside, which broke brittle, and was found, had an aromatic flavour, a bitterish astringent taste, with a degree of aromatic warmth, was esteemed the best; though some esteemed the large pieces as of equal goodness. During the time of the late war, in the year 1779, the Hussar frigate took a Spanish ship, loaded principally with Peruvian bark, which was much larger, thicker, and of a deeper reddish colour than the bark in common use. Soon after it was brought to London, it was tried in St Bartholomew's hospital, and in other hospitals about town, and was said to be more efficacious than the quill bark. This put practitioners upon examining into the history of the bark, on trying experiments with it, and of making comparative trials of its effects with those of the bark in common use on patients labouring under intermittent complaints. In July 1782, Dr William Saunders published an account of this red bark, in which he says that the small quill bark used in England is either the bark of young trees, or of the twigs or branches of the old ones; and that the large bark, called the *red bark* from the deep colour, is the bark of the trunk of the old trees; and he mentions a Mr Arnot, who himself gathered the bark from the trees in Peru; and Monf. Condamine, who gives an account of the tree in the Memoirs of the Academy of Sciences at Paris in the year 1738; who both say, that taking the bark from an old tree effectually kills it; but that most of the young trees which are barked recover, and continue healthy; and that for these reasons the Spaniards now barked the younger trees for foreign markets, though they still imported into Spain some of the bark of the old trees, which they esteemed to be much more efficacious than what was got from the young. From these accounts Dr Saunders concludes, that the large red bark brought to London in the year 1779 was of the same kind as that used by Sydenham and Morton, as it answers to the description of the bark used in their time, which is given by Dale and other writers on the materia medica, who were their contemporaries. Dr Saunders says, that it is not only stronger and more resinous, but likewise more efficacious and certain in its effect, than the common bark, and had cured many agues after the other had failed.

A species of cinchona has also been discovered in the West India islands, particularly in Jamaica. It is accurately described by Dr Wright, under the title of *Cinchona Jamaicensis*, in a paper published in the Philosophical Transactions. In Jamaica it is called the *sea-side beech*, and grows from 20 to 40 feet high. The white, furrowed, thick outer bark is not used; the dark brown inner bark has the common flavour, with a mixed kind of a taste, at first of horse radish and ginger, becoming at last bitter and astringent. It seems to give out more extractive matter than the cinchona officinalis. Some of it was imported from St Lucia, in consequence of its having been used with advantage in the army and navy during the last war; and it has lately been treated of at considerable length by Dr Kentish, under the title of *St Lucia bark*. The fresh bark is found to be considerably emetic and cathartic, which properties it is said to lose on drying.

The pale and the red are chiefly in use in Britain. The pale is brought to us in pieces of different sizes, either flat or quilled, and the powder is rather of a lighter colour than that of cinnamon. The red is generally in much larger, thicker, flattish pieces, but sometimes also in the form of quills, and its powder is reddish like that of Armenian bole. As already observed, it is much more resinous, and possesses the sensible qualities of the cinchona in a much higher degree than the other sorts; and the more nearly the other kinds resemble the red bark, the better they are now considered. The red bark is heavy, firm, sound, and dry; friable between the teeth; does not separate into fibres; and breaks, not shivery, but short, close, and smooth. It has three layers; the outer is thin, rugged, of a reddish brown colour, but frequently covered with mossy matter; the middle is thicker, more compact, darker coloured, very resinous, brittle, and yields first to the pestle; the inmost is more woody, fibrous, and of a brighter red.

The Peruvian bark yields its virtues both to cold and boiling water; but the decoction is thicker, gives out its taste more readily, and forms an ink with a chalybeate more suddenly than the fresh cold infusion. This infusion, however, contains at least as much extractive

tractive matter, but more in a ftate of folution; and its colour, on ftanding fome time with the chalybeate, becomes darker, while that of the decoction becomes more faint. When they are of a certain age, the addition of a chalybeate renders them green; and when this is the cafe, they are found to be in a ftate of fermentation, and effete. Mild or cauftic alkalies, or lime, precipitate the extractive matter, which in the cafe of the cauftic alkali is rediffolved by a farther addition of the alkali. Lime-water precipitates lefs from a frefh infufion than from a frefh decoction; and in the precipitate of this laft fome mild earth is perceptible. The infufion is by age reduced to the fame ftate with the frefh decoction, and then they depofite nearly an equal quantity of mild earth and extractive matter; fo that lime-water, as well as a chalybeate, may be ufed as a teft of the relative ftrength, and perifhable nature of the different preparations, and of different barks. Accordingly cold infufions are found by experiments to be lefs perifhable than decoctions; infufions and decoctions of the red bark than thofe of the pale; thofe of the red bark, however, are found by length of time to feparate more mild earth with the lime-water, and more extractive matter. Lime-water, as precipitating the extractive matter, appears an equally improper and difagreeable menftruum.

Water is found to fufpend the refin by means of much lefs gum than has been fuppofed. Alcohol extracts a bitternefs, but no aftringency, from a refiduum of 20 affufions of cold water; and water extracts aftringency, but no bitternefs from the refiduum of as many affufions of alcohol. The refiduum in both is infipid.

From many ingenious experiments made on the Peruvian bark by Dr Irvine, which are now publifhed in a differtation which gained the prize-medal given by the Harveian Society of Edinburgh for 1783, the power of different menftrua, as acting upon Peruvian bark, is afcertained with greater accuracy than had before been done; and it appears, that with refpect to comparative power, the fluids after mentioned act in the order in which they are placed.

Dulcified fpirit of vitriol.
Cauftic ley.
French brandy.
Rhenifh wine.
Soft water.
Vinegar and water.
Dulcified fpirit of nitre.
Mild volatile alkali.
Alcohol.
Mild vegetable alkali.
Lime-water.

The antifeptic powers of vinegar and bark united are double the fum of thofe taken feparately. The aftringent power of the bark is increafed by fulphuric acid; and the bitter tafte is deftroyed by it.

The officinal preparations of the bark are, 1. The powder: of this, the firft parcel that paffes the fieve being the moft refinous and brittle layer, is the ftrongeft. 2. The extract: the watery and fpirituous extract conjoined form the moft proper preparations of this kind. 3. The refin: this cannot perhaps be obtained feparate from the gummy part, nor would it be defirable. 4. Spirituous tincture: this is beft made with proof-fpirit. 5. The decoction: this preparation, though frequently employed, is yet in many refpects inferior even to a fimple watery infufion.

The beft form is that of powder, in which the conftituent parts are in the moft effectual proportion. The cold infufion, which can be made in a few minutes by agitation, the fpirituous tincture; and the extract, are likewife proper in this refpect. For covering the tafte, different patients require different vehicles; liquorice, aromatics, acids, port wine, fmall beer, porter, milk, butter-milk, &c. are frequently employed; and thofe who diflike the tafte of the bark itfelf, vary in their accounts to which the preference is due; or it may be given in form of electuary with currant jelly, or with brandy or rum.

Practitioners have differed much with regard to the mode of operation of the Peruvian bark. Some have afcribed its virtues entirely to a ftimulant power. But while the ftrongeft and moft permanent ftimuli have by no means the fame effect with bark in the cure of difeafes, the bark itfelf fhows hardly any ftimulant power, either from its action on the ftomach, or on other fenfible parts to which it is applied. From its action on dead animal fibres, there can be no doubt of its being a powerful aftringent; and from its good effects in certain cafes of difeafe, there is reafon to prefume that it is a ftill more powerful tonic. To this tonic power fome think that its action as an antifeptic is to be entirely attributed; but that, independently of this, it has a very powerful effect in refifting the feptic procefs to which animal fubftances are naturally fubjected, appears beyond all difpute, from its effects in refifting putrefaction, not only in dead animal folids, but even in animal fluids, when entirely detached from the living body.

But although it be admited that the Peruvian bark acts powerfully as an aftringent, as a tonic, and as an antifeptic; yet thefe principles will by no means explain all the effects derived from it in the cure of difeafes. And accordingly, from no artificial combination in which thefe powers are combined, or in which they exift even to a higher degree, can the good confequences refulting from Peruvian bark be obtained. Many practitioners, therefore, are difpofed to view it as a fpecific. If by a fpecific we mean an infallible remedy, it cannot indeed be confidered as entitled to that appellation; but in as far as it is a very powerful remedy, of the operation of which no fatisfactory explanation has yet been given, it may with great propriety be denominated a fpecific. But whatever its mode of operation may be, there can be no doubt that it is daily employed with fuccefs in a great variety of different difeafes.

It was firft introduced, as has already been faid, for the cure of intermittent fevers; and in thefe, when properly exhibited, it rarely fails of fuccefs. Practitioners, however, have differed with regard to the beft mode of exhibition; fome prefer giving it juft before the fit, fome during the fit, others immediately after it. Some again, order it in the quantity of an ounce, between the fits; the dofe being the more frequent and larger according to the frequency of the fits; and this mode of exhibition, although it may perhaps fometimes lead to the employment of more bark than is

is neceffary, we confider as upon the whole preferable, from being beft fuited to moft ftomachs. The requifite quantity is very different in different cafes; and in many vernal intermittents it feems even hardly neceffary.

It often pukes or purges, and fometimes oppreffes the ftomach. Thefe, or any other effects that may take place, are to be counteracted by remedies particularly appropriated to them. Thus, vomiting is often reftrained by exhibiting it in wine; loofenefs, by combining it with opium; and oppreffion at ftomach, by the addition of an aromatic. But unlefs for obviating particular occurrences, it is more fuccefsful when exhibited in its fimple ftate than with any addition; and there feems to be little ground for believing that its powers are increafed by crude fal ammoniac, or any other additions which have frequently been made.

It is now given, from the very commencement of the difeafe, without previous evacuations, which, with the delay of the bark, or under dofes of it, by retarding the cure, often feem to induce abdominal inflammation, fchirrus, jaundice, hectic, dropfy, &c. fymptoms formerly imputed to the premature or intemperate ufe of the bark, but which are beft obviated by its early and large ufe. It is to be continued not only till the paroxyfms ceafe, but till the natural appetite, ftrength, and complexion, return. Its ufe is then to be gradually left off, and repeated at proper intervals to fecure againft a relapfe; to which, however unaccountable, independently of the recovery of vigour, there often feems to be a peculiar difpofition, and efpecially when the wind blows from the eaft. Although, however, moft evacuants conjoined with the Peruvian bark in intermittents are rather prejudicial than otherwife, yet it is of advantage, previous to its ufe, to empty the alimentary canal, particularly the ftomach; and on this account good effects are often obtained from premifing an emetic.

It is a medicine which feems not only fuited to both formed and latent intermittents, but to that ftate of fibre on which all rigidly periodical difeafes feem to depend; as periodical pain, inflammation, hemorrhagy, fpafm, cough, lofs of external fenfe, &c.

Bark is now ufed by fome in all continued fevers: at the fame time attention is paid to keep the bowels clean, and to promote when neceffary the evacuation of redundant bile; always, however, fo as to weaken as little as poffible.

In confluent fmall-pox, it promotes languid eruption and fuppuration, diminifhes the fever through the whole courfe of it, and prevents or corrects putrefcence and gangrene.

In gangrenous fore throats it is much ufed, as it is externally and internally in every fpecies of gangrene.

In contagious dyfentery, after due evacuation, it has been ufed by the mouth, and by injection with and without opium.

In all thofe hemorrhagies called *paffive*, and which it is allowed all hemorrhagies are very apt to become, and likewife in other increafed difcharges, it is much ufed; and in certain undefined cafes of hæmoptyfis, fome allege that it is remarkably effectual when joined with an abforbent.

It is ufed for obviating the difpofition to nervous and convulfive difeafes; and fome have great confidence in it joined with fulphuric acid, in cafes of phthifis, fcrophula, ill-conditioned ulcers, rickets, fcurvy, and in ftates of convalefcence.

In thefe cafes in general, notwithftanding the ufe of the acid, it is proper to conjoin it with a milk diet.

In dropfy, not depending on any particular local affection, it is often alternated or conjoined with diuretics, or other evacuants; and by its early exhibition after the water is once drawn off, or even begins to be freely difcharged, a frefh accumulation is prevented, and a radical cure obtained. In obftinate venereal cafes, particularly thofe which appear under the form of pains in the bones, the Peruvian bark is often fuccefsfully fubjoined to mercury, or even given in conjunction with it.

CINCINNATUS, the Roman dictator, was taken from the plough, to be advanced to the dignity of conful, in which office he reftored public tranquillity, and then returned to his rural employments. Being called forth a fecond time to be dictator, he conquered the enemies of Rome, and refufing all rewards, retired again to his farm, after he had been dictator only 16 days. The fame circumftance occurred once more in the 80th year of his age. He died 376 years before Chrift.

Order of CINCINNATUS, or *the Cincinnati*, a fociety which was eftablifhed in America foon after the peace, and confifts of the generals and officers of the army and navy of the United States. This inftitution, called after the name of the Roman dictator mentioned in the preceding article, was intended to perpetuate the memory of the revolution, the friendfhip of the officers, and the union of the ftates; and alfo to raife a fund for the relief of poor widows and orphans, whofe hufbands and fathers had fallen during the war, and for their defcendants. The fociety was fubdivided into ftate focieties, which were to meet on the 4th of July, and with other bufinefs depute a number of their members to convene annually in general meetings. The members of the inftitution were to be diftinguifhed by wearing a medal, emblematical of the defign of the fociety; and the honours and advantages were to be hereditary in the eldeft male heirs, and in default of male iffue, in the collateral male heirs. Honorary members were to be admitted, but without the hereditary advantages of the fociety; and provided their number fhould never exceed the ratio of one to four of the officers or their defcendants. Though the apparent defigns of this fociety were harmlefs and honourable, it did not efcape popular jealoufy. Views of a deeper nature were imputed to the framers, and the inftitution was cenfured and oppofed as giving birth to a military nobility, of a dangerous ariftocratic power, which might ultimately prove ruinous to the liberties of the new empire. But the principal ground of apprehenfion was the fuppofed right of inheritance connected with this honour to render it hereditary; which, however, has been given up and totally difclaimed by the fociety.

CINCTURE, in *Architecture*, a ring, lift, or orlo, at the top and bottom of the fhaft of a column, feparating the fhaft at one end from the bafe, and at the other from the capital.

CINEAS, a Theffalian, minifter and friend to Pyrrhus

rhus king of Epirus. He was ſent to Rome by his maſter to ſue for a peace, which he, however, could not obtain. He told Pyrrhus that the Roman ſenate was a venerable aſſembly of kings; and obſerved, that to fight with them was to fight againſt another Hydra. He was of ſuch a retentive memory, that the day after his arrival at Rome he could call every ſenator and knight by his name.

CINERITIOUS, an appellation given to different ſubſtances, on account of their reſembling aſhes either in colour or conſiſtence; hence it is that the cortical part of the brain has ſometimes got this epithet.

CINNA, L. CORN. a Roman who oppreſſed the republic with his cruelties. He was baniſhed by Octavius for attempting to make the fugitive ſlaves free. He joined himſelf with Marius, and with him at the head of the ſlaves he defeated his enemies and made himſelf conſul even to a fourth time. He maſſacred ſo many citizens at Rome, that his name became odious, and one of his officers aſſaſſinated him at Ancona, as he was preparing war againſt Sylla.

CINNA, *C. Helvius*, a poet intimate with Cæſar. He went to attend the obſequies of Cæſar, and being miſtaken by the populace for the other Cinna, he was torn to pieces.—Alſo a grandſon of Pompey's. He conſpired againſt Auguſtus, who pardoned him, and made him one of his moſt intimate friends. He was conſul A. U. C. 758, and made Auguſtus his heir.

CINNABAR, in *Natural Hiſtory*, is either native or factitious.

The *native* cinnabar is an ore of quickſilver, moderately compact, very heavy, and of an elegant ſtriated red colour. See MINERALOGY *Index*.

Factitious cinnabar is a mixture of mercury and ſulphur ſublimed, and thus reduced into a fine red glebe. The beſt is of a high colour, and full of fibres like needles. See CHEMISTRY *Index*.

The chief uſe of cinnabar is for painting. Although the body is compoſed of ſulphur, which is of a light colour, and mercury, which is white as ſilver, it is nevertheleſs of an exceeding ſtrong red colour. Lumps of it are of a deep brown red without brilliancy; but when the too great intenſity of its colour is diminiſhed by bruiſing and dividing it into ſmall parts, (which is a method generally uſed to leſſen the intenſity of all colours), the red of the cinnabar becomes more and more exalted, flame-coloured, and exceedingly vivid and brilliant; in this ſtate it is called *vermilion*.

Cinnabar is often employed as an internal medicine. Hoffman greatly recommends it as a ſedative and antiſpaſmodic, and Stahl makes it an ingredient in his *temperant powder*. Other intelligent phyſicians deny that cinnabar taken internally has any medicinal quality. Their opinion is grounded on the inſolubility of this ſubſtance in any menſtruum. This queſtion concerning its internal utility cannot be decided without further reſearches and experiments; but cinnabar is certainly uſed with ſucceſs to procure a mercurial fumigation, when that method of cure is proper in venereal diſeaſes. For this purpoſe it is burnt in an open fire on red-hot coals, by which the mercury is diſengaged and forms vapours, which, being applied to the body of the deceaſed perſon, penetrate through the pores of the ſkin, and produce effects ſimilar to thoſe of mercury adminiſtered by friction.

CINNAMON, the bark of two ſpecies of laurus. The true cinnamon is from the laurus cinnamomum; and the baſe cinnamon, which is often ſold for the true, is from the laurus caſſia. See LAURUS, BOTANY *Index*.

CINNAMON-Water, is made by diſtilling the bark firſt infuſed in alcohol, brandy, or white-wine.

Clove CINNAMON, is the bark of a tree growing in Brazil, which is often ſubſtituted for real cloves.

White CINNAMON, called alſo *Winter's bark*, is the bark of a tree frequent in the iſles of St Domingo, Guadaloupe, &c. of a ſharp biting taſte like pepper. Some uſe it inſtead of nutmeg; and in medicine it is eſteemed a ſtomachic and antiſcorbutic. See CANELLA.

CINNAMUS, a Greek hiſtorian, wrote a hiſtory of the eaſtern empire during the reigns of John and Manuel Commenes, from 1118 to 1143. His ſtyle is reckoned the beſt of the modern Greek authors. He died after 1183.

CINNERETH, CINERETH, *Chinnereth*, (Moſes); or *Genneſareth*, in *Ancient Geography*, a lake of the Lower Galilee, called the *Sea of Galilee*, (Matthew); *of Tiberius*, (John). Its name *Genneſareth* is from a ſmall cognominal diſtrict upon it. In breadth 40 ſtadia, in length 140. The water freſh and fit to drink, and abounding in fiſh.

CINQUEFOIL, in *Botany*. See POTENTILLA.

CINQUE-PORTS, five havens that lie on the eaſt part of England, towards France; thus called by way of eminence on account of their ſuperior importance, as having been thought by our kings to merit a particular regard for their preſervation againſt invaſion. Hence they have a particular policy, and are governed by a keeper with the title of *Lord-warden of the Cinque-ports*.

Camden tells us, that William the Conqueror firſt appointed a warden of the Cinque-ports; but King John firſt granted them their privileges, and that upon condition they ſhould provide 80 ſhips at their own charge for 40 days, as often as the king ſhould have occaſion in the wars, he being then ſtraitened for a navy to recover Normandy.

The five ports are Haſtings, Romney, Hythe, Dover, and Sandwich.—Thorn tells us, that Haſtings provided 21 veſſels, and in each veſſel 21 men. To this port belong Seaford, Pevenſey, Hedney, Winchelſea, Rye, Hamine, Wakeſbourn, Creneth, and Forthclipe.—Romney provided five ſhips, and in each 24 men. To this belonged Bromhal, Lyde, Oſwarſtone, Dangemares, and Romenhal.—Hythe furniſhed ſeven ſhips, and in each 21 ſeamen. To this belongs Weſtmeath.—Dover the ſame number as Haſtings. To this belongs Folkſton, Feverſham, and Marge.—Laſtly, Sandwich furniſhed the ſame with Hythe. To this belong Fordiwic, Reculver, Serre, and Deal.

The privileges granted to them in conſequence of theſe ſervices were very great. Amongſt others, they were each of them to ſend two barons to repreſent them in parliament; their deputies were to bear the canopy over the king's head at the time of his coronation, and to dine at the uppermoſt table in the

great hall on his right hand; to be exempted from subsidies and other aids; their heirs to be free from personal wardship, notwithstanding any tenure; to be impleaded in their own towns, and not elsewhere; not to be liable to tolls, &c.

The Cinque-ports give the following titles: Hastings, a barony to the ancient family of Huntington: Romney, to the Marshams: Dover, new barony, to a branch of the York family; formerly a dukedom (now extinct) to the Queensberry family: Sandwich, an earldom to a branch of the Montagues.

CINTRA, a cape and mountain of Portugal, in the province of Estremadura, usually called the *Rock of Lisbon*. It lies on the north side of the entrance of the river Tajo; and there is a town of the same name situated thereon. W. Long. 10. 15. N. Lat. 59. 0.

CINUS, or CYNUS, a famous civilian of Pistoia in the 14th century. His commentary on the Code was finished in 1313; he also wrote on some parts of the Digest. He was no less famous for his Italian poems, and is ranked among those who first gave graces to the Tuscan lyric poetry.

CINYRA, in the Jewish antiquities, a musical instrument. This, and the Hebrew *cinnor*, which is generally translated *cithera*, *lyra*, or *psalterium*, are the same. It was made of wood, and was played on in the temple of Jerusalem. Josephus says that the *cinyra* of the temple had ten strings, and that it was touched with a bow. In another place he says that Solomon made a great number of them with a precious kind of metal called *electrum*, wherein he contradicts the Scriptures, which inform us that Solomon's *cinnors* were made of wood.

CINYRAS, in fabulous history, a king of Cyprus, son of Paphus. He married Cenchreis, by whom he had a daughter called *Myrrha*. Myrrha fell in love with her father, and in the absence of her mother she introduced herself into his bed by means of her nurse. Cinyras had by her a son called *Adonis*; and when he knew the incest he had committed, he attempted to stab his daughter, who escaped his pursuit and fled to Arabia, where, after she had brought forth, she was changed into a tree which still bears her name. Cinyras, according to some, stabbed himself.

CION, or CYON, in *Gardening*, a young shoot, sprout, or sprig, put forth by a tree. Grafting is performed by the application of the cion of one plant upon the stock of another. To produce a stock of cions for grafting, planting, &c. the gardeners sometimes cut off the bodies of trees a little above the ground, and only leave a stump or root standing: the redundant sap will not fail next spring to put forth a great number of shoots. In dressing dwarf-trees, a great many cions are to be cut off.

CIOTAT, a sea-port town of Provence in France; famous for Muscadine wine. It is seated on the bay of Laquea, between Marseilles and Toulon; and the harbour is defended by a strong fort. E. Long. 5. 30. N. Lat. 43. 10.

CIPHER, or CYPHER, one of the Arabic characters or figures used in computation, formed thus, 0. See ARITHMETIC.

CIPHER is also a kind of enigmatic character composed of several letters interwoven, which are generally the initial letters of the persons names for whom the ciphers are intended. These are frequently used on seals, coaches, and other moveables.—Anciently, merchants and tradesmen were not allowed to bear arms: in lieu thereof, they bore their ciphers, or the initial letters of their names, artfully interwoven about a cross, of which we have divers instances on tombs, &c. See DEVICE.

CIPHER, denotes likewise certain secret characters disguised and varied, used in writing letters that contain some secret, not to be understood but by those between whom the cipher is agreed on.

De la Guilletiere, in his *Lacedæmon ancient and modern*, endeavours to make the ancient Spartans the inventors of the art of writing in cipher. Their scytala, according to him, was the first sketch of this mysterious art: these scytalæ were two rollers of wood, of equal length and thickness; one of them kept by the ephori, the other by the general of the army sent on any expedition against the enemy. Whensoever those magistrates would send any secret orders to the general, they took a slip of parchment, and rolled it very justly about the scytala which they had reserved, and in this state wrote their intentions, which appeared perfect and consistent while the parchment continued on the roll: when taken off, the writing was maimed, and without connection, but was easily retrieved by the general, upon his applying it to his scytala.

Polybius says, that Æneas Tacitus, 2000 years ago, collected together 20 different manners of writing so as not to be understood by any but those in the secret; part whereof were invented by himself, and part used before his time.—Trithemius, Cap. Porta, Vigenere, and P. Niceron, have written expressly on the subject of *ciphers*.

As the writing of *cipher* is become an art, so is the reading or unravelling thereof, called *deciphering*.—The rules of deciphering are different in different languages. By observing the following, you will soon make out any common cipher written in English.

1. Observe the letters or characters that most frequently occur, and set them down for the six vowels, including *y*, and of these the most frequent will generally be *e*, and the least frequent *u*.

2. The vowels that most frequently come together are *ea* and *ou*.

3. The consonant most common at the end of words is *s*, and the next frequent *r* and *t*.

4. When two similar characters come together, they are most likely to be the consonants *f*, *l*, or *s*, or the vowels *e* or *o*.

5. The letter that precedes or follows two similar characters is either a vowel, or *l*, *m*, *n*, or *r*.

6. In deciphering, begin with the words that consist of a single letter, which will be either *a*, *I*, *o*, or *&*.

7. Then take the words of two letters, one of which will be a vowel. Of these words the most frequent are, *an*, *to*, *be*, *by*, *of*, *on*, *or*, *no*, *so*, *as*, *at*, *if*, *in*, *is*, *it*, *he*, *me*, *my*, *us*, *we*, *am*.

8. In words of three letters there are most commonly two consonants. Of these words the most frequent are, *the*, *and*, *not*, *but*, *yet*, *for*, *tho'*, *how*, *why*, *all*, *you*, *she*, *his*, *her*, *our*, *who*, *may*, *can*, *did*, *was*, *are*, *has*, *had*, *let*, *one*, *two*, *six*, *ten*, *&c.*—Some of these, or those of two letters, will be found in every sentence.

9. The most common words of four letters are, *this*, *that*,

Cipher.

that, then, thus, with, when, from, here, ſome, moſt, none, they, them, whom, mine, your, ſelf, muſt, will, have, been, were, four, five, nine, &c.

10. The moſt uſual words of five letters, are, *their, theſe, thoſe, which, where, while, ſince, there, ſhall, might, could, would, ought, three, ſeven, eight,* &c.

11. Words of two or more ſyllables frequently begin with double conſonants, or with a prepoſition; that is, a vowel joined with one or more conſonants. The moſt common double conſonants are *bl, br, dr, fl, fr, gl, gr, ph, pl, pr, ſh, ſb, ſp, ſt, th, tr, wh, wr,* &c. and the moſt common prepoſitions are *com, con, de, dis, ex, im, in, int, mis, per, pre, pro, re, ſub, ſup, un,* &c.

12. The double conſonants moſt frequent at the end of long words, are *ck, ld, lf, mn, nd, ng, rl, rm, rn, rp, rt, ſm, ſt, xt,* &c. and the moſt common terminations are *ed, en, er, es, et, ing, ly, ſon, ſion, tion, able, ence, ent, ment, full, leſs, neſs,* &c.

On Plate CXLIV. in Vol. V. fig. 7. is given an example of a cipher wrote in arbitrary characters as is commonly practiſed. It will be eaſily deciphered by obſerving the rules: but when the characters are all placed cloſe together, as in the example fig. 8. and as they always ſhould be, the deciphering is much more difficult.

To decipher a writing of this ſort, you muſt firſt look for thoſe characters that moſt frequently occur, and ſet them down for vowels as before. Then obſerve the ſimilar characters that come together; but you muſt remember that two ſuch characters may here belong to two words. You are next to remember the combinations of two or three characters that are moſt frequent; which will be ſome of the words in the ſeventh and eighth of the foregoing rules; and by obſerving the other rules, you will infallibly diſcover, with time and attention, any cipher wrote on theſe principles.

When the words are wrote all cloſe together, if the key to the cipher were to be changed every word, according to a regular method agreed on between the parties, as might be done by either of the methods mentioned in N° II. below, with very little additional trouble, the writing would then be extremely difficult to decipher. The longer any letter written in cipher is, the more eaſy it is to decipher, as then the repetitions of the characters and combinations are the more frequent.

The following are the contents of the two foregoing ciphers, in which we have inverted the order of the words and letters, that they who are deſirous of trying their talent at deciphering, may not, inadvertently, read the explanation before the cipher.

enil eno ton dna shtnom elohw eerht, suoidifrep dna leurc o noituac & ecnedurp fo klat lliw uoy: on, rotiart, tcelgen & ecnereffidni si ti. yltrohs rettel a em dnes ot snaem emoſ dnif´rehtie, traeh eht morf semoc ti taht ees em tel &, erom ecaf ym ees ot erab reven ro.

evlewt fo ruoh eht ta thgin siht, ledatic eht fo etag eht erofeb elbmeſſa lliw sdneirf ruo lla. ruoh eht ot lautcnup eb: deraperp llew emoc dna, ytrebil ruoy niager ot, ylevarb eid ro. thgin eht si siht, su sekam rehtie taht, etiuq su seodnu ro.

Contrivances for communicating intelligence by CIPHER.

I. *By means of a pack of cards.* The parties muſt previouſly agree in what manner the cards ſhall be firſt placed, and then how they ſhall be ſhuffled. Thus ſuppoſe the cards are to be firſt placed in the order as hereafter follows, and then ſhuffled by taking off 3 from the top, putting the next 2 over them, and the following 3 under them *, and ſo alternately. Therefore the party who ſends the cipher firſt writes the contents of it on a ſeparate paper, and then copies the firſt 32 letters on the cards, by writing one letter on every card; he then ſhuffles them in the manner deſcribed, and writes the ſecond 32 letters: he ſhuffles them a ſecond time, and writes the third 32 letters, and ſo of the reſt. An example will make this plain. Suppoſe the letter to be as follows.

I am in full march to relieve you; within| three days I ſhall be with you. If the ene|my in the mean time ſhould make an aſſau|lt, remember what you owe to your countr|y, to your family, and yourſelf. Live with ho|nour, or die with glory.

Order of the cards before the 1ſt ſhuffle.

Ace ſpades	*i a d u y i*
Ten diamonds	*a l e u l*
Eight hearts	*m l m o i u*
King ſpades	*i s u m l*
Nine clubs	*n h l e o*
Seven diamonds	*f b m r i*
Nine diamonds	*u a a c t n*
Ace clubs	*l w k r y i*
Knave hearts	*l s e e a e*
Seven ſpades	*m i a r m w*
Ten clubs	*a i t h e r*
Ten hearts	*r r h o f*
Queen ſpades	*c h e e i*
Eight diamonds	*h a h y w*
Eight clubs	*t y o o o l*
Seven hearts	*o y a o h o*
Queen clubs	*r o n u y h*
Nine ſpades	*e u i y f y*
King hearts	*l e t e u o*
Queen diamonds	*i d s o e*
Eight ſpades	*e i n w s o*
Knave clubs	*v f a n t g*
Seven clubs	*e t s l y*
Ace hearts	*y r e b r*
Nine hearts	*o l n w o t*
Ace diamonds	*u h s t & d*
Knave ſpades	*w l m a l*
Ten ſpades	*i e y t r r*
King diamonds	*t t i b u r*
Queen hearts	*h h m m u*
King clubs	*i n a t h*
Knave diamnods	*n e u r o*

The perſon that receives theſe cards firſt places them in the order agreed on, and tranſcribes the firſt letter on every card. He then ſhuffles them, according to order, and tranſcribes the ſecond letter on each card. He ſhuffles them a ſecond time, and tranſcribes the third letter, and ſo of the reſt.

If the cards were to be ſhuffled the ſecond time by threes and fours, the third time by twos and fours, &c. it would make the cipher ſtill more difficult to diſcover:

Cipher.

* By ſhuffling the cards in this manner, there will remain only 2 to put under at laſt.

ver: though as all ciphers depend on the combination of letters, there are ſcarce any that may not be deciphered with time and pains; as we ſhall ſhow further on. Thoſe ciphers are the beſt that are by their nature moſt free from ſuſpicion of being ciphers; as for example, if the letters were there written with ſympathetic ink, the cards might then paſs for a common pack.

II. *By a dial.* On a piece of ſquare paſteboard ABCD, fig. 3. 4. draw the circle EFGH, and divide it into 26 equal parts, in each of which muſt be written one of the letters of the alphabet.

On the inſide of this there muſt be another circle of paſteboard, ILMN, moveable round the centre O, and the extremity of this muſt be divided into the ſame number of equal parts as the other. On this alſo muſt be written the letters of the alphabet, which, however, need not be diſpoſed in the ſame order. The perſon with whom you correſpond muſt have a ſimilar dial, and at the beginning of your letter you muſt put any two letters that anſwer to each other when you have fixed the dial.

Exam. Suppoſe you would write as follows: "If you will come over to us, you ſhall have a penſion, and you may ſtill make a ſham oppoſition." You begin with the letters *Ma*, which ſhow how the dial is fixed: then for *If you*, you write *un juc*, and ſo for the reſt, as you ſee at fig. 6.

The ſame intention may be anſwered by a ruler, the upper part of which is fixed, and the lower part made to ſlide; but in this caſe the upper part muſt contain two alphabets in ſucceſſion, that ſome letter of that part may conſtantly correſpond to one in the lower part. The diviſions ſtanding directly over each other in a ſtraight line will be much more obvious than in the circumference of a circle. Or two ſtraight pieces of paſteboard regularly divided, the one containing a ſingle, and the other a double alphabet, would anſwer exactly the ſame purpoſe. In this caſe a blank ſpace may be left at each end of the ſingle alphabet, and one or two weights being placed on both the pieces will keep them ſteady.

III. *The correſponding ſpaces.* Take two pieces of paſteboard or ſtiff paper, through which you muſt cut long ſquares, at different diſtances, as you will ſee in the following example. One of theſe pieces you keep yourſelf, and the other you give to your correſpondent. When you would ſend him any ſecret intelligence, you lay the paſteboard upon a paper of the ſame ſize, and in the ſpaces cut out, you write what you would have underſtood by him only, and then fill up the intermediate ſpaces with ſomewhat that makes with thoſe words a different ſenſe.

|I ſhall be| much obliged to you, as reading |alone| engages my attention |at| preſent, if you will lend me any one of the |eight| volumes of the Spectator. I hope you will excuſe |this| freedom, but for a winter's |evening| I |dont| know a better entertainment. If I |fail| to return it ſoon, never truſt me for the time |to come.|

A paper of this ſort may be placed four different ways, either by putting the bottom at the top, or by turning it over; and by theſe means the ſuperfluous words may be the more eaſily adapted to the ſenſe of the others.

This is a very eligible cipher, as it is free from ſuſpicion, but it will only do for ſhort meſſages; for if the ſpaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together; and if the ſenſe be not clear, the writing will be liable to ſuſpicion.

IV. *The muſical cipher.* The conſtruction of this cipher is ſimilar to that of N° II. The circle EFGH (fig. 3.) is to be divided into twenty-ſix equal parts; in each part there muſt be written one of the letters of the alphabet, and on the anterior circle ILMN, moveable round the centre O, there is to be the ſame number of diviſions: the circumference of the inner circle muſt be ruled in the manner of a muſic paper; and in each diviſion there is to be placed a note, differing either in figure or poſition. Laſtly, within the muſical lines place the three keys, and on the outer circle, the figures that are commonly uſed to denote the time.

Then provide yourſelf with a ruled paper, and place one of the keys, as ſuppoſe that of *ge re ſol*, againſt the time two-fourths at the beginning of the paper, which will inform your correſpondent how to fix his circle. You then copy the notes that anſwer to the ſeveral letters of the words you intend to write, in the manner expreſſed at fig. 5.

A cipher of this ſort may be made more difficult to diſcover by frequently changing the key, and that will not in the leaſt embarraſs the reader. You may likewiſe add the mark ※ or ♭ to the note that begins a word, which will make it more eaſy to read, and at the ſame time give the muſic a more natural aſpect. This cipher is preferable to that of N° II. above, as it may be incloſed in a letter about common affairs, and paſs unſuſpected.

CIPUS, in antiquity, a low column, with an inſcription, erected on the high roads, or other places, to ſhow the way to travellers; to ſerve as a boundary; to mark the grave of a deceaſed perſon, &c.

CIR, ST, a village of France, two miles from Verſailles, which was remarkable for a nunnery founded by Louis XIV. The nuns were obliged to take care of the education of 250 girls, who could prove their families to have been noble from the 4th generation on the father's ſide. They could not enter before 7, nor after 12 years of age; and they continued till they were 20 years and three months old. The houſe was formerly a moſt magnificent ſtructure.

CIRCÆA, ENCHANTER'S NIGHT-SHADE. See BOTANY *Index*.

CIRCASSIA, a large country of Aſia, ſituated between 45 and 50 degrees of north latitude, and between 40 and 50 of eaſt longitude. It is bounded by Ruſſia on the north; by Aſtracan and the Caſpian ſea on the eaſt; by Georgia and Dagiſtan on the ſouth; and by the river Don, the Palus Mæotis, and the Black ſea, on the weſt. This country has long been celebrated for the extraordinary beauty of its women; and here it was that the practice of inoculating for the ſmallpox firſt began. Terki, the principal city, is ſeated in a very ſpacious plain, very ſwampy, towards the ſea-ſide, in 43° 23′ north latitude: it is about three werſts in compaſs, well fortified with ramparts and

and baftions in the modern ftyle, well ftored with cannon, and has always a confiderable garrifon in it, under the command of a governor. The Circaffian prince who refides here, is allowed 500 Ruffians for his guard, but none of his own fubjects are permitted to dwell within any part of the fortifications. Ever fince the reduction of thofe parts to the obedience of Ruffia, they have put in all places of ftrength, not only Ruffian garrifons and governors, but magiftrates and priefts for the exercife of the Chriftian religion; yet the Circaffian Tartars are governed by their own princes, lords, and judges; but thefe adminifter juftice in the name of the emperor, and in matters of importance, not without the prefence of the Ruffian governors, being all obliged to take the oath of allegiance to his imperial majefty. The apparel of the men of Circaffia is much the fame with that of the Nagayans, only their caps are fomething larger; and their cloaks being likewife of coarfe cloth or fheep fkins, are faftened only at the neck with a ftring, and as they are not large enough to cover the whole body, they turn them round according to the wind and weather. The men here are much better favoured than thofe of Nagaya, and the women extremely well fhaped, with exceeding fine features, fmooth clear complexions, and beautiful black eyes, which, with their black hair hanging in two treffes, one on each fide the face, give them a moft lovely appearance. They wear a black coif on their heads, covered with a fine white cloth tied under the chin. During the fummer they all wear only a fmock of divers colours, and that open fo low before, that one may fee below their navels: this, with their beautiful faces always uncovered (contrary to the cuftom of moft of the other provinces in thefe parts), their good humour and lively freedom in converfation, altogether render them very attracting: notwithftanding which they have the reputation of being very chafte, though they feldom want opportunity; for according to the accounts of a late traveller, it is an eftablifhed point of good manners among them, that as foon as any perfon comes in to fpeak to the wife, the hufband goes out of the houfe: but whether this continency of theirs proceeds from their own generofity, to recompenfe their hufbands for the confidence they put in them, or has its foundation only in fame, he pretends not to determine. Their language they have in common with the other neighbouring Tartars, although the chief people among them are alfo not ignorant of the Ruffian. Their religion is Paganifm; for notwithftanding they ufe circumcifion among them, they have neither prieft, alcoran, nor mofque, like other Mahometans. Every body here offers his own facrifice at pleafure; for which, however, they have certain days, eftablifhed rather by cuftom than any pofitive command: their moft folemn facrifice is offered at the death of their neareft friends, upon which occafion both men and women meet in the field to be prefent at the offering, which is a he-goat; and having killed, they flay it, and ftretch the fkin with the head and horns on, upon a crofs at the top of a long pole, placed commonly in a quickfet hedge (to keep the cattle from it); and near the place the facrifice is offered by boiling and roafting the flefh, which they afterwards eat. When the feaft is over, the men rife, and having paid their adoration to the fkin, and muttered over certain prayers, the women withdraw, and the men conclude the ceremony with drinking a great quantity of fpirits; and this generally ends in a quarrel before they part. The face of the country is pleafantly diverfified with mountains, valleys, woods, lakes, and rivers; and, though not much cultivated, is far from being unfruitful. In fummer the inhabitants quit the towns, and encamp in the fields like the neighbouring Tartars, occafionally fhifting their ftations along with their flocks and herds. Befides game, in which the country greatly abounds, the Circaffian eat beef and mutton; but that which they prefer to all others is the flefh of a young horfe. Their bread confifts of thin cakes of barley meal, baked upon the hearth, which they always eat new; and their ufual drink is water or mare's milk, from the latter of which they diftil a fpirit, as do moft of the Tartar nations. They allot no fixed hours for the refrefhments of the table or fleep, which they indulge irregularly, as inclination or convenience dictates. When the men make excurfions into an enemy's country, they pafs feveral days and nights fucceffively without fleeping; but, at their return, devote as much time to repofe as the fpace in which they had before withheld from that gratification. When they eat, they fit crofs-legged on the floor, the fkin of fome animal ferving them inftead of a carpet. In removing from one part of the country to another, the women and children are carried in waggons, which are a kind of travelling houfes, and drawn by oxen or camels; they never ufe horfes for draught. Their breed of the latter, however, is reckoned exceeding good; and they are accuftomed to fwim almoft any river on horfeback. The women and children fmoke tobacco as well as the men; and this is the moft acceptable commodity which a traveller can carry with him into the Tartar countries. There are here no public inns, which indeed are unneceffary; for fo great is the hofpitality of the people, that they will contend with each other who fhall entertain any ftranger that happens to come among them.—The principal branch of their traffic is their own children, efpecially their daughters, whom they fell for the ufe of the feraglios in Turkey and Perfia, where they frequently marry to great advantage, and make the fortune of their families. The merchants, who come from Conftantinople to purchafe thofe girls, are generally Jews, who, as well as the mothers, are faid to be extremely careful of preferving the chaftity of the young women, knowing the value that is fet by the Turks upon the marks of virginity. The greater part of the Circaffians are Chriftians of the Greek church; but there are alfo both Mahometans and Pagans among them.

CIRCE, in fabulous hiftory, a daughter of Sol and Perfeis, celebrated for her knowledge of magic and venomous herbs. She was fifter to Æetes king of Colchis, and to Pafiphae the wife of Minos. She married a Sarmatian prince of Colchis, whom fhe murdered to obtain the kingdom. She was expelled by her fubjects, and carried by her father upon the coafts of Italy in an ifland called Ææa. Ulyffes, at his return from the Trojan war, vifited her coafts, and all his companions, who ran headlong into pleafure and voluptuoufnefs, were changed by Circe's potions into filthy fwine. Ulyffes, who was fortified againft all enchantments by an herb called *moly*, which he had received from Mercury,

cury, went to Circe, and demanded ſword in hand the reſtoration of his companions to their former ſtate. She complied, and loaded the hero with pleaſures and honours. In this voluptuous retreat Ulyſſes had by Circe one ſon called Telegonus, or two, according to Heſiod, called Agrius and Latinus. For one whole year Ulyſſes forgot his glory in Circe's arms. At his departure the nymph adviſed him to deſcend to hell and to conſult the manes of Tireſias concerning the fates that attended him. Circe ſhowed herſelf cruel to Scylla her rival, and to Picus.

CIRCENSIAN GAMES, a general term under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Moſt of the feaſts of the Romans were accompanied with Circenſian games; and the magiſtrates, and other officers of the republic, frequently preſented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 13th of September. See CIRCUS.

CIRCLE, in *Geometry*, a plane figure comprehended by a ſingle curve line, called its circumference, to which right lines drawn from a point in the middle, called the centre, are equal to each other. See GEOMETRY.

CIRCLES of the Sphere, are ſuch as cut the mundane ſphere, and have their periphery either on its moveable ſurface, or in another immoveable, conterminous, and equidiſtant ſurface. See SPHERE. Hence ariſe two kinds of circles, moveable and immoveable. The firſt, thoſe whoſe peripheries are in the moveable ſurface, and which therefore revolve with its diurnal motion; as, the meridians, &c. The latter having their periphery in the immoveable ſurface, do not revolve; as the ecliptic, equator, and its parallels, &c. See GEOGRAPHY.

CIRCLES of Altitude, otherwiſe called *almucantars*, are circles parallel to the horizon, having their common pole in the zenith, and ſtill diminiſhing as they approach the zenith. See ALMUCANTAR.

Diurnal CIRCLES, are immoveable circles, ſuppoſed to be deſcribed by the ſeven ſtars, and other points of the heavens, in their diurnal rotation round the earth; or rather, in the rotation of the earth round its axis. The diurnal circles are all unequal: the equator is the biggeſt.

Horary CIRCLES, in *Dialing*, are the lines which ſhow the hours on dials; though theſe be not drawn circular, but nearly ſtraight. See DIALING.

CIRCLES of Latitude, or *Secondaries of the Ecliptic*, are great circles parallel to the plane of the ecliptic, paſſing through the poles thereof, and through every ſtar and planet. They are ſo called, becauſe they ſerve to meaſure the latitude of the ſtars, which is nothing but an arch of one of theſe circles intercepted between the ſtar and the ecliptic. See LATITUDE.

CIRCLES of Longitude, are ſeveral leſſer circles, parallel to the ecliptic; ſtill diminiſhing, in proportion as they recede from it. On the arches of theſe circles, the longitude of the ſtars is reckoned.

CIRCLE of perpetual Apparition, one of the leſſer circles, parallel to the equator, deſcribed by any point of the ſphere touching the northern point of the horizon, and carried about with the diurnal motion. All the ſtars included within this circle never ſet, but are ever viſible above the horizon.

CIRCLE of perpetual Occultation, is another circle at a like diſtance from the equator, and contains all thoſe ſtars which never appear in our hemiſphere. The ſtars ſituated between theſe circles alternately riſe and ſet at certain times.

Polar CIRCLES, are immoveable circles, parallel to the equator, and at a diſtance from the poles equal to the greateſt declination of the ecliptic. That next the northern pole is called the ARCTIC; and that next to the ſouthern one the ANTARCTIC.

Fairy CIRCLE. See *FAIRY-Circle*.

Druidical CIRCLES, in Britiſh topography, a name given to certain ancient incloſures formed by rude ſtones circularly arranged, in the manner repreſented on Plate CXLV. Theſe, it is now generally agreed, were temples, and many writers think alſo, places of ſolemn aſſemblies for councils or elections, and ſeats of judgment. Mr Borlaſe is of this opinion. "Inſtead, therefore (ſays he), of detaining the reader with a diſpute, whether they were places of worſhip or council, it may with great probability be aſſerted, that they were uſed for both purpoſes; and having for the moſt part been firſt dedicated to religion, naturally became afterwards the curiæ and fora of the ſame community." Theſe temples, though generally circular, occaſionally differ as well in figure as magnitude: with relation to the firſt, the moſt ſimple were compoſed of one circle: Stonehenge conſiſted of two circles and two ovals, reſpectively concentric, whilſt that at Bottalch near St Juſt in Cornwall is formed by four interſecting circles. And the great temple at Avebury in Wiltſhire, it is ſaid, deſcribed the figure of a ſeraph or fiery flying ſerpent, repreſented by circles and right lines. Some beſides circles have avenues of ſtone pillars. Moſt, if not all of them, have pillars or altars within their penetralia or centre. In the article of magnitude and number of ſtones, there is the greateſt variety, ſome circles being only twelve feet diameter, and formed only of twelve ſtones, whilſt others, ſuch as Stonehenge and Avebury, contained, the firſt 140, the ſecond 652, and occupied many acres of ground. All theſe different numbers, meaſures, and arrangements had their pretended reference; either to the aſtronomical diviſions of the year, or ſome myſteries of the druidical religion. Mr Borlaſe, however, ſuppoſes, that thoſe very ſmall circles, ſometimes formed of a low bank of earth, ſometimes of ſtones erect, and frequently of looſe ſmall ſtones thrown together in a circular form, incloſing an area of about three yards diameter, without any larger circle round them, were originally places of burial.

CIRCLE, in *Logic*, or *Logical CIRCLE*, is when the ſame terms are proved *in orbem* by the ſame terms; and the parts of the ſyllogiſm alternately by each other, both directly and indirectly.

CIRCLES of the Empire, ſuch provinces and principalities of the German empire as have a right to be preſent at diets. Maximilian I. divided the empire into ſix, and ſome years after into ten circles. This laſt diviſion was confirmed by Charles V. The circles, as they ſtand in the Imperial Matricola, are as follow: Auſtria, Burgundy, the Lower Rhine, Bavaria, Up-

per Saxony, Franconia, Swabia, Upper Rhine, Weftphalia, and the Lower Saxony,

CIRCONCELLIONES, a fpecies of fanatics, fo called becaufe they were continually rambling round the houfes in the country. They took their rife among the Donatifts in the reign of the emperor Conftantine. It is incredible what ravages and cruelties thefe vagabonds committed in Africa through a long feries of years. They were illiterate favage peafants, who underftood only the Punic language. Intoxicated with a barbarous zeal, they renounced agriculture, profeffed continence, and affumed the title of "Vindicators of juftice, and protectors of the oppreft." To accomplifh their miffion, they enfranchifed flaves, fcoured the roads, forced mafters to alight from their chariots, and run before their flaves, who they obliged to mount in their place; and difcharged debtors, killing the creditors if they refufed to cancel the bonds. But the chief objects of their cruelty were the Catholics, and efpecially thofe who had renounced Donatifm. At firft they ufed no fwords, becaufe God had forbidden the ufe of one to Peter; but they were armed with clubs, which they called the *clubs of Ifrael*, and which they handled in fuch a manner as to break a man's bones without killing him immediately, fo that he languifhed a long time and then died. When they took away a man's life at once, they looked upon it as a favour. They became lefs fcrupulous afterwards, and made ufe of all forts of arms. Their fhout was *Praife be to God.* Thefe words in their mouths were the fignal of flaughter, more terrible than the roaring of a lion. They had invented an unheard-of punifhment; which was to cover with lime diluted with vinegar the eyes of thofe unhappy wretches whom they had crufhed with blows, and covered with wounds, and to abandon them in that condition. Never was a ftronger proof what horrors fuperftition can beget in minds deftitute of knowledge and humanity. Thefe brutes, who had made a vow of chaftity, gave themfelves up to wine and all forts of impurities, running about with women and young girls as drunk as themfelves, whom they called *facred virgins*, and who often carried proofs of their incontinence. Their chiefs took the name of *Chiefs of the Saints.* After having glutted themfelves with blood, they turned their rage upon themfelves, and fought death with the fame fury with which they gave it to others. Some fcrambled up to the tops of rocks, and caft themfelves down headlong in multitudes; others burned themfelves, or threw themfelves into the fea. Thofe who propofed to acquire the title of martyrs, publifhed it long before, upon which they were feafted and fattened like oxen for the flaughter; after thefe preparations they fet out to be deftroyed. Sometimes they gave money to thofe whom they met, and threatened to murder them if they did not make them martyrs. Theodoret gives an account of a ftout young man, who meeting with a troop of thefe fanatics, confented to kill them, provided he might bind them firft; and having by this means put it out of their power to defend themfelves, whipped them as long as he was able, and then left them tied in that manner. Their bifhops pretended to balance them, but in reality made ufe of them to intimidate fuch as might be tempted to forfake their fect; they even honoured them as faints. They were not, however, able to govern thofe furious monfters, and more than once found themfelves under a neceffity of abandoning them, and even of imploring the affiftance of the fecular power againft them. The counts Urfacius and Taurinus were employed to quell them; they deftroyed a great number of them, of whom the Donatifts made as many martyrs. Urfacius, who was a good Catholic and a religious man, having loft his life in an engagement with the barbarians, the Donatifts did not fail to triumph in his death, as an effect of the vengeance of heaven. Africa was the theatre of thefe bloody fcenes during a great part of Conftantine's life.

CIRCUIT, in *Law*, fignifies a longer courfe of proceedings than is needful to recover the thing fued for.

CIRCUIT, alfo fignifies the journey or progrefs which the judges take twice every year, through the feveral counties of England and Wales, to hold courts and adminifter juftice, where recourfe cannot be had to the king's courts at Weftminfter; hence England is divided into fix circuits, viz. the Home circuit; Norfolk circuit; Midland circuit; Oxford circuit; Weftern circuit; and Northern circuit. In Wales there are but two circuits, North and South Wales: two judges are affigned by the king's commiffion to every circuit.

In Scotland, the judges of the fupreme criminal court, or court of jufticiary, are divided into three feparate courts, confifting of two judges each; and the kingdom into as many diftricts. In certain boroughs of every diftrict, each of thefe courts by rotation is obliged to hold two courts in the year, in fpring and autumn; which are called *circuit-courts.*

Electrical CIRCUIT, denotes the courfe of the electric fluid from the charged furface of an electric body, to the oppofite furface into which the difcharge is made. Some of the firft electricians apprehend, that the fame particles of the electric fluid, which were thrown on one fide of the charged glafs, actually made the whole circuit of the intervening conductors, and arrived at the oppofite fide; whereas Dr Franklin's theory only requires, that the redundancy of electric matter on the charged furface fhould pafs into the bodies forming that part of the circuit which is contiguous to it, driving forward that part of the fluid which they naturally poffefs; and that the deficiency of the exhaufted furface fhould be fupplied by the neighbouring conductors, which form the laft part of the circuit. On this fuppofition, a vibrating motion is fucceffively communicated through the whole length of the circuit. This circuit is always formed of the beft conductors, let the length of it be ever fo great. Many attempts were made, both in France and England, at an early period in the hiftory of electricity, to afcertain the diftance to which the electric fhock might be carried, and the velocity of its motion. The French philofophers, at different times, made it to pafs through a circuit of 900 toifes, and of 2000 toifes, or about two Englifh miles and a half; and they difcharged the Leyden phial through a bafon of water, the furface of which was about an acre. And M. Mounier found, that, in paffing through an iron wire of 950 toifes in length, it did not fpend a quar-

ter

ter of a fecond; and that its motion was inftantaneous through a wire of 1319 feet. In 1747, Dr Watfon, and other Englifh philofophers, after many experiments of a fimilar kind, conveyed the electric matter through a circuit of four miles; and they concluded from this and another trial, that its velocity is inftantaneous.

CIRCULAR, in a general fenfe, any thing that is defcribed, or moved in a round, as the circumference of a circle, or furface of a globe.

CIRCULAR Numbers, called alfo *fpherical ones*, according to fome, are fuch whofe powers terminate in the roots themfelves. Thus, for inftance, 5 and 6, all whofe powers do end in 5 and 6, as the fquare of 5 is 25; the fquare of 6 is 36, &c.

CIRCULAR Sailing, is the method of failing by the arch of a great circle. See NAVIGATION.

CIRCULATION, the act of moving round, or in a circle; thus we fay, the circulation of the blood, &c.

CIRCULATION of the Blood, the natural motion of the blood in a living animal, whereby that fluid is alternately carried from the heart into all parts of the body, by the arteries, from whence it is brought back to the heart again by the veins. See ANATOMY *Index*.

In a fœtus, the apparatus for the circulation of the blood is fomewhat different from that in adults. The feptum, which feparates the two auricles of the heart, is pierced through with an aperture, called the *foramen ovale;* and the trunk of the pulmonary artery, a little after it has left the heart, fends out a tube into the defcending aorta, called the *communicating canal.* The fœtus being born, the foramen ovale clofes by degrees, and the canal of communication dries up, and becomes a fimple ligament.

As to the velocity of the circulating blood, and the time wherein the circulation is completed, feveral computations have been made. By Dr Keil's account, the blood is driven out of the heart into the aorta with a velocity which would carry it twenty-five feet in a minute; but this velocity is continually abated in the progrefs of the blood, in the numerous fections or branches of the arteries; fo that before it arrives at the extremities of the body, its motion is greatly diminifhed. The fpace of time wherein the whole mafs of blood ordinarily circulates is varioufly determined. Some ftate it thus: Suppofing the heart to make two thoufand pulfes in an hour, and that at every pulfe there is expelled an ounce of blood; as the whole mafs of blood is not ordinarily computed to exceed twenty-four pounds, it muft be circulated feven or eight times over in the fpace of an hour.

The curious, in microfcopic obfervations, have found an eafy method of feeing the circulation of the blood in the bodies of animals: for thefe inquiries it is neceffary to choofe fuch animals as are fmall, and eafily manageable, and which are either wholly or in part tranfparent. The obfervations made by this means are preferable to any others we can have recourfe to, fince, in diffections, the animal is in a ftate of pain, or dying; whereas in animals fmall enough to be thus viewed, all is left in its ufual courfe, and we fee what nature does in her own undifturbed method. In thefe creatures alfo, after viewing, as long as we pleafe, the natural ftate and current of the blood, we may, by preffure, and feveral other ways, impede its courfe; and by putting various mixtures into the creature's water, induce a morbid ftate, and finally fee the creature die, either by means of this or by any other method; and we may thus accurately obferve all the changes it undergoes, and fee what occafions the trembling pulfe, &c. of dying people.

The current of the blood in fmall animals, that is, its paffing on through the veffels, either to or from the heart, is very eafily feen by the microfcope; but its circulation, that is, its running to the extremities of the parts, and thence returning, is more difficult; becaufe the veffels where this fhould be feen are fo extremely minute, as not eafily to come under obfervation. The larger arteries are eafily diftinguifhed from the veins by the motion of the blood through them, which in the veins is always fmooth and regular; but in the arteries, by feveral propulfions after the manner of pulfation. But this difference is not to be found in the more minute veffels, in all which, as well arteries as veins, the motion of the blood is even and regular.

The tranfparent membrane, or web between the toes of a frog's hinder foot, is a very proper object to obferve the circulation of the blood in. The tails or fins of fifhes are alfo very fine objects; and when the fifh is very fmall, thefe are manageable, and afford a view of a great number of veins and arteries, with a very quick and beautiful fucceffion of blood through them. The tail of a flounder may be very conveniently placed before the double microfcope on a plate of glafs; and its body being fupported by fomething of equal height, the fifh will lie ftill, and the circulation may be feen very agreeably. In the minuteft veffels thus examined, the blood always appears pale or colourlefs, but in the large ones it is manifeftly red. The arteries ufually branch out extremely before they join the veins to carry the blood back to the heart; but this is not always the cafe; for Mr Leuwenhoeck has obferved, that on each fide of the little griftles which give a ftiffnefs to the tail of a flounder, there may be feen a very open communication of the veins and arteries; the blood running towards the extremities through arteries, and returning back again through veins, which were evidently a continuation of thofe arteries, and of the fame diameter with them. The whole fifh, on the tail of which this examination was made, was not more than half an inch in length; it is eafy to conceive, therefore, how fmall the tail muft be; and yet in it there were 68 veffels which carried and returned the blood; and yet thefe veffels were far from being the moft minute of all. How inconceivably numerous then muft the *circulations* in the whole human body be? Mr Leuwenhoeck is of opinion, that a thoufand different circulations are continually carried on in every part of a man's body in the breadth of a finger nail.

The tail of a newt or water-lizard affords alfo a very entertaining profpect of the circulation of the blood through almoft numberlefs fmall veffels; but no objects fhows it fo agreeably as one of thefe animals, while fo young as not to be above an inch long; for then the whole body is fo very tranfparent, that the circulation may be feen in every part of it, as well as in

in the tail; and, in theſe objects, nothing is more beautiful than the courſe of the blood into the toes and back again, where it may be traced all the way with great eaſe. Near the head there are alſo found three ſmall fins which afford a very delightful proſpect; theſe are all divided like the leaves of polypody; and in every one of the branches of theſe, the blood may be very accurately traced, running to the end through the artery, and there returning back again by a vein of the ſame ſize, and laid in the ſame direction; and as the veſſels are very numerous and large in this part, and the third or fourth magnifier may be uſed, there are ſometimes ſeen thirty or forty channels of running blood at once; and this the more as the globules of blood in the newt are large, and fewer in number, in proportion to the quantity of ſerum than in any other animal: and their figure, as they are protruded through the veſſels, changes in a very ſurpriſing manner. The impetus occaſioning the circulation is great enough in ſome animals to raiſe the blood ſix, ſeven, or eight feet high from the blood-veſſel it ſprings out at, which, however, is far exceeded by that of the ſap of a vine in bleeding time, which will ſometimes riſe 40 feet high.

CIRCULATION of the ſap of Plants. See PLANTS and SAP.

CIRCULATION of the Spirits, or Nervous Fluid. See ANATOMY *Index.*

CIRCULATION, in *Chemiſtry*, is an operation whereby the ſame vapour, raiſed by fire, falls back, to be returned and diſtilled ſeveral times.

CIRCULATION of Money. See COMMERCE and MONEY.

Subterranean CIRCULATION. See SPRINGS.

CIRCULUS, in *Chemiſtry*, an iron inſtrument in form of a ring, which being heated red hot, and applied to the neck of retorts and other glaſs veſſels till they grow hot, a few drops of cold water thrown upon them, or a cold blaſt, will make the necks fly regularly and evenly off.

Another method of doing this is, to tie a thread, firſt dipt in oil of turpentine, round the place where you would have it break; and then ſetting fire to the thread, and afterwards ſprinkling the place with cold water, the glaſs will crack exactly where the thread was tied.

CIRCUMAMBIENT, an appellation given to a thing that ſurrounds another on all ſides; chiefly uſed in ſpeaking of the air.

CIRCUMCELLIONES. See CIRCONCELLIONES.

CIRCUMCISION, the act of cutting off the prepuce; a ceremony in the Jewiſh and Mahometan religions, wherein they cut off the foreſkin of their males, who are to profeſs the one or the other law.

Circumciſion commenced in the time of Abraham; and was the ſeal of a covenant ſtipulated between God and him. It was in the year of the world 2178 that Abraham, by divine appointment, circumciſed himſelf and all the males of his family; from which time it became an hereditary practice among his deſcendants.

The ceremony, however, was not confined to the Jews. Herodotus and Philo Judæus obſerve, that it obtained alſo among the Egyptians and Ethiopians. Herodotus ſays, that the cuſtom was very ancient among each people; ſo that there was no determining which of them borrowed it from the other. The ſame hiſtorian relates, that the inhabitants of Colchis alſo uſed circumciſion; whence he concludes, that they were originally Egyptians. He adds, that the Phenicians and Syrians were likewiſe circumciſed; that they borrowed the practice from the Egyptians; and, laſtly, that a little before the time when he wrote, circumciſion had paſſed from Colchis to the people inhabiting near Thermodon and Parthenius.

Marſham is of opinion, that the Hebrews borrowed circumciſion from the Egyptians; and that God was not the firſt author thereof, citing Diodorus Siculus and Herodotus as evidences on his ſide. This latter propoſition ſeems directly contrary to the teſtimony of Moſes, who aſſures us (Gen. xvii.), that Abraham, though 99 years of age, was not circumciſed till he had the expreſs command of God for it. But as to the former poſition of Marſham, it will admit of more debate. The arguments on both ſides may be ſeen in one view in *Spencer de Legibus Hebræorum*, l. 2. c. 4.

Be this as it will, it is certain the practice of circumciſion among the Hebrews differed very conſiderably from that of the Egyptians. Among the firſt it was a ceremony of religion, and was performed on the eighth day after the birth of the child. Among the latter, a point of mere decency and cleanlineſs; and, as ſome will have it, of phyſical neceſſity; and was not performed till the 13th year, and then on girls as well as boys.

Among the Jews, the time for performing this rite was the eighth day, that is, ſix full days, after the child was born. The law of Moſes ordained nothing with reſpect to the perſon by whom, the inſtrument with which, or the manner how, the ceremony was to be performed; the inſtrument was generally a knife of ſtone. The child is uſually circumciſed at home, where the father or godfather holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third perſon holds a porringer, with ſand in it, to catch the blood; then the operator applies his mouth to the part, and, having ſucked the blood, ſpits it into a bowl of wine, and throws a ſtyptic powder upon the wound. This ceremony was uſually accompanied with great rejoicings and feaſting; and it was at this time that the child was named in preſence of the company. The Jews invented ſeveral ſuperſtitious cuſtoms at this ceremony, ſuch as placing three ſtools, one for the circumciſor, the ſecond for the perſon who holds the child, and the third for Elijah, who, they ſay, aſſiſts inviſibly at the ceremony, &c.

The Jews diſtinguiſhed their proſelytes into two ſorts, according as they became circumciſed or not: thoſe who ſubmitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moſes; the uncircumciſed were only bound to obſerve the precepts of Noah, and were called *Noachidæ.*

The Turks never circumciſe till the ſeventh or eighth year, as having no notion of its being neceſſary to ſalvation. The Perſians circumciſe their boys at 13, and their girls from 9 to 15. Thoſe of Madagaſcar cut the fleſh at three ſeveral times, and the moſt zealous of

of the relations present catches hold of the preputium and swallows it.

Circumcision is practised on women by cutting off the foreskin of the clitoris, which bears a near resemblance and analogy to the preputium of the male penis. We are told that the Egyptian captive women were circumcised; and also the subjects of Prester John.

Circumcision is also the name of a feast, celebrated on the first of January, in commemoration of the circumcision of our Saviour.

CIRCUMDUCTION, in *Scots Law*. When parties in a suit are allowed a proof of alledgeances; after the time limited by the judge for taking the proof is elapsed, either party may apply for circumduction of the time of proving; the effect of which is, that no proof can afterwards be brought, and the cause must be determined as it stood when circumduction was obtained.

CIRCUMFERENCE, in a general sense, denotes the line or lines bounding a plane figure. However, it is generally used in a more limited sense for the curve line which bounds a circle, and otherwise called a *periphery*; the boundary of a right-lined figure being expressed by the term *perimeter*.

CIRCUMFERENTOR, an instrument used by surveyors for taking angles.

Plate CXLV.

It consists of a brass index and circle, all of a piece. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about seven inches. On this circle is made a chart, whose meridian line answers to the middle of the breadth of the index, and is divided into 360 degrees. There is a brass ring soldered on the circumference of the circle, on which screws another ring, with a flat glass in it, so as to form a kind of box for the needle, suspended on the pivot in the centre of the circle. There are also two sights to screw on, and slide up and down the index, as also a spangle and socket screwed on the back side of the circle for putting the head of the staff in.

Ibid.

How to observe the Quantity of an angle by the Circumferentor. Let it be required to find the quantity of the angle EKG; first place your instrument at K, with the flower-de-luce of the chart towards you; then direct your sights to E, and observe what degrees are cut by the south end of the needle, which let be 296; then, turning the instrument about, direct your sights to G, noting then also what degrees are cut by the south end of the needle, which suppose 247. This done, always subtract the lesser from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

A circumferentor was made by Mr Jones of Holborn on an improved construction. From a very simple contrivance, it is rendered sufficient to take angles with the accuracy of a common theodolite; and by it angles of altitude and depression may be observed as readily as horizontal ones. The improvement chiefly consists in an arm or index (G), so applied to the centre of the compass box, and within it, that, at the time of observing, by only slipping a pin (*p*) out, the circle of degrees alone may move round, and leave the index

Ibid.

(G) fixed. This index will remain stationary, from its being attached to the socket that screws on the head of the staffs. On the end of this index, next the degrees in the box, there is graduated a nonius scale, by which the circle of 360 degrees is subdivided into five minutes or less if desired. To take angles of altitudes or depressions, the instrument is turned down on its ball and socket into a perpendicular position, and adjusted to its level by a plumb line (*l*), that is hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the small sight holes (*s*) purposely made, the angles are shown on the circles of degrees by the nonius as before. The arms (AA) of the instrument slip off (at BB), and the whole packs into a case but $5\frac{1}{2}$ inches square and 3 deep.

CIRCUMFLEX, in *Grammar*, an accent serving to note, or distinguish, a syllable of an intermediate sound between acute and grave; and generally somewhat long.—The Greeks had three accents, the acute, the grave, and the circumflex; formed thus, ´, `, ~. In Latin, English, French, &c. the circumflex is made thus ^.—The acute raises the voice, and the grave falls or lowers it: the circumflex is a kind of undulation, or wavering of the voice, between the two. It is seldom used among the moderns, unless to show the omission of a letter which made the syllable long and open; a thing much more frequent in the French than among us: thus they write *pâte* for *paste*; *tête* for *teste*; *fûmes* for *fusmes*, &c. They also use the circumflex in the participles; some of their authors writing *conneu*, *peu*, others *connû*, *pû*, &c. Father Buffier is at a loss for the reason of the circumflex on, this occasion.

The form of the Greek circumflex was anciently the same with that of ours, viz. ʌ; being a composition of the other two accents ʌ in one.—But the copyists changing the form of the characters, and introducing the running hand, changed also the form of the circumflex accent; and instead of making a just angle, rounded it off, adding a dash, through too much haste; and thus formed an *s*, laid horizontally, which produced this figure ~, instead of this ʌ.

CIRCUMGYRATION, denotes the whirling motion of any body round a centre; such is that of the planets round the sun.

CIRCUMLOCUTION, an ambages, or tour of words, used either when a proper term is not at hand, to express a thing naturally and immediately by; or when one chooses not to do it, out of respect, or for some other reason. The word comes from *circumloquor*, "I speak about."

Circumlocution, in oratory, is the avoiding of something disagreeable or inconvenient to be expressed in direct terms; by intimating the sense thereof in a kind of paraphrase, so conceived as to soften or break the force thereof.

Thus Cicero, unable to deny that Clodius was slain by Milo, owns it, with this circumlocution, "Milo's "servants being prevented from assisting their master, "who was reported to be killed by Clodius; they, in "his absence, and without his privity, or consent, did "what every body would expect from their own servants on such an occasion."

CIRCUMPOLAR STARS, an appellation given to thofe ftars, which, by reafon of their vicinity to the pole, move round it without fetting.

CIRCUMPOTATIO, in antiquity, a funeral feaft provided in honour of the dead. This was very frequent among the ancient Romans, as well as among the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this cuftom, thinking it abfurd that mirth and drunkennefs fhould mingle with forrow and grief.

CIRCUMSCRIBED, in *Geometry*, is faid of a figure which is drawn round another figure, fo that all its fides or planes touch the infcribed figure.

CIRCUMSCRIPTION, in *Natural Philofophy*, the termination, bounds, or limits, of any natural body.

CIRCUMSTANCE, a particularity, which, though not effential to any action, yet doth fome way affect it.

CIRCUMSTANTIAL EVIDENCE, in *Law*, or the doctrine of prefumption, takes place next to pofitive proof: circumftances which either neceffarily or ufually attend facts of a particular nature, that cannot be demonftratively evinced, are called *prefumptions*, and are only to be relied on till the contrary be actually proved.

CIRCUMSTANTIBUS, in *Law*, a term ufed for fupplying and making up the number of jurors, (in cafe any impannelled appear not, or appearing are challenged by any party), by adding to them fo many of the perfons prefent as will make up the number, in cafe they are properly qualified.

CIRCUMVALLATION, or *Line of CIRCUMVALLATION*, in the art of war, is a trench bordered with a parapet, thrown up quite round the befieger's camp, by way of fecurity againft any army that may attempt to relieve the place, as well as to prevent defertion.

CIRCUMVOLUTION, in *Architecture*, denotes the torus of the fpiral line of the Ionic order.

CIRCUS, in antiquity, a large building, either round or oval, ufed for the exhibiting of fhows to the people. Some derive the word from *Circe*, to whom Tertullian attributes the invention. Caffiodorus fays, *Circus* comes *à circuitu*. The Romans, Servius obferves, at firft had no other circus but that made by the Tiber on one fide, and a palifade of naked fwords on the other. Hence, according to Ifidore, came the term *ludi circenfes, quafi circum enfes*. But Scaliger ridicules that etymology.

The Roman circus was a large oblong edifice, arched at one end, encompaffed with porticoes, and furnifhed with rows of feats, placed afcending over each other. In the middle was a kind of foot-bank, or eminence, with obelifks, ftatues, and pofts at each end. This ferved them for the courfes of their *bigæ* and *quadrigæ*. There were no lefs than ten circufes at Rome: The largeft was built by the elder Tarquin, called *Circus Maximus*, between the Aventine and Palatine mounts. It was fo called, either becaufe of its vaft circumference, or becaufe the great games were celebrated in it; or again, becaufe it was confecrated to the great gods, viz. to Vertumnus, Neptune, Jupiter, Juno, Minerva, and the Dii Penates of Rome. Dionyfius Halicarnaffenfis fays that it was three ftadia and a half in length, and four jugera broad; and thefe meafures, according to Pliny, allowing to the Roman ftadia 625 Roman feet, each of which is twelve inches, will give for the length, 2187 Roman feet, or fomewhat more than three Englifh furlongs: and as to the breadth, allowing for each of the jugera 240 Roman feet, it will be 960 Roman feet. It was beautified and enlarged by the Roman emperors, fo as to feat 250,000 fpectators. The moft magnificent circufes were thofe of Auguftus and Nero. There are ftill fome remains of the circufes at Rome, at Nifmes, and other places. The Romans were exceffively fond of the games exhibited in the circus: witnefs that verfe in Juvenal,

——Atque duas tantum res anxius optat,
Panem et circenfes.————————

The Games of the CIRCUS, which fome call the *Circenfian Games*, were combats celebrated in the circus, in honour of Confus the god of councils; and thence alfo called *Confualia*. They were alfo called *Roman Games*, *Ludi Romani*, either on account of their antiquity, as being coeval with the Roman people, or becaufe eftablifhed by the Romans; and the games held there, the great games, *ludi magni*, becaufe celebrated with more expence and magnificence than others; and becaufe held in honour of the great god Neptune, who was their Confus.—Thofe who fay they were inftituted in honour of the fun, confound the *pompa circenfis*, or proceffion of the circus, with the games.

The games of the circus were inftituted by Evander, and re-eftablifhed by Romulus: the pomp, or proceffion, was only a part of the games, making the prelude thereof, and confifting of a fimple cavalcade of chariots. Till the time of the elder Tarquin, they were held in an ifland of the Tiber; and were called *Roman Games:* after that prince had built the circus, they took their name therefrom, as being conftantly held there. There were fix kinds of exercifes in the circus: the firft was wreftling, and fighting with fwords, with ftaves, and with pikes; the fecond was racing; the third, faltatio, leaping; the fourth, difci, quoits, arrows, and ceftus; all which were on foot: the fifth was horfe-courfing; the fixth, courfes of chariots, whether with two horfes or with four. In this laft exercife, the combatants were at firft divided into two fquadrons or quadrils; then into four; each bearing the names of the colours they wore; *factio alba, ruffea*, &c. At firft there were only white and red; then green and blue were added. Domitian added two more colours, but they did not continue. It was Oenomaus who firft invented this method of diftinguifhing the quadrils by colours. The green was for thofe who reprefented the earth; the blue for the fea, &c.

CIRENCESTER, an ancient town of Gloucefterfhire in England. It was ftrongly fortified with walls and a caftle in the time of the Romans. The ruins of the walls and ftreets are, or were lately, to be feen in the adjacent meadows, where many Roman coins, chequered pavements, and infcriptions on marble, have been found. Two of the Roman confular ways crofs each other at this town. The foffe-way, which comes from Scotland, paffes through this county and town to Totnefs in Devonfhire. The other, called *Irminftreet*, comes from Gloucefter, and runs along to Southampton.

ampton. Not many years ago they discovered, by digging in a meadow near the town, an ancient building under ground, 50 feet long, 40 broad, and 4 high, and supported by 100 brick pillars, curiously inlaid with stones of various colours, supposed to have been a Roman bath. Cirencester has now but one church, in the windows of which are the remains of very valuable painted glass. The town is governed by two high constables, and 14 wards-men, who govern seven distinct wards; and it sends two members to parliament. It has a free-school, a charity-school, with several alms-houses; and is seated on the river Churn, 36 miles north-east of Bristol, and 88 west by north of London. W. Long. 0. 2. N. Lat. 51. 42.

CIRENZA, a city of Naples, capital of the Basilicate, with an archbishop's see. It was formerly a considerable place, but is now of small consequence. It is situated on the river Brandano, at the foot of the Apennine mountains, in E. Long. 16. 44. N. Lat. 40. 48.

CIRO-FERRI, an excellent Italian painter and architect, was born at Rome in 1614, and was the disciple of Peter de Cortona, whose designs he imitated with such exactness, that it is difficult to distinguish them. He was esteemed by Pope Alexander VII. and his three successors, and died at Rome in 1689.

CIRRUS, or CIRRHUS, in *Botany*, a clasper or tendril; that fine spiral string or fibre put out from the footstalks, by which some plants, as the ivy and vine, fasten themselves to walls, pales, or trees for support. The term is synonymous to the capreolus, clavicula, and viticulus of other botanists; and is ranked by Linnæus among the fulcra, or parts of plants that serve for protection, support, and defence.

Tendrils are sometimes placed opposite to the leaves, as in the vine; sometimes at the side of the footstalk of the leaf, as in the passion flower; and sometimes, as in winged pea, *pisum ochrus*, they are emitted from the leaves themselves. With respect to composition, they are either simple, that is, composed of one fibre or chord, as in the vetch; or compound, that is, consist of two, three, or more, as in the everlasting pea. Bitter sweet, *solanum dulcamara*, bignonia, and ivy, send forth tendrils which plant themselves like roots in the adjacent walls, or the bark of the neighbouring trees. Claspers, says the ingenious Dr Grew, are like trunk-roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circumvolutions, in which they mutually ascend and descend. In the mounting of the trunk, continues the same author, claspers serve for support. Thus, in vines, the branches being very long, fragile, and slender, would be liable to frequent breaking, unless, by means of their claspers, they were mutually contained together; so that the whole care is divided betwixt the gardener and nature: the former with his ligaments of leather, secures the main branches; and nature, with those of her own providing, secures the less. Their aptitude to this end is seen in their convolutions, a motion not proper to any other part; and also in their toughness, which is so much the more remarkable, as they are slenderer than the branches from which they proceed. In the trailing of the trunk, tendrils serve for stabilement and shade: thus, in cucumbers the trunk and branches being long and fragile, would be driven to and fro by the winds, to the great prejudice both of themselves and their tender fruits, were they not, by these ligaments, held fast together, and preserved in association and good fellowship. The same claspers serve likewise for shade, so that a natural arbour is formed by the branches of the cucumber, in the same manner as an artificial one is made by tangling together the branches of trees; for the branches, by the linking of the claspers, being couched together, the tender fruits lie under the umbrage of a bower made of their own leaves. Most of the pea-bloom flowers have twining claspers, that is, which wind to the right and back again.

CIRRI, in *Ichthyology*, certain oblong and soft appendages, not unlike little worms, hanging from the under jaws or mouths of some fishes; these cirri, commonly translated *beards*, afford marks to distinguish the different species of the fishes on which they are found.

CIRTA, in *Ancient Geography*, the metropolis and royal residence, not far from the river Ampsaga, in the inland parts of Numidia Propria. A colony, surnamed *Colonia Sittianorum*, very rich, when in the hands of Syphax. The colony was led by one P. Sittius, under the auspices of Cæsar, and was surnamed *Julia*. Now called *Constantina*, in Algiers. E. Long. 7. 0. N. Lat. 35. 30.

CISALPINE, any thing on this side the Alps. The Romans divided Gaul and the country now called *Lombardy*, into Cisalpine and Transalpine. That which was Cisalpine with regard to the Romans, is Transalpine with regard to us.

CISLEU, in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil, year, answering nearly to our November.

CISPADANA GALLIA, in *Ancient Geography*; a district of Italy, to the south of the Po, occupied by the Gauls in the time of the kings of Rome, separated from Liguria on the west, as is thought by the Iria, running from south to north into the Po; bounded on the south by the Apennine, and on the east by the Adriatic. The term is formed analogically, there being much mention in Cicero, Tacitus, Suetonius, and ancient inscriptions, made of the *Transpadani*; which and *Cispadani* are terms used with respect to Rome. Ptolemy calls the *Cispadana* peculiarly *Gallia Togata*, extending between the Po and Apennine, to the Sapis and Rubicon.

CISSA, or CISSUM, in *Ancient Geography*, a town of the Hither Spain, in Lusitania, on the east side of the Iberus (thought to be *Guissona*), where the Carthaginians were first defeated by Scipio. Another *Cissa* of Thrace, situated on the river Ægos Potamus, which Scylax seems to call *Cressa*, or *Crissa*; so that the reading is doubtful.

CISSAMPELOS. See BOTANY *Index*. There are two species of this genus, the pareira and caapeba, both natives of the warmest parts of America. The root of the second, applied externally, is said to be an antidote against the bites of venomous serpents. The plant being infused in water, quickly fills the liquor with a mucilaginous substance, which is as thick as jelly;

jelly; whence the name of *freezing-wyth*, by which this genus of plants has been diftinguifhed by the Brazilians.

CISSOID, in *Geometry*, a curve of the fecond order, firft invented by Diocles, whence it is called *the ciffoid of Diocles*. See FLUXIONS.

CISSUS, the WILD GRAPE. See BOTANY *Index*.

CISTERCIANS, in *Church-hiftory*, a religious order founded in the 11th century by St Robert a Benedictine. They became fo powerful, that they governed almoft all Europe, both in fpirituals and temporals. Cardinal de Vitri defcribing their obfervances, fays, they neither wore fkins nor fhirts, nor ever ate flefh, except in ficknefs; and abftained from fifh, eggs, milk, and cheefe: they lay upon ftraw-beds, in tunics and cowls; they rofe at midnight to prayers; they fpent the day in labour, reading, and prayer, and in all their exercifes obferved a continual filence. The habit of the Ciftercian monks is a white robe, in the nature of a caffock, with a black fcapulary and hood, and is girt with a wooden girdle. The nuns wear a white tunic, and a black fcapulary and girdle.

CISTERN, denotes a fubterraneous refervoir of rain-water; or a veffel ferving as a receptacle for rain or other water, for the neceffary ufes of a family. There are likewife lead-cifterns, jar-cifterns, &c.

Authors mention a ciftern at Conftantinople, the vaults of which are fupported by two rows of pillars, 212 in each row, each pillar being two feet in diameter. They are planted circularly, and *in radii* tending to that of the centre.

Anciently there were cifterns all over the country in Paleftine. There were fome likewife in cities and private houfes. As the cities for the moft part were built on mountains, and the rains fell regularly in Judea at two feafons in the year only, in fpring and autumn, people were obliged to keep water in cifterns in the country for the ufe of their cattle, and in cities for the conveniency of the inhabitants. There are ftill cifterns of very large dimenfions to be feen in Paleftine, fome whereof are 150 paces long, and 54 wide. There is one to be feen at Ramah of 32 paces in length, and 28 in breadth. Wells and cifterns, fprings and fountains, are generally confounded in fcripture-language.

CISTUS, the ROCK-ROSE. See BOTANY *Index*.

CITADEL, a place fortified with five or fix baftions, built on a convenient ground near a city, that it may command it in cafe of a rebellion.

CITADELLA, the capital town in the ifland of Minorca, in the Mediterranean, with a new harbour. This, with the whole ifland, was taken by General Stanhope and the confederate fleet in 1708, and ceded to Great Britain by the treaty of Utrecht in 1713; but it was taken by the French, after a brave defence, in 1756, and reftored by the peace. In 1782, it was taken by the Spaniards, and confirmed to them at the fubfequent peace. It is 27 miles weft of Port-Mahon. E. Long. 3. 30. N. Lat. 39. 58.

CITADINESCA, in *Natural Hiftory*, a name given by fome writers to the Florentine marble, which is fuppofed to reprefent towns, palaces, ruins, rivers, &c. Thefe delineations are merely accidental, and are commonly much affifted by the imagination, though the

natural lines of a ftone may fometimes luckily enough reprefent the ruins of fome ancient building, or the courfe of a river. In England there is a kind of feptaria, or ludus Helmontii, which has fometimes pretty beautiful, though very irregular, delineations of this kind. The Florentine marble, as we fee it wrought up in the ornaments of cabinets, &c. owes a great deal to the fkill of the workmen, who always pick out the proper pieces from the mafs, and difpofe them in the work fo as to reprefent what they pleafe.

CITATION, in ecclefiaftical courts, is the fame with fummons in civil courts. See SUMMONS.

CITATION, is alfo a quotation of fome law authority, or paffage of a book.

CITHÆRON, in *Ancient Geography*, a mountain and foreft of Bœotia, celebrated both in fable and fong. To the weft it ran obliquely, a little above the Sinus Criffæus, taking its rife contiguous to the mountains of Megara and Attica; then levelled into plains, it terminates at Thebes, famous for the fate of Pentheus and Actæon; the former torn by the Bacchæ, the latter by his dogs; as alfo for the *orgia*, or revels of Bacchus.

CITHARA, in antiquity, a mufical inftrument, the precife ftructure of which is not known; fome think it refembled the Greek delta Δ; and others the fhape of a half-moon. At firft it had only three ftrings, but the number was at different times increafed to 8, to 9, and laftly to 24. It was ufed in entertainments and private houfes, and played upon with a plectrum or quill, like the lyre.

CITHAREXYLON, FIDDLE-WOOD. See BOTANY *Index*.

CITIUM, CETIUM, or *Cittium*, in *Ancient Geography*, a town of Cyprus, fituated in the fouth of the ifland, famous for the birth of Zeno, author of the fect called *Stoics*; diftant two hundred ftadia to the weft of Salamis (Diodorus Siculus). A colony of Phœnicians, called *Chetim*: And hence it is that not only Cyprus, but the other iflands and many maritime places, are called *Chetim* by the Hebrews: now called *Chiti*.

CITIZEN, a native or inhabitant of a city, vefted with the freedom and liberties of it.

A citizen of Rome was diftinguifhed from a ftranger, becaufe he belonged to no certain commonwealth fubject to the Romans. A citizen is either by birth or election; and fons may derive the right from their fathers. To make a good Roman citizen, it was neceffary to be an inhabitant of Rome, to be inrolled in one of the tribes, and to be capable of dignities. Thofe to whom were granted the rights and privileges of Roman citizens were only honorary citizens. It was not lawful to fcourge a citizen of Rome.

CITRINUS, in *Natural Hiftory*, the name of a peculiar fpecies of fprig cryftal, which is of a beautiful yellow. Many of the common cryftals, when in the neighbourhood of lead mines, are liable to be accidentally tinged yellow, by an admixture of the particles of that metal; and all thefe, whether finer or coarfer, have been too frequently confounded together under the name *citrine*; but Dr Hill has afcertained this to be a peculiar fpecies of cryftal different from all the others in form as well as in colour; and diftinguifhed by the name of *ellipomacroftylum lucidum flavefcens*,

vescens, pyramide brevi. It is never found colourless like the other crystals, but has great variety of tinges, from that of the deeper ochres to a pale lemon colour. It is very plentiful in the West Indies, and is sometimes found in Bohemia. Our jewellers have learned from the French and Italians, who are very fond of it, to call it *citrine;* and often cut stones for rings out of it, particularly out of the pyramid, which is always finer than the column; and these, after they have passed through two or three hands, are generally mistaken for topazes.

CITRON-TREE. See CITRUS, BOTANY *Index*.

CITRON Water, a well-known strong water or cordial, which may be thus made: Take of fine thin lemon-peel, 18 ounces; of orange-peel, 9 ounces; perfect nutmegs, 4 ounces; the finest and best alcohol 2 gallons and a half. Digest in balneo mariæ for one night: draw off with a slow fire; then add as much water as will just make the matter milky (which will be about 7 quarts or 2 gallons; and lastly, add 2 pounds of fine sugar. This composition may be improved by fresh elder flowers, hung in a cloth in the head of the still, sprinkled with ambergris in powder, or its essence.

CITRON-Wood, the wood of an American tree, called by the natives *candle-wood*, because, being cut into splinters it burns like a candle. The tree is frequent in the Leeward islands, and grows to a considerable size: the leaves are like those of the bay-tree, but of a finer green; the flower is sweet, and much like those of the orange; the fruit succeeding these is black, and of the size of a pepper-corn. The trunk is so like the yellow saunders in colour, that there was once an opinion that it was the same tree, and much of it was imported into Europe, and sold as such; but they were soon found to be different; the saunders being of a sweet scent, and but moderately heavy and resinous: but the citron-wood considerably heavy, very oily, and of a strong smell. It is of no known use in medicine; but is used in France and Germany by the turners, being a fine firm-grained wood, and taking a fine polish, and with age becoming of a very beautiful brown.

CITRUS, the CITRON-TREE. See BOTANY *Index*. This genus includes the citron, the lemon, the lime, the orange, of which there are different varieties, the shaddock, and the forbidden fruit.

CITTERN, a musical instrument much resembling the guitar, for which it has been frequently mistaken. Anciently it was called the *cistrum*, and till lately was held in great contempt both in France and Britain. The practice on it being very easy, it was formerly the amusement and recreation of lewd women and their visitors, insomuch, that in many of the old English dramatic writers, it is made the symbol of a woman that lived by prostitution. It was also the common amusement of waiting customers in barbers shops, as being the most easy of all instruments to play on, and therefore it was thought that almost every body could make use of it.

CITY, according to Cowel, is a town corporate which hath a bishop and cathedral church; and is called *civitas*, *oppidum*, and *urbs*: *civitas*, in regard it is governed by justice and order of magistracy; *oppidum*, because it contains a great number of inhabitants; and *urbs* because it is in due form surrounded with walls.

Kingdoms have been said to contain as many cities as they have seats of archbishops and bishops; but, according to Blount, *city* is a word that hath obtained since the conquest; for, in the time of the Saxons, there were no cities, but all the great towns were called *burghs*, and even London was then called *Londonburgh*, as the capital of Scotland is called *Edinburgh*. And long after the conquest the word *city* is used promiscuously with the *burgh*, as in the charter of Leicester, where it is both called *civitas* and *burgus;* which shows that those writers were mistaken who tell us every city was, or is, a bishop's see. And though the word *city* signifies with us such a town corporate as hath usually a bishop and a cathedral church, yet it is not always so.

As to the ancient state of cities and villages, whilst the feudal policy prevailed, they held of some great lord on whom they depended for protection, and were subject to his arbitrary jurisdiction. The inhabitants were deprived of the natural and most unalienable rights of humanity. They could not dispose of the effects which their own industry had acquired, either by a latter will or by any deed executed during their life. They had no right to appoint guardians for their children during their minority. They were not permitted to marry without purchasing the consent of the lord on which they depended. If once they had commenced a law-suit, they durst not terminate it by an accommodation, because that would have deprived the lord, in whose court they pleaded, of the perquisites due to him on passing his sentence. Services of various kinds no less disgraceful than oppressive were exacted from them without mercy or moderation. The spirit of industry was checked in some cities by absurd regulations, and in others by unreasonable exactions; nor would the narrow and oppressive maxims of a military aristocracy have permitted it ever to rise to any degree of height or vigour.

Robertson's Charles V.

The freedom of cities was first established in Italy, owing principally to the introduction of commerce. As soon as they began to turn their attention towards this object, and to conceive some idea of the advantages they might derive from it, they became impatient to shake off the yoke of their insolent lords, and to establish among themselves such a free and equal government as would render property secure and industry flourishing. The German emperors, especially those of the Franconian and Suabian lines, as the seat of their government was far distant from Italy, possessed a feeble and imperfect jurisdiction in that country. Their perpetual quarrels, either with the popes or their own turbulent vassals, diverted their attention from the interior police of Italy, and gave constant employment for their arms. These circumstances induced some of the Italian cities towards the beginning of the 11th century, to assume new privileges; to unite together more closely, and to form themselves into bodies politic, under the government of laws established by common consent. The rights which many cities acquired by bold or fortunate usurpations, others purchased from the emperors, who deemed themselves gainers when they received large sums for immunities which they were no longer able to withhold; and some cities obtained

City.

tained them gratuitoufly from the facility or generofity of the princes on whom they depended. The great increafe of wealth which the crufades brought into Italy, occafioned a new kind of fermentation and activity in the minds of the people, and excited fuch a general paffion for liberty and independence, that, before the conclufion of the laft crufade, all the confiderable cities in that country had either purchafed or had extorted large immunities from the emperors.

This innovation was not long known in Italy before it made its way into France. Louis the Grofs, in order to create fome power that might counterbalance thofe potent vaffals who controlled or gave law to the crown, firft adopted the plan of conferring new privileges on the towns fituated within his own domain. Thefe privileges were called *charters of community*, by which he enfranchifed the inhabitants, abolifhed all marks of fervitude, and formed them into corporations or bodies politic, to be governed by a council and magiftrates of their own nomination. Thefe magiftrates had the right of adminiftering juftice within their own precincts; of levying taxes; of embodying and training to arms the militia of the town, which took the field when required by the fovereign under the command of officers appointed by the community. The great barons imitated the example of their monarch, and granted like immunities to the towns within their territories. They had wafted fuch great fums in their expeditions to the Holy Land, that they were eager to lay hold on this new expedient for raifing money by the fale of thofe charters of liberty. Though the conftitution of communities was as repugnant to their maxims of policy as it was adverfe to their power, they difregarded remote confequences in order to obtain prefent relief. In lefs than two centuries, fervitude was abolifhed in moft of the cities of France, and they became free corporations, inftead of dependent villages without jurifdiction or privileges. Much about the fame period the great cities of Germany began to acquire like immunities, and laid the foundations of their prefent liberty and independence. The practice fpread quickly over Europe, and was adopted in Spain, England, Scotland, and all the other feudal kingdoms.

The Spanifh hiftorians are almoft entirely filent concerning the origin and progrefs of communities in that kingdom; fo that it is impoffible to fix with any degree of certainty, the time and manner of their firft introduction there. It appears, however, from Mariana, that in the year 1350 eighteen cities had obtained a feat in the Cortes of Caftile. In Arragon, cities feem early to have acquired extenfive immunities, together with a fhare in the legiflature. In the year 1118, the citizens of Saragoffa had not only obtained political liberty, but they were declared to be of equal rank with the nobles of the fecond clafs; and many other immunities, unknown to perfons in their rank of life in other parts of Europe, were conferred upon them. In England, the eftablifhment of communities or corporations was pofterior to the conqueft. The practice was borrowed from France, and the privileges granted by the crown were perfectly fimilar to thofe above enumerated. It is not improbable, that fome of the towns in England were formed into corporations under the Saxon kings; and that the charters granted by the kings of the Norman race were not charters of enfranchifements from a ftate of flavery, but a confirmation of privileges which they had already enjoyed*. The Englifh cities, however, were very confiderable in the 12th century. A clear proof of this occurs in the hiftory juft referred to. Fitz-Stephen, a contemporary author, gives a defcription of the city of London in the reign of Henry II. and the terms in which he fpeaks of its trade, its wealth, and the number of its inhabitants, would fuggeft no inadequate idea of its ftate at prefent, when it is the greateft and moft opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flourifhed in the fame reign, and who had good opportunity of being informed, that this city, of which Fitz-Stephen gives fuch a pompous account, contained no more than 40,000 inhabitants. The other cities were fmall in proportion, and in no condition to extort any extenfive privileges. That the conftitution of the boroughs of Scotland in many circumftances refembles that of the towns of France and England, is manifeft from the *Leges Burgorum* annexed to the *Regiam Majeftatem.*

City ‖ Civic Crown.

* See *Lord Lyttlet n's Hiftory of Henry II.* vol. ii. p. 317.

CIVET, a kind of perfume which bears the name of the animal it is taken from, and to which it is peculiar. See VIVERRA.

Good civet is of a clear, yellowifh, or brownifh colour; not fluid nor hard, but about the confiftence of butter or honey, and uniform throughout; of a very ftrong fmell, quite offenfive when undiluted, but agreeable when only a fmall portion of civet is mixed with a large one of other fubftances. It unites eafily with oils both expreffed and diftilled, but not at all with water or alcohol; nor can it be rendered mifcible with water by the mediation of fugar. The yolk of an egg feems to difpofe it to unite with water; but in a very little while the civet feparates from the liquor, and falls to the bottom, though it does not prove of fuch a refinous tenacity as when treated with fugar and alcohol. It communicates, however, fome fhare of its fmell both to watery and fpirituous liquors: hence a fmall portion of it is often added in odoriferous tinctures, and fufpended in the ftill-head during the diftillation of odoriferous waters and fpirits. It is rarely if ever employed for medicinal purpofes. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its fcent; for oils wholly diffolve the fubftance of it. It is very rare, however, to meet with civet unadulterated. The fubftances ufually mixed with it are lard and butter, which agreeing with it in its general properties, render all criteria for diftinguifhing the adulteration impoffible. A great trade of civet is carried on at Calicut, Baffora, and other parts of the Indies, and in Africa, where the animal that produces the perfume is found. Live civet-cats are to be feen alfo in France and Holland. The French keep them only as a rarity; but the Dutch, who keep a great number, draw the civet from them for fale. It is moftly ufed by confectioners and perfumers.

CIVET-Cat, the Englifh name of the animal which produces the civet. See VIVERRA, MAMMALIA *Index*.

CIVIC CROWN, was a crown given by the ancient Romans to any foldier who had faved the life of a citizen in an engagement.

The civic crown was reckoned more honourable

than

than any other crown, though compofed of no better materials than oak boughs. Plutarch, in the life of C. M. Coriolanus, accounts as follows for ufing on this occafion the branches of this tree before all others: becaufe, fays, he, the oaken wreath being facred to Jupiter, the great guardian of their city, they thought it the moft proper ornament for him who had preferved the life of a citizen. Pliny *, fpeaking of the honour and privileges conferred on thofe who had merited this crown, fays, "They who had once obtained it, might wear it always." When they appeared at the public fpectacles, the fenate and people rofe to do them honour, and they took their feats on thefe occafions among the fenators. They were not only perfonally excufed from all troublefome offices, but procured the fame immunity for their father and grandfather by the father's fide.

* *Lib.* xvi. *cap.* 4.

CIVIDAD DE-LAS-PALMAS, the capital town of the ifland of Canary, with a bifhop's fee, and a good harbour. The houfes are well built, two ftories high, and flat-roofed. The cathedral is a very handfome ftructure; and the inhabitants are gay and rich. The air is temperate, and free from extremes of heat and cold. It is defended by a fmall caftle feated on a hill. W. Long. 14. 35. N. Lat. 28. 0.

CIVIDAD Real, a town of Spain, in New Caftile, and capital of La Mancha. The inhabitants are noted for dreffing leather extremely well for gloves. W. Long. 4. 15. N. Lat. 39. 2.

CIVIDAD Roderigo, a ftrong and confiderable town of Spain, in the kingdom of Leon, with a bifhop's fee. It is feated in a fertile country, on the river Agueda, in W. Long. 6. 52. N. Lat. 40. 38.

CIVIDAD-di-Friuli, a fmall but ancient town of Italy, in Friuli, and in the territory of Venice; feated on the river Natifona. E. Long. 13. 25. N. Lat. 46. 15.

CIVIL, in a general fenfe, fomething that regards the policy, public good, or peace, of the citizens or fubjects of the ftate; in which fenfe we fay, civil government, civil law, civil right, civil war, &c.

CIVIL, in a popular fenfe, is applied to a complaifant and humane behaviour in the ordinary intercourfe of life. See CIVILITY.

CIVIL, in a legal fenfe, is alfo applied to the ordinary procedure in an action, relating to fome pecuniary matter or intereft; in which fenfe it is oppofed to criminal.

CIVIL Death, any thing that cuts off a man from civil fociety; as a condemnation to the galleys, perpetual banifhment, condemnation to death, outlawry, and excommunication.

CIVIL Law, is properly the peculiar law of each ftate, country, or city: but what we ufually mean by the civil law, is a body of laws compofed out of the beft Roman and Grecian laws, compiled from the laws of nature and nations; and, for the moft part, received and obferved, throughout all the Roman dominions for above 1200 years. See LAW *Index*.

It was firft brought over into England by Theobald a Norman abbot, who was elected to the fee of Canterbury in 1138; and he appointed a profeffor, viz. Roger furnamed *Vicarius*, in the univerfity of Oxford, to teach it to the people of this country. Neverthelefs, it gained ground very flowly. King Stephen iffued a proclamation, prohibiting the ftudy of it. And though the clergy were attached to it, the laity rather wifhed to preferve the old conftitution. However, the zeal and influence of the clergy prevailed; and the civil law acquired great reputation from the reign of King Stephen to the reign of King Edward the III. both inclufive. Many tranfcripts of Juftinian's Inftitute are to be found in the writings of our ancient authors, particularly of Bracton and Fleta; and Judge Blackftone obferves, that the common law would have been loft and overrun by the civil, had it not been for the incident of fixing the court of common pleas in one certain fpot, and the forming the profeffion of the municipal law into an aggregate body.

It is allowed that the civil law contains all the principles of natural equity; and that nothing can be better calculated to form good fenfe and found judgment. Hence, though in feveral countries it has no other authority but that of reafon and juftice, it is everywhere referred to for authority. It is not received at this day in any nation without fome alterations; and fometimes the feudal law is mixed with it, or general and particular cuftoms; and often ordinances and ftatutes cut off a great part of it.

In Turkey, the Bafilics are only ufed. In Italy, the canon law and cuftoms have excluded a good part of it. In Venice, cuftom hath almoft an abfolute government. In the Milanefe, the feudal law and particular cuftoms bear fway. In Naples and Sicily, the conftitutions and laws of the Lombards are faid to prevail. In Germany and Holland, the civil law is efteemed to be the municipal law; but yet many parts of it are there grown obfolete; and others are altered, either by the canon law or a different ufage. In Friefland, it is obferved with more ftrictnefs; but in the northern parts of Germany, the jus Saxonicum, Lubecenfe, or Culmenfe, is preferred before it. In Denmark and Sweden, it hath fcarce any authority at all. In France, only a part of it is received, and that part is in fome places as a cuftomary law; and in thofe provinces neareft to Italy it is received as a municipal written law. In criminal caufes, the civil law is more regarded in France; but the manner of trial is regulated by ordinances and edicts. In Spain and Portugal, the civil law is connected with the jus regium and cuftom. In Scotland, the ftatutes of the federunt, part of the regiam majeftatem, and their cuftoms, controul the civil law.

In England, it is ufed in the ecclefiaftical courts, in the high court of admiralty, in the court of chivalry, in the two univerfities, and in the courts of equity; yet in all thefe it is reftrained and directed by the common law.

CIVIL Society. See LAW *Index*.

CIVIL State, in the Britifh polity, one of the general divifions of the LAITY, comprehending all orders of men, from the higheft nobleman to the meaneft peafant, that are not included under the MILITARY or MARITIME ftates; though it may fometimes include individuals of thefe as well as of the CLERGY; fince a nobleman, a knight, a gentleman, or a peafant, may become either a divine, a foldier, or a feaman. The divifion of this ftate is into NOBILITY and COMMONALTY. See thefe articles.

CIVIL War, a war between people of the fame ftate, or the citizens of the fame city.

CIVIL Year, is the legal year, or annual account of time, which every government appoints to be ufed within its own dominions; and is fo called in contradiftinction to the natural year, which is meafured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes fomething belonging to the civil law; but more efpecially the doctors and profeffors thereof are called *civilians*.

CIVILITY, a term ufed in common life as fynonymous with complaifance or good-breeding.

Civility is juftly inculcated by didactic writers as a duty of no flight confideration. Without civility, or good-breeding, a court would be the feat of violence and defolation. There, all the paffions are in fermentation; becaufe all purfue what but few can obtain; there, if enemies did not embrace, they would ftab; there, fmiles are often put on to conceal tears; there, mutual fervices are profeffed, while mutual injuries are intended; and there, the guile of the ferpent fimulates the gentlenefs of the dove. To what a degree muft good-breeding adorn the beauty of truth, when it can thus foften the deformity of falfehood? On this fubject we have the following elegant obfervations in Knox's Effays, N° 95.

"However juft the complaints of the mifery of life, yet great occafions for the difplay of beneficence and liberality do not often occur. But there is an hourly neceffity for the little kind offices of mutual civility. At the fame time that they give pleafure to others, they add to our own happinefs and improvement. Habitual acts of kindnefs have a powerful effect in foftening the heart. An intercourfe with polifhed and humane company tends to improve the difpofition, becaufe it requires a conformity of manners. And it is certain, that a fenfe of decorum, and of a proper external behaviour, will reftrain thofe whofe natural temper would otherwife break out in acrimonious and petulant converfation. Even the affectation of philanthropy will in time contribute to realife it. The pleafure refulting from an act of kindnefs naturally excites a wifh to repeat it; and indeed the general efteem which the character of benevolence procures, is fufficient to induce thofe to wifh for it who only act from the mean motives of felf-intereft.

"As we are placed in a world where natural evil abounds, we ought to render it fupportable to each other as far as human endeavours can avail. All that can add a fweet ingredient to the bitter cup muft be infufed. Amid the multitude of thorns, every flower that will grow muft be cultivated with care. But neither pomp nor power are of themfelves able to alleviate the load of life. The heart requires to be foothed by fympathy. A thoufand little attentions from all around us are neceffary to render our days agreeable. The appearance of neglect in any of thofe with whom we are connected, chills our bofom with chagrin, or kindles the fire of refentment. Nothing therefore feems fo likely to enfure happinefs as our mutual endeavours to promote it. Our fingle endeavours, originating and terminating in ourfelves, are ufually unfuccefsful. Providence has taken care to fecure that intercourfe which is neceffary to the exiftence of fociety, by rendering it the greateft fweetener of human life.

"By reciprocal attentions we are enabled to become beneficent without expence. A fmile, an affable addrefs, a look of approbation, are often capable of giving a greater pleafure than pecuniary benefits can beftow. The mere participation of the ftudies and amufements of others, at the fame time that it gratifies ourfelves, is often an act of real humanity; becaufe others would not enjoy them without companions. A friendly vifit in a folitary hour, is often a greater act of kindnefs than a valuable prefent.

"It is really matter of furprife, that thofe who are diftinguifhed by rank and opulence fhould ever be unpopular in their neighbourhood. They muft know the value of popularity; and furely nothing is more eafily obtained by a fuperior. Their notice confers honour, and the afpiring heart of man is always delighted with diftinction. A gracious look from them diffufes happinefs on the lower ranks. But it ufually happens, that an overgrown rich man is not the favourite of a neighbouring country; and it is unfortunate, that pride or inadvertence often prevent men from acting the godlike part of making others happy, even when they might do it without inconvenience to themfelves."

CIVITA-DI-PENNA, an ancient town of Italy, in the kingdom of Naples, and in the Farther Abruzzo, with a bifhop's fee. It is fituated near the river Salino, 25 miles north-eaft of Aquila. E. Long. 13. 3. N. Lat. 42. 25.

CIVITA Caftellana, a town of Italy, in St Peter's patrimony, feated on a river, which, feven miles from thence, falls into the Tiber. E. Long. 13. 5. N. Lat. 42. 15.

CIVITA Turchino, a place in Italy, about two miles north of the town of Corneto in the patrimony of St Peter. It is a hill of an oblong form, the fummit of which is almoft one continued plain. From the quantity of medals, intaglios, fragments of infcriptions, &c. that are occafionally found here, this is believed to be the very fpot where the ancient and powerful city of Tarquinii once ftood. At prefent it is only one continued field of corn. On the fouth-eaft fide of it runs the ridge of a hill which unites it to Corneto. This ridge is at leaft three or four miles in length, and almoft entirely covered with artificial hillocks, called by the inhabitants *monti-roffi*. About twelve of thefe hillocks have at different times been opened; and in every one of them have been found feveral fubterranean apartments cut out of the folid rock. Thefe apartments are of various forms and dimenfions; fome confift of a large outer room, and a fmall one within; others of a fmall room, at the firft entrance, and a large one within; others are fupported by a column of the folid rock left in the centre, with openings on every part. The entrance to them all is by a door about five feet high, by two and a half broad. Some of them have no light but from the door, while others feem to have had a fmall light from above, through a hole of a pyramidal form. Many of thefe apartments have an elevated port that runs all round the wall, being a part of the rock left for that purpofe. The moveables found in thefe apartments confift chiefly of Etrufcan vafes of various forms. In fome indeed have been found fome plain farcophagi of ftone, with bones in them. The whole of thefe apartments are ftuccoed, and ornamented in various manners:

manners: ſome indeed are plain; but others, particularly three, are richly adorned, having a double row of Etruſcan inſcriptions running round the upper part of the walls, and under them a kind of frieze of figures in painting; ſome have an ornament under the figures, which ſeems to ſupply the place of an architrave. The paintings ſeem to be in freſco; and in general reſemble thoſe which are uſually ſeen upon Etruſcan vaſes; though ſome of them are perhaps ſuperior to any thing as yet ſeen of the Etruſcan art in painting. In general they are ſlight, but well conceived; and prove, that the artiſt was capable of producing things more ſtudied and better finiſhed; though, in ſuch a ſubterraneous ſituation, the delicacy of a finiſhed work would in a great meaſure have been thrown away. It is probable, however, that among the immenſe number of theſe apartments that yet remain to be opened, many paintings and inſcriptions may be found, ſufficient to form a very uſeful and entertaining work. At preſent this great ſcene of antiquities is almoſt entirely unknown, even in Rome. Mr Jenkins, reſident at Rome, was the firſt Engliſhman who viſited it.

CIVITA Vecchia, a ſea port town of Italy in the patrimony of St Peter, with a good harbour and an arſenal. Here the Pope's galleys are ſtationed, and it has lately been made a free port; but the air is very unwholeſome. E. Long. 12. 31. N. Lat. 45. 5.

CIVOLI, or CIGOLI, *Lewis*, an Italian painter, whoſe family name was *Cardi*, was born at the caſtle of Cigoli, in Tuſcany, in the year 1559. His *ecce homo*, which he performed as a trial of ſkill with Barochio and Michael Angelo de Caravaggio, was judged better than thoſe executed by them. He excelled in deſigning, and was employed by the popes and princes of his time. He died at Rome in 1613.

CIUS, in *Ancient Geography*, a town and river of Bithynia, which gave name to the Sinus Cianus. The town was afterwards called *Pruſa*, Cius having been deſtroyed by Philip father of Perſeus, and rebuilt by Pruſias king of Bithynia. In the river, Hylas, the favourite boy of Hercules, was drowned; (Apollonius Rhodius).

CLAC, among countrymen. To clack wool, is to cut off the ſheep's mark, which makes the weight leſs, and yields leſs cuſtom to the king.

CLACKMANNAN, the name of a ſmall ſhire in Scotland, not exceeding eight miles in length and five in breadth. It is bounded on the ſouth by the frith of Forth; on the north and weſt by Perthſhire; and on the eaſt by Fife. The country is plain and fertile towards the frith, producing corn and paſture in abundance. It likewiſe yields great abundance of excellent coal, conſiderable quantities of which are ſhipped to ſupply Edinburgh with fuel. It is watered by the rivers Forth and Devon, and joins the ſhire of Kinroſs in ſending a member alternately to parliament.

Population of the different Pariſhes in this County at two Periods.

	In 1755.	In 1790—1798.
Alloa,	5816	4802
Clackmannan,	1913	2528
Dollar,	517	510
Tillicoultry	757	909
	9003	8749
	8749	
Decreaſe,	254 *	

* Statiſt. Hiſt.

CLACKMANNAN, a ſmall town of Scotland, and capital of the county of that name, is ſituated on the northern ſhore of the Forth, in W. Long. 3. 40. N. Lat. 56. 15. It ſtands on a hill, on the top of which is the caſtle, commanding a noble proſpect. It was long the ſeat of the chief of the Bruces, who was hereditary ſheriff of the county before the juriſdictions were aboliſhed. The large ſquare tower is called after the name of *Robert Bruce*, whoſe great ſword and caſque are ſtill preſerved here. The hill is prettily wooded; and, with the tower, forms a pictureſque object. Clackmannan is ſtill the ſeat of the Bruces of Kennet.

CLAGENFURT, a ſtrong town of Germany, and capital of Carinthia, ſituated in E. Long. 13. 56. N. Lat. 46. 50.

CLAGET, WILLIAM, an eminent and learned divine, born in 1646. He was preacher to the ſociety of Gray's Inn, which employment he exerciſed until he died in 1688, being then alſo one of the king's chaplains. Archbiſhop Sharp gives him an excellent character; and Biſhop Burnet has ranked him among thoſe worthy men whoſe lives and labours contributed to reſcue the church from the reproaches which the follies of others had drawn upon it. Dr Claget publiſhed ſeveral things; but his principal work is his "Diſcourſe concerning the Operations of the Holy Spirit;" nor muſt it be forgotten that he was one of thoſe excellent divines who made a noble ſtand againſt the deſigns of James II. to introduce popery. Four volumes of his ſermons were publiſhed after his death by his brother Nicholas Claget, archdeacon of Sudbury, father of Nicholas Claget afterwards biſhop of Exeter.

CLAIM, in *Law*, a challenge of intereſt in any thing that is in poſſeſſion of another.

CLAIR OBSCURE. See *CLARO-Obſcuro*.

CLAIRAULT, ALEXIS, of the French academy of ſciences, was one of the moſt illuſtrious mathematicians in Europe. He read to the academy in 1726, when he was not 13 years old, "A Memoir upon Four new Geometrical Curves of his own invention;" and ſupported the character he thus laid a foundation for by various publications from time to time. He publiſhed *Elémens de Géometrie*, 1741, in 8vo; *Elémens d'Algebre*, 1746, in 8vo; *Theorie de la Figure de la Terre*, 1743, in 8vo.; *Tables de la Lune*, 1754, in 8vo. He was concerned alſo in the *Journal de Sçavans*, which he furniſhed with many excellent extracts. He died in 1765. He was one of the academicians who were ſent into the north to determine the figure of the earth.

CLAM, in *Zoology*, a ſhell-fiſh. See VENUS.

CLAMP, a piece of wood joined to another.

CLAMP is likewiſe the term for a pile of unburnt bricks

bricks built up for burning. These clamps are built much after the same manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to ascend by; but with this difference, that instead of arching, they truss over, or over-span; that is, the end of one brick is laid about half way over the end of another, and so till both sides meet within half a brick's length, and then a binding brick at the top finishes the arch.

CLAMP in a ship, denotes a piece of timber applied to a mast or yard to prevent the wood from bursting; and also a thick plank lying fore and aft under the beams of the first orlop, or second deck, and is the same that the rising timbers are to the deck.

CLAMP Nails, such nails as are used to fasten on clamps in the building or repairing of ships.

CLAMPETIA, in *Ancient Geography*, a town of the Bruttii, one of those which revolted from Hannibal (Livy;) called *Lampetia* by Polybius. Now *Amantia*, or *Mantia*, a town of Calabria Ultra, near the bay of Euphemia. E. Long. 16. 20. N. Lat. 39. 15.

CLAMPING, in joinery, is the fitting a piece of board with the grain to another piece of board cross the grain. Thus the ends of tables are commonly clamped, to prevent their warping.

CLANDESTINE, any thing done without the knowledge of the parties concerned, or without the proper solemnities. Thus a marriage is said to be clandestine, when performed without the publication of bans, the consent of parents, &c.

CLANS, in history, and particularly in that of Scotland. The nations which overran Europe were originally divided into many small tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to bestow a portion, in the first place, upon those of his own tribe or family. These all held their lands of him; and as the safety of each individual depended on the general union, these small societies clung together, and were distinguished by some common appellation, either patronymical or local, long before the introduction of surnames or ensigns armorial. But when these became common, the descendants and relations of every chieftain assumed the same name and arms with him; other vassals were proud to imitate their example; and by degrees they were communicated to all those who held of the same superior. Thus clanships were formed; and in a generation or two, that consanguinity which was at first in a great measure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the superior of their lands and the chief of their blood; and served him not only with the fidelity of vassals, but the affection of friends. In the other feudal kingdoms, we may observe such unions as we have described, imperfectly formed; but in Scotland, whether they were the production of chance, or the effect of policy, or strengthened by their preserving their genealogies both genuine and fabulous, clanships were universal. Such a confederacy might be overcome; it could not be broken; and no change of manner or government has been able, in some parts of the kingdom, to dissolve associations which are founded upon prejudices so natural to the human mind. How formidable were nobles at the head of followers, who, counting that cause just and honourable which their chief approved, were ever ready to take the field at his command, and to sacrifice their lives in defence of his person or of his fame! Against such men a king contended with great disadvantage; and that cold service, which money purchases, or authority extorts, was not an equal match for their ardour and zeal.

[Margin: Robertson's History of Scotland.]

Some imagine the word *clan* to be only a corruption of the Roman *colonia*; but Mr Whittaker asserts it to be purely British, and to signify a *family*.

CLAP, in *Medicine*, the first stage of the venereal disease, more usually called a GONORRHOEA.

CLAP-Net, in birding, a sort of net contrived for the taking of larks with the looking-glass, by the method called *daring* or *doring*. The nets are spread over an even piece of ground, and the larks are invited to the place by other larks fastened down, and by a looking-glass composed of five pieces, and fixed in a frame so that it is turned round very swiftly backwards and forwards, by means of a cord pulled by a person at a considerable distance behind a hedge. See DORING.

CLAR, or CLAER, in *Metallurgy*, bone-ashes perfectly calcined, and finely powdered, kept purposely for covering the insides of CUPELS.

CLARAMONT POWDER, a kind of earth, called *terra de Baira*, from the place where it is found; it is famous at Venice, for its efficacy in stopping hemorrhagies of all kinds, and in curing malignant fevers.

PRECEPT *of* CLARE CONSTAT, in *Scots Law*, the warrant of a superior for entering and infefting the heir of his former vassal, without the interposition of an inquest.

Nuns of St CLARE, were founded at Assisa in Italy, about the year 1212. These nuns observed the rule of St Francis, and wore habits of the same colour with those of the Franciscan friars; and hence were called *Minoresses*; and their house, without Aldgate, the Minories, where they were settled when first brought over into England, about the year 1293. They had only three houses besides this.

CLARE, a market-town of Suffolk, 13 miles south of Bury. E. Long. 0. 35. N. Lat. 52. 15. It gives the title of earl to the duke of Newcastle.

CLARE is also the capital of a county of the same name in the province of Connaught, in Ireland, situated about 17 miles north-west of Limerick. W. Long. 9. 0. N. Lat. 52. 40.

CLARENCIEUX, the second king at arms, so called from the duke of Clarence, to whom he first belonged; for Lionel, third son to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards escheating to Edward IV. he made this earl a king at arms. His office is to marshal and dispose of the funerals of all the lower nobility, as baronets, knights, esquires, on the south side of the Trent; whence he is sometimes called *surroy* or *south-roy*, in contradistinction to *norroy*.

CLARENDON, *Constitutions of*, certain constitutions made in the reign of Henry II. A. D. 1164, in a parliament held at Clarendon, whereby the king checked the power of the pope and his clergy, and greatly

greatly narrowed the total exemption they claimed from secular jurisdiction.

CLARENDON, *Earl of*. See HYDE.

CLARENNA, (Tabulæ), in *Ancient Geography*, a town of Vindelicia, at the confluence of the Lycus and Danube. Now *Rain*, a town of Bavaria, on the south side of the Danube, at the confluence of the Lech. E. Long. 11. 0. N. Lat. 48. 45.

CLARENZA, the capital of a duchy of the same name in the Morea; it is a sea-port town, situated on the Mediterranean. E. Long. 21. 40. N. Lat. 37. 40.

CLARET, a name given by the French to such of their red wines as are not of a deep or high colour. See WINE.

CLARICHORD, or MANICHORD, a musical instrument in form of a spinet.

It has 49 or 50 stops, and 70 strings, which bear on five bridges; the first whereof is the highest, the rest diminishing in proportion. Some of the strings are in unison, their number being greater than that of the stops. There are several little mortizes for passing the jacks, armed with brass-hooks, which stop and raise the chords instead of the feather used in virginals and spinets; but what distinguishes it most is, that the chords are covered with pieces of cloth, which render the sound sweeter, and deaden it so that it cannot be heard at any considerable distance; whence it comes to be particularly in use among the nuns, who learn to play, and are unwilling to disturb the silence of the dormitory.

CLARIFICATION, the act of cleaning or fining any fluid from all heterogeneous matter or feculencies.

The substances usually employed for clarifying liquor, are whites of eggs, blood, and isinglass. The two first are used for such liquors as are clarified whilst boiling hot; the last for those which are clarified in the cold, such as wines, &c. The whites of eggs are beaten up into a froth, and mixed with the liquor, upon which they unite with and entangle the impure matters that float in it; and presently growing hard by the heat, carry them up to the surface in form of a scum, no longer dissoluble in the liquid. Blood operates in the same manner, and is chiefly used in purifying the brine from which salt is made. Great quantities of isinglass are consumed for fining turbid wines. For this purpose some throw an entire piece, about a quarter of an ounce, into a wine cask; by degrees the glue dissolves, and forms a skin upon the surface, which at length subsiding, carries down with it the feculent matter which floated in the wine. Others previously dissolve the isinglass; and having boiled it down to a slimy consistence, mix it with the liquor, roll the cask strongly about, and then suffer it to stand to settle. Neumann questions the wholesomeness of wines thus purified, and assures us that he himself, after drinking only a few ounces of sack thus clarified, but not settled quite fine, was seized with sickness and vomiting, followed by such a vertigo, that he could not stand upright for a minute together. The giddiness continued with a nausea and want of appetite for several days.

CLARIGATIO, in Roman antiquity, a ceremony that always preceded a formal declaration of war. It was performed in this manner: first four heralds crowned with vervain were sent to demand satisfaction for the injuries done the Roman state. These heralds taking the gods to witness that their demands were just, one of them, with a clear voice, demanded restitution within a limited time, commonly 33 days, which being expired without restitution made, then the *pater patratus*, or prince of the heralds, proceeded to the enemies frontiers, and declared war.

CLARII APOLLINIS FANUM (Strabo, Pliny), a temple and grove of Apollo, situated between Colophon and Lebedos, in Ionia; called *Claros* (Thucydides, Ovid). The name also of a town and mountain there (Nicander); and of a fountain (Clemens Alexandrinus), the waters of which inspired with prophetic fury. *Clarius* the epithet of Apollo (Strabo).

CLARION, a kind of trumpet, whose tube is narrower and its tone acuter and shriller than that of the common trumpet. It is said that the clarion, now used among the Moors, and Portuguese who borrowed it from the Moors, served anciently for a treble to several trumpets, which sounded tenor and bass.

CLARISSES, an order of nuns so called from their founder St Clara or St Clare. (See St CLARE.) She was in the town of Assisa in Italy; and having renounced the world to dedicate herself to religion, gave birth to this order in the year 1212; which comprehends not only those nuns that follow the rule of St Francis, according to the strict letter, and without any mitigation, but those likewise who follow the same rule softened and mitigated by several popes. It is at present one of the most flourishing orders of nuns in Europe. After Ferdinand Cortez had conquered Mexico for the king of Spain, Isabella of Portugal, wife of the emperor Charles V. sent thither some nuns of the order of St Clara, who made several settlements there. Near their monasteries were founded communities of Indian young women, to be instructed by the clarisses in religion, and such works as were suitable to persons of their sex. These communities are so considerable that they usually consist of four or five hundred.

CLARKE, DR SAMUEL, a preacher and writer of considerable note in the reign of Charles II. was, during the interregnum, and at the time of the ejection, minister of St Dennet Fink in London. In November 1660, he, in the name of the Presbyterian ministers, presented an address of thanks to the king for his declaration of liberty of conscience. He was one of the commissioners of the Savoy, and behaved on that occasion with great prudence and moderation. He sometimes attended the church as a hearer and communicant, and was much esteemed by all that knew him, for his great probity and industry. The most valuable of his numerous works are said to be his Lives of the Puritan Divines and other persons of note, 22 of which are printed in his Martyrology; the rest are in his Lives of sundry eminent Persons in this latter Age, folio; and his Marrow of Ecclesiastical History, in folio and quarto. He died in 1680.

CLARK, *Samuel*, the son of the former, was fellow of Pembroke-hall in Cambridge; but was ejected from his fellowship for refusing to take the engagements, as he was also afterwards from his rectory of Grendon in Buckinghamshire. He applied himself early to the study of the Scriptures, and his Annotations on the Bible, printed together with the sacred text, is highly commended

Clarke.

commended by Dr Owen, Mr Baxter, and Dr Calamy. He died in 1701, aged 75.

CLARKE, *Dr Samuel*, a very celebrated English divine, was the son of Edward Clarke, Esq. alderman of Norwich, and one of its representatives in parliament for several years; and born there October 11. 1675. He was instructed in classical learning at the free-school of that town; and in 1691 removed thence to Caius College in Cambridge, where his uncommon abilities soon began to display themselves. Though the philosophy of Des Cartes was at that time the established philosophy of the university, yet Clarke easily mastered the new system of Newton; and in order to his first degree of arts, performed a public exercise in the schools upon a question taken from it. He greatly contributed to the establishment of the Newtonian philosophy by an excellent translation of, and notes upon, Rohault's "Physics," which he finished before he was 22 years of age. The system of natural philosophy then generally taught in the university was that written by Rohault, founded altogether upon Cartesian principles, and very ill translated into Latin. Clarke gave a new translation, and added to it such notes as might lead students insensibly and by degrees to other and truer notions than could be found there. "And this certainly (says Bishop Hoadly) was a more prudent method of introducing truth unknown before, than to attempt to throw aside this treatise entirely, and write a new one instead of it. The success answered exceedingly well to his hopes; and he may justly be styled a great benefactor to the university in this attempt. For by this means the true philosophy has, without any noise, prevailed; and to this day the translation of Rohault is, generally speaking, the standing text for lectures, and his notes the first direction to those who are willing to receive the reality and truth of things in the place of invention and romance." Whiston relates, that in 1697, while he was chaplain to Moore bishop of Norwich, he met young Clarke, then wholly unknown to him, at a coffeehouse in that city; where they entered into a conversation about the Cartesian philosophy, particularly Rohault's "Physics," which Clarke's tutor, as he tells us, had put him upon translating. "The result of this conversation was (says Whiston), that I was greatly surprised that so young a man as Clarke then was should know so much of those sublime discoveries, which were then almost a secret to all but to a few particular mathematicians. Nor do I remember (continues he) above one or two at the most, whom I had then met with, that seemed to know so much of that philosophy as Clarke." This translation of Rohault was first printed in 1697, 8vo. There have been four editions of it, in every one of which improvements have been made; especially in the last in 1718, which has the following title: *Jacobi Rohaulti Physica. Latinè vertit, recensuit, et uberioribus jam Annotationibus, ex illustrissimi Isaaci Newtoni Philosophia maximam partem haustis, amplificavit et ornavit S. Clarke, S. T. P. Accedunt etiam in hac quarta editione novæ aliquot tabulæ æri incisæ, et Annotationes multum sunt auctæ.* Dr John Clarke, late dean of Sarum, and our author's brother, translated this work into English, and published it in 2 vols 8vo.

Afterwards he turned his thoughts to divinity; and in order to fit himself for the sacred function, he studied the Old Testament in the original Hebrew, the New in the original Greek, and the primitive Christian writers. Having taken holy orders, he became chaplain to Moore bishop of Norwich, who was ever after his constant friend and patron. In 1699 he published two treatises: one entitled "Three practical Essays on Baptism, Confirmation, and Repentance;" the other, "Some Reflections on that part of a book called Amyntor, or a Defence of Milton's Life, which relates to the Writings of the Primitive Fathers, and the Canon of the New Testament." In 1701 he published "A Paraphrase upon the Gospel of St Matthew; which was followed in 1702 by the "Paraphrases upon the Gospels of St Mark and St Luke," and soon after by a third volume "upon St John." They were afterwards printed together in 2 volumes 8vo; and have since undergone several editions. He intended to have gone through the remaining books of the New Testament, but something accidentally interrupted the execution.

Meanwhile Bishop Moore gave him the rectory of Drayton, near Norwich, and procured for him a parish in that city; and these he served himself in that season when the bishop resided at Norwich. In 1704 he was appointed to preach Boyle's lecture; and the subject he chose was, "The being and attributes of God." He succeeded so well in this, and gave such high satisfaction, that he was appointed to preach the same lecture the next year; when he chose for his subject "The evidences of natural and revealed religion." These sermons were first printed in two distinct volumes; the former in 1705, the latter in 1706. They have been since printed in one volume, under the general title of "A Discourse concerning the Being and Attributes of God, the Obligations of natural Religion, and the Truth and Certainty of the Christian Revelation, in opposition to Hobbes, Spinoza, the Author of the Oracles of Reason, and other Deniers of natural and revealed Religion." Clarke having endeavoured in the first part of his work to show, that the being of a God may be demonstrated by arguments *à priori*, is unluckily involved in the censure which Pope has passed upon this method of reasoning in the following lines. They are put into the mouth of one of his dunces, addressing himself to the goddess Dulness:

> "Let others creep by timid steps and slow,
> "On plain experience lay foundations low,
> "By common sense to common knowledge bred,
> "And lost to nature's cause through nature led.
> "All-seeing in thy mists, we want no guide,
> "Mother of arrogance, and source of pride!
> "We nobly take the high priori road,
> "And reason downward, till we doubt of God."
>
> *Dunciad*, b. 4. l. 455.

Upon which we have the following note: "Those who, from the effects in this visible world, deduce the eternal power and godhead of the First Cause, though they cannot attain to an adequate idea of the Deity, yet discover so much of him as enables them to see the end of their creation and the means of their happiness; whereas they who take this high priori road, as Hobbes, Spinoza, Des Cartes, and some better rea-

soners,

Clarke.

soners, for one that goes right, ten lose themselves in mist, or ramble after visions, which deprive them of all sight of their end, and mislead them in the choice of wrong means." Clarke, it is probable, would not have denied this; and the poet perhaps would have spared his better reasoners, and not have joined them with such company, had he recollected our author's apology for using the argument *à priori.* "The argument *à posteriori* (says he) is indeed by far the most generally useful argument, most easy to be understood, and in some degree suited to all capacities; and therefore it ought always to be insisted upon: But for as much as atheistical writers have sometimes opposed the being and attributes of God by such metaphysical reasonings, as can no otherwise be obviated than by arguing *à priori;* therefore this manner of arguing also is useful and necessary in its proper place." To this may be added the answer he made to Mr Whiston upon this occasion, as narrated by the latter in his Historical Memoirs. "When Clarke brought me his book, I was in my garden against St Peter's college in Cambridge, where I then lived. Now I perceived that in these sermons he had dealt a great deal in abstract and metaphysical reasoning. I therefore asked him how he ventured into such subtleties, which I never durst meddle with? and showing him a nettle, or some contemptible weed in my garden, I told him that weed contained better arguments for the being and attributes of God than all his metaphysics. Clarke confessed it to be so; but alleged for himself, that since such philosophers as Hobbes and Spinoza had made use of those kind of subtleties against, he thought proper to show that the like way of reasoning might be made better use of on the side of, religion; which reason or excuse I allowed to be not inconsiderable." Undoubtedly, as the present editor of the Biographia Britannica observes, the grand, the proper, the decisive proof of the existence, perfections, and providence of the Deity, must be drawn from his works. On this proof, as being equally satisfactory to the profoundest philosopher and the meanest peasant, the cause of religion will ever stand secure. Nevertheless, if there be such a thing as an argument *à priori*, why may not speculative men be employed in its examination? Several able divines and philosophers have thought, and still think, that this argument for the being and attributes of God will stand the test of the severest scrutiny; and therefore they cannot be blamed for endeavouring to set it in a convincing light to others. As to the merit, indeed, of the whole work under consideration, including the evidences of natural and revealed religion, it is undoubtedly of the first order. Difficulties may be raised on particular points, and the ablest and most candid inquirers may sometimes see cause to hesitate with regard to the validity of the reasoning; but still, in general, the book reflects honour on the age as well as the author that produced it, and will descend, with distinguished reputation, to a late posterity. The defence, in particular, of the sacred original and authority of Christianity is admirably conducted.

In 1706 he published "A Letter to Mr Dodwell;" wherein all the arguments in his epistolary discourse against the immortality of the soul are particularly answered, and the judgment of the fathers, to whom Mr Dodwell had appealed concerning that matter, truly represented. Bishop Hoadly observes, that in this letter he answered Mr Dodwell in so excellent a manner, both with regard to the philosophical part, and to the opinions of some of the primitive writers, upon whom these doctrines were fixed, that it gave universal satisfaction. But this controversy did not stop here; for the celebrated Collins, coming in as a second to Dodwell, went much farther into the philosophy of the dispute, and indeed seemed to produce all that could possibly be said against the immateriality of the soul, as well as the liberty of human actions. This enlarged the scene of the dispute, into which our author entered, and wrote with such a spirit of clearness and demonstration, as at once showed him greatly superior to his adversaries in metaphysical and physical knowledge, and made every intelligent reader rejoice, that such an incident had happened to provoke and extort from him that plenty of strong reasoning and perspicuity of expression, which were indeed very much wanted upon this intricate and obscure subject. "And I am persuaded (continues the bishop), that as what he has written in this controversy comprehends the little that the ancients had said well, and adds still more evidence than ever appeared clearly before, and all in words that have a meaning to them, it will remain the standard of good sense on that side of the question, on which he spent so many of his thoughts, as upon one of his favourite points." Clarke's letter to Dodwell was soon followed by four defences of it, in four several letters to the author of "A letter to the learned Mr Henry Dodwell, containing some Remarks on a pretended Demonstration of the Immateriality and natural Immortality of the Soul, in Mr Clarke's Answer to his late Epistolary Discourse, &c." They were afterwards all printed together; and the "Answer to Toland's Amyntor" added to them. In the midst of all these labours, he found time to show his regard to mathematical and physical studies, and exact knowledge and skill in them. And his natural affection and capacity for these studies were not a little improved by the friendship of Sir Isaac Newton, at whose request he translated his "Optics" into Latin in 1706. With this version Sir Isaac was so highly pleased, that he presented him with the sum of 500l. or 100l. for each child, Clarke having then five children.

This year also, Bishop Moore, who had long formed a design of fixing him more conspicuously, procured for him the rectory of St Bennet's, Paul's Wharf, in London; and soon after carried him to court, and recommended him to the favour of Queen Anne. She appointed him one of her chaplains in ordinary; and, in consideration of his great merit, and at the request of the bishop, presented him to the rectory of St James's, Westminster, when it became vacant in 1709. Upon his advancement to this station, he took the degree of D.D. when the public exercise which he performed for it at Cambridge was prodigiously admired. The questions which he maintained were these: 1. "Nullum fidei Christianæ dogma, in sacris scripturis traditum, est rectæ rationi dissentaneum;" that is, "No article of the Christian faith, delivered in the Holy Scriptures, is disagreeable to right reason." 2. "Sine actionum humanarum libertate nulla potest esse religio;" that is, "Without the liberty of human actions.

Clarke.

tions there can be no religion." His thesis was upon the first of these questions, which being thoroughly sifted by that most acute disputant Professor James, he made an extempore reply, in a continued discourse for near half an hour, with so little hesitation, that many of the auditors declared themselves astonished; and owned, that if they had not been within sight of him, they should have supposed him to have read every word of it from a paper. After this, through the course of the syllogistical disputation, he guarded so well against the arts which the professor was a complete master of; replied so readily to the greatest difficulties such an objector could propose; and pressed him so close and hard with clear and intelligible answers, that perhaps there never was such a conflict heard in those schools. The professor, who was a man of humour as well as learning, said to him at the end of the disputation, "Profecto, me probè exercuisti;" that is, "On my word, you have worked me sufficiently;" and the members of the university went away, admiring, as indeed they well might, that a man even of Clarke's abilities, after an absence of so many years, and a long course of business of quite another nature, should acquit himself in such a manner, as if this sort of academical exercise had been his constant employment; and with such fluency and purity of expression, as if he had been accustomed to no other language in conversation but Latin. The same year 1709, he revised and corrected Whiston's translation of the "Apostolical Constitutions" into English. Whiston tells us, that his own studies having been chiefly upon other things, and having rendered him incapable of being also a critic in words and languages, he desired his great friend and great critic Dr Clarke to revise that translation, which he was so kind as to agree to.

In 1712, he published a most beautiful and pompous edition of Cæsar's commentaries, adorned with elegant sculptures. It is entitled, "C. Julii Cæsaris quæ extant, accuratissimè cum libris editis et mss. optimis collata, recognita, et correcta; accesserunt annotationes Samuelis Clarke, S. T. P. item indices locorum, rerumque et verborum, utilissimæ." It was printed in 1712, folio; and afterwards, in 1720, 8vo. It was dedicated to the great duke of Marlborough, "at a time," says Bishop Hoadly, "when his unequalled victories and successes had raised his glory to the highest pitch abroad, and lessened his interest and favour at home." In the publication of this book, the doctor took particular care of the punctuation. In the annotations, he selected what appeared the best and most judicious in former editors, with some corrections and emendations of his own interspersed. Mr Addison has spoken of this folio edition of Cæsar's commentaries in the following words: "The new edition, which is given us of Cæsar's commentaries, has already been taken notice of in foreign gazettes, and is a work that does honour to the English press. It is no wonder that an edition should be very correct, which has passed through the hands of one of the most accurate, learned, and judicious writers this age has produced. The beauty of the paper, of the character, and of the several cuts with which this noble work is illustrated, makes it the finest book that I have ever seen; and is a true instance of the English genius, which, though it does not come the first into any art, generally carries it to greater heights than any other country in the world." This noble work has risen in value from that time to the present. A copy of this edition in large paper, most splendidly bound in morocco, was sold at the Hon. Mr Beauclerk's sale for forty-four pounds; and it was said to be purchased by the duke of Grafton. "To a prince or a nobleman (says Dr Harwood), it was a cheap purchase; for it was the most magnificent book I ever beheld." The binding cost Mr Beauclerk five guineas.

The same year, 1712, he published his celebrated book entitled, "The Scripture Doctrine of the Trinity," &c. which is divided into three parts. The first is, a collection and explication of all the texts in the "New Testament," relating to the doctrine of the Trinity: in the second, the foregoing doctrine is set forth at large, and explained in particular and distinct propositions; and in the third, the principal passages in the liturgy of the church of England, relating to the doctrine of the Trinity, are considered. Bishop Hoadly applauds our author's method of proceeding, in forming his sentiments upon so important a point: "He knew (says he), and all men agreed, that it was a matter of mere revelation. He did not therefore retire into his closet, and set himself to invent and forge a plausible hypothesis, which might sit easily upon his mind. He had no recourse to abstract and metaphysical reasonings to cover or patronize any system he might have embraced before. But, as a Christian, he laid open the New Testament before him. He searched out every text in which mention was made of the three persons, or any one of them. He accurately examined the meaning of the words used about every one of them; and by the best rules of grammar and critique, and by his skill in language, he endeavoured to fix plainly what was declared about every person, and what was not. And what he thought to be the truth, he published under the title of 'The Scripture Doctrine of the Trinity.' "I am far (says the bishop) from taking upon me to determine, in so difficult a question between him and those who made replies to him; but this I hope I may be allowed to say, that every Christian divine and layman ought to pay his thanks to Dr Clarke for the method into which he brought this dispute; and for that collection of texts of the New Testament by which at last it must be decided, on which side soever the truth may be supposed to lie." Whiston informs us, that some time before the publication of this book, there was a message sent to him from Lord Godolphin and others of Queen Anne's ministers, importing, "That the affairs of the public were with difficulty then kept in the hands of those that were for liberty; that it was therefore an unseasonable time for the publication of a book that would make a great noise and disturbance; and that therefore they desired him to forbear till a fitter opportunity should offer itself;" which message (says he) the doctor had no regard to, but went on according to the dictates of his own conscience with the publication of his book. The ministers, however, were very right in their conjectures; for the work made noise and disturbance enough, and occasioned a great number of books and pamphlets, written by himself and others.

Clarke.

Books and pamphlets, however, were not all which the "Scripture Doctrine of the Trinity" occasioned: it made its author obnoxious to the power ecclesiastical, and his book to be complained of by the Lower House of convention. The doctor drew up a preface, and afterwards gave in several explanations, which seemed to satisfy the Upper House; at least the affair was not brought to any issue, the members appearing desirous to prevent dissensions and divisions.

In 1715 and 1716, he had a dispute with the celebrated Leibnitz, relating to the principles of natural philosophy and religion; and a collection of the papers which passed between them was published in 1717. This performance of the doctor's is inscribed to her late Majesty Queen Caroline, then princess of Wales, who was pleased to have the controversy pass through her hands. It related chiefly to the important and difficult subjects of liberty and necessity.

In 1718, Dr Clarke made an alteration in the forms of doxology in the singing psalms, which produced no small noise and disturbance, and occasioned some pamphlets to be written. The alteration was this:

To God, through Christ, his only Son,
Immortal glory be, &c.
And
To God, through Christ, his Son, our Lord,
All glory be therefore, &c.

A considerable number of these select psalms and hymns having been dispersed by the Society for Promoting Christian Knowledge, before the alteration of the doxologies was taken notice of, he was charged with a design of imposing upon the society; whereas, in truth, the edition of them had been prepared by him for the use of his own parish only, before the society had thoughts of purchasing any of the copies; and as the usual forms of doxology are not established by any legal authority, ecclesiastical or civil, in this he had not offended.

About this time he was presented by the lord Lechmere, the chancellor of the duchy of Lancaster, to the mastership of Wigston's hospital in Leicester. In 1724, he published 17 sermons preached on several occasions, 11 of which were never before printed: and the year following, a sermon, preached at the parish-church of St James's, upon the erecting a charity-school for the education of women servants. In 1727, upon the death of Sir Isaac Newton, he was offered by the court the place of master of the mint, worth *communibus annis* 1200 or 1500l. a-year. But to this secular preferment he could not reconcile himself, and therefore absolutely refused it. Whiston seems to wonder, that Clarke's eulogists should lay so little stress upon this refusal, as to mention it not at all, or at least very negligently; while "he takes it," he says, "to be one of the most glorious actions of his life, and to afford undeniable conviction, that he was in earnest in his religion." In 1728, was published, "A Letter from Dr Clarke to Mr Benjamin Hoadly, F. R. S. occasioned by the controversy, relating to the Proportion of Velocity and Force in Bodies in Motion;" and printed in the Philosophical Transactions, N° 401.

In 1729, he published the 12 first books of "Homer's Iliad." This edition was printed in 4to, and dedicated to the duke of Cumberland. The Latin version is almost entirely new, and annotations are added to the bottom of the pages. Homer, Bishop Hoadly tells us, was Clarke's admired author, even to a degree of something like enthusiasm, hardly natural to his temper, and that in this he went a little beyond the bounds of Horace's judgment, and was so unwilling to allow the favourite poet ever to nod, that he has taken remarkable pains to find out, and give a reason for every passage, word, and title, that could create any suspicion. "The translation, (adds the Bishop), with his corrections, may now be styled accurate, and his notes, as far as they go, are indeed a treasury of grammatical and critical knowledge. He was called to his task by royal command; and he has performed it in such a manner, as to be worthy of the young prince, for whom it was laboured." The year of its publication was the last of this great man's life. Though not robust, he had always enjoyed a firm state of health, without any indisposition bad enough to confine him, except the small-pox in his youth; till on Sunday May 11. 1729, going out in the morning to preach before the judges at Sergeant's-Inn, he was there seized with a pain in his side, which made it impossible for him to perform the office he was called to; and quickly became so violent, that he was obliged to be carried home. He went to bed, and thought himself so much better in the afternoon, that he would not suffer himself to be bled; against which remedy, it is remarkable that he had entertained strong prejudices. But the pain returning violently about two the next morning, made bleeding absolutely necessary; he appeared to be out of danger, and continued to think himself so, till the Saturday morning following; when, to the inexpressible surprise of all about him, the pain removed from his side to his head; and, after a very short complaint, took away his senses so, that they never returned any more. He continued breathing till within seven and eight of the evening of that day, which was May 17. 1729; and then died, in his 54th year.

Soon after his death were published, from his original manuscripts, by his brother Dr John Clarke, dean of Sarum, "An Exposition of the Church Catechism," and ten volumes of sermons, in 8vo. His "Exposition" is made up of those lectures he read every Thursday morning for some months in the year, at St James's church. In the latter part of his time he revised them with great care, and left them completely prepared for the press. As to the sermons, few discourses in the English language are more judicious, and fewer still are equally instructive. The reasoning and the practical parts are excellent, and the explanations of Scripture are uncommonly valuable. Though Dr Clarke had not the turn of mind which qualified him for moving the passions, and indeed did not make it his object, his sentiments, nevertheless, are frequently expressed with such a clearness of conception, and such a force of language, as to produce in well disposed readers all the effect of the pathetic. Several volumes of sermons have been published since his time, which are far superior in point of elegance and beauty, and we have the highest sense of their merit. But still if we were called upon to recommend discourses, which abound with the most solid instruction, and promise the most lasting improvement, we should never forget

a

Clarke.

a Clarke and a Jortin. Three years after the doctor's death appeared also the Twelve Last books of the Iliad, published in 4to by his son Mr Samuel Clarke, who informs us, in the preface, that his father had finished the annotations to the three first of these books, and as far as the 359th verse of the fourth; and had revised the text and version as far as verse 510 of the same book. Dr Clarke married Catharine, the daughter of the reverend Mr Lockwood, rector of Little Missingham in Norfolk; in whose good sense and unblameable behaviour he was happy to his death. By her he had seven children, two of whom died before and one a few weeks after him.

Of the character of this great divine, the following short delineation appeared some years since in the Gentleman's Magazine: "Samuel Clarke, D. D. rector of St James's, Westminster: in each several part of useful knowledge and critical learning, perhaps without a superior; in all united, certainly without an equal; in his works, the best defender of religion; in his practice, the greatest ornament to it; in his conversation communicative, and in an uncommon manner instructive; in his preaching and writings, strong, clear, and calm; in his life, high in the esteem of the wise, the good, and the great; in his death, lamented by every friend to learning, truth, and virtue." In the same publication some not incurious anecdotes concerning him are printed, collected by the Rev. Mr Jones of Welwyn. We learned from them, that Dr Clarke was of a very humane and tender disposition. When his young children amused themselves with tormenting and killing flies upon the windows, he not only forbade such practices, but calmly reasoned with them, in such a familiar manner, as was calculated to make a powerful impression upon their minds. He was very ready and condescending in answering applications to him with respect to scruples; numberless instances of which occurred in the course of his life. One thing of which Dr Clarke was peculiarly cautious, was not to lose the least minute of his time. He always carried some book about with him, which he would read whilst riding in a coach or walking in the fields, or if he had any leisure moments free from company or his other studies. Nay, he would read even in company itself, where he might take such a liberty without offence to good manners. His memory was remarkably strong. He told Mr Pyle of Lyn, that he never forgot any thing which he had once thoroughly apprehended and understood. The Doctor, with his intimate friends, was perfectly free and easy; but if strangers were introduced, he behaved with much circumspection, conversing only upon common topics.

When he visited Dr Sykes, his usual way was to sit with him upon a couch, and, reclining upon his bosom, to discourse with him, in the most familiar manner, upon such subjects as were agreeable to the taste and judgment of both. When Sir John Germaine lay upon his deathbed, and was in great confusion and trouble of mind, he sent for Dr Clarke, and requested to know of him whether he should receive the sacrament, and what he should do in his sad condition. The Doctor, who was well acquainted with Sir John's pursuits and course of life, sedately replied, that he could not advise him to receive the sacrament, and that he did not think it likely to be of any avail to him with respect to his final welfare. Having said this, he departed without administering the communion, having first recommended the dying man to the mercy of God.

Dr Clarke was of a cheerful, and even playful disposition. An intimate friend of his, the late Rev. Mr Bott, used to relate, that once when he called upon him, he found him swimming upon a table. At another time, when the two Dr Clarkes, Mr Bott, and several men of ability and learning were together, and amusing themselves with diverting tricks, Dr Samuel Clarke, looking out at the window, saw a grave blockhead approaching to the house; upon which he cried out, "Boys, boys, be wise, here comes a fool." This turn of his mind hath since been confirmed by Dr Warton, who, in his observations on the following line of Mr Pope,

"Unthought-of frailties cheat us in the wise,"

says, "Who could imagine that Locke was fond of romances; that Newton once studied astrology; that Dr Clarke valued himself on his agility, and frequently amused himself in a private room of his house, in leaping over the tables and chairs; and that our author himself was a great epicure!" With respect to what is here recorded of Dr Clarke, we can scarcely persuade ourselves to consider it as a frailty. To be possessed of such a temper as he was, must have been no small degree of happiness; as it probably enabled him to pursue his important and serious studies with greater vivacity and vigour. To be capable of deriving amusement from trivial circumstances, indicates a heart at ease, and may generally be regarded as the concomitant of virtue.

Clarke, *William*, an English divine, was born at Haghmon-abbey in Shropshire, 1696; and after a grammar-education at Shrewsbury school, was sent to St John's college Cambridge, of which he was elected fellow, Jan. 17. 1716; B. A. 1731; M. A. 1735. He was presented by Archbishop Wake in 1724 to the rectory of Buxted in Sussex, at the particular recommendation of Dr Wotton, whose daughter he married. In 1738 he was made prebendary and residentiary of the cathedral church at Chichester. Some years before this he had given to the public a specimen of his literary abilities, in a preface of his father-in law Dr Wotton's *Leges Walliæ Ecclesiasticæ et Civiles Hoeli Boni, et aliorum Walliæ Principum*; or Ecclesiastical and Civil Laws of Howel D Da, and other princes of Wales. There is reason likewise to surmise, that an excellent Discourse on the Commerce of the Romans, which was highly extolled by Dr Taylor in his Elements of the Civil Law, might have been written by our author. It came either from his hand or from that of his friend Mr Bowyer, and is reprinted in that gentleman's Miscellaneous Tracts. But Mr Clarke's chief work was, the Connexion of the Roman, Saxon, and English Coins; deducing the Antiquities, Customs, and Manners of each people to modern times: particularly the Origin of Feudal Tenures, and of Parliaments; illustrated throughout with critical and historical Remarks on various Authors both sacred and profane. This work was published, in one volume quarto, in 1767; and its appearance from the press was owing to the

the discovery made by Martin Folkes, Esq. of the old Saxon pound. It was dedicated to the duke of Newcastle, whose beneficent disposition is celebrated for having conferred obligations upon the author, which were not the effects of importunity. Mr Clarke's performance was perused in manuscript by Arthur Onslow, Esq. speaker of the house of commons, who honoured him with some useful hints and observations; but he was chiefly indebted to Mr Bowyer, who took upon him all the care of the publication, drew up several of the notes, wrote part of the dissertation on the Roman sesterce, and formed an admirable index to the whole. By this work our author acquired a great and just reputation. Indeed, it reflects honour upon the country by which it is produced; for there are few performances that are more replete with profound and curious learning. Mr Clarke's last promotions were the chancellorship of the church of Chichester, and the vicarage of Amport, which were bestowed upon him in 1770. These preferments he did not long live to enjoy, departing this life on the 21st of October, in the following year. He had resigned in 1768, the rectory of Buxted to his son Edward. In Mr Nichols's Anecdotes of Bowyer, there are several letters and extracts of letters written to that learned printer by Mr Clarke, which display him to great advantage as a man of piety, a friend, and a scholar.

In a sketch of his character in the *Biographia Britannica*, furnished by Mr Hayley, who was his intimate acquaintance, he is represented as not only a man of extensive erudition, but as possessed of the pleasing talent of communicating his various knowledge in familiar conversation, without any appearance of pedantry or presumption. Antiquities were the favourite study of Mr Clarke, as his publications sufficiently show; but he was a secret, and by no means an unsuccessful, votary of the muses. He wrote English verse with ease, elegance, and spirit. Perhaps there are few better epigrams in our language than the following, which he composed on seeing the words *Domus ultima* inscribed on the vault belonging to the dukes of Richmond in the cathedral of Chichester.

> Did he, who thus inscribed the wall,
> Not read, or not believe, St Paul,
> Who says there is, where'er it stands,
> Another house not made with hands?
> Or, may we gather from these words,
> That house is not a house of lords?

Among the happier little pieces of his sportive poetry, there were some animated stanzas, describing the character of the twelve English poets, whose portraits, engravéd by Vertue, were the favourite ornament of his parlour: but he set so modest and humble a value on his poetical compositions, that they were seldom committed to paper, and are therefore very imperfectly preserved in the memory of those to whom he sometimes recited them. His taste and judgment in poetry appear indeed very striking in many parts of his learned and elaborate *Connexion of Coins*. His illustration of Nestor's cup, in particular, may be esteemed as one of the happiest examples of that light and beauty which the learning and spirit of an elegant antiquarian may throw on a cloudy and mistaken passage of an ancient poet. In strict attention to all the duties of his station, in the most active and unwearied charity, he might be regarded as a model to the ministers of God. Though his income was never large, it was his custom to devote a shilling in every guinea that he received to the service of the poor. As a master, as a husband, and a father, his conduct was amiable and endearing; and to close this imperfect sketch of him with his most striking features, he was a man of genuine unaffected piety.

CLARO-OBSCURO, or CLAIR-OBSCURE, in painting, the art of distributing to advantage the lights and shades of a piece, both with respect to the easing of the eye and the effect of the whole piece. See PAINTING.

CLARO-Obscuro, or *Chiaro-scuro*, is also used to signify a design consisting only of two colours, most usually black and white, but sometimes black and yellow; or it is a design washed only with one colour, the shadows being of a dusky brown, and the lights heightened up by white.

The word is also applied to prints of two colours taken off at twice; whereof there are volumes in the cabinets of those who are curious in prints.

CLARUS, or CLAROS, in *Ancient Geography*, a town of Ionia, famous for an oracle of Apollo. It was built by Manto, daughter of Tiresias, who fled from Thebes after it had been destroyed by the Epigoni. She was so afflicted with her misfortunes, that a lake was formed with her tears, where she first founded the oracle. Apollo was from thence surnamed *Clarius*. Also an island of the Ægean sea, between Tenedos and Scios.

CLARY. See SALVIA, BOTANY *Index*.

CLARY-Water, is composed of brandy, sugar, clary-flowers, and cinnamon, with a little ambergis dissolved in it. It helps digestion, and is cardiac. This water is rendered either purgative or emetic, by adding resin of jalap and scammony, or *crocus metallorum*. Some make clary-water of brandy, juice of cherries, strawberries, and gooseberries, sugar, cloves, white pepper, and coriander seeds; infused, sugared, and strained.

CLASMIUM, an old term in *Natural History*, applied to some fossils, of the class of gypsums; the characters of which are, that they are of a soft texture, and of a dull opaque look, being composed, as all the other gypsums, of irregularly arranged flat particles.

The word is derived from the Greek κλασμος, a fragment or small particle; from the flaky small particles of which these bodies are composed. Of this genus there is only one known species: this is of a tolerably regular and even structure; though very coarse and harsh to the touch. It is of a very lively and beautiful red in colour; and is found in thick roundish masses, which, when broken, are to be seen composed of irregular arrangements of flat particles; and emulate a striated texture. It will neither give fire with steel nor ferment with acids; but calcines very freely and easily, and affords a very valuable plaster of Paris, as do all the purer gypsums. It is common in Italy, and is greatly esteemed there; it is also found in some parts of England, particularly Derbyshire, but there it is not much regarded.

CLASPERS, or TENDRILS. See CIRRHUS.

CLASS, an appellation given to the most general subdivisions of any thing; thus, *animal* is subdivided

into the claffes quadrupeds, birds, fifhes, &c. which are again fubdivided into feriefes or orders; and thefe laft into genera. See BOTANY.

CLASS, is alfo ufed in fchools, in a fynonymous fenfe with *form*, for a number of boys all learning the fame thing.

CLASSIC, or CLASSICAL, an epithet chiefly applied to authors read in the claffes at fchools.

This term feems to owe its origin to Tullius Servius, who, in order to make an eftimate of every perfon's eftate, divided the Roman people into fix bands, which he called *claffes*. The eftate of the firft clafs was not to be under 200l. and thefe by way of eminence were called *claffici*, "claffics:" hence authors of the firft rank came to be called *claffics*, all the reft being faid to be *infra-claffem:* thus Ariftotle is a claffic author in philofophy; Aquinas in fchool divinity, &c.

CLASSICUM was the alarm for battle, given by the Roman generals, and founded by trumpets and other martial mufic throughout the army.

CLATHRI, in antiquity, bars of wood or iron, ufed in fecuring doors and windows. There was a goddefs called *Clathra*, that prefided over the clathri.

CLAVARIA, CLUB-TOP. See BOTANY *Index*.

CLAVARIUM, in antiquity, an allowance the Roman foldiers had for furnifhing nails to fecure their fhoes with. They raifed frequent mutinies, demanding largeffes of the emperors under this pretence.

CLAVATA VESTIMENTA, in antiquity, habits adorned with purple clavi, which were either broad or narrow. See CLAVUS.

CLAUBERG, JOHN, a learned profeffor of philofophy and divinity at Diufburg, was born at Solingen in 1622. He travelled into Holland, France, and England, and in each country obtained the efteem of the learned. The elector of Brandenburg gave him public teftimonies of his efteem. He died in 1665. His works were printed at Amfterdam in 2 vols 4to. The moft celebrated of thefe is his treatife, entitled *Logica vetus et nova*, &c.

CLAUDE LE LORRAIN, or CLAUDE GELEE, a celebrated landfcape painter, and a ftriking example of the efficacy of induftry to fupply, or at leaft to call forth genius. Claude was born in the diocefe of Toul in Lorrain in 1600; and, being dull and heavy at fchool, was put an apprentice to a paftry-cook; he afterwards rambled to Rome to feek a livelihood; but, being very ill-bred, and unacquainted with the language, nobody cared to employ him. Chance threw him at laft in the way of Auguftin Taffi, a painter, who hired him to grind his colours, and to do all the houfehold drudgery. His mafter hoping to make him ferviceable to him in fome of his greateft works, taught him by degrees the rules of perfpective and the elements of defign. Claude at firft did not know what to make of thofe principles of art; but being encouraged, and not failing in application, he came at length to underftand them. Then his mind began to expand, and he cultivated the art with wonderful eagernefs. He exerted his utmoft induftry to explore the true principles of painting by an inceffant examination of nature, that genuine fource of excellence; for which purpofe, he made his ftudies in the open fields; where he very frequently continued from funrife till the dufk of the evening compelled him to withdraw himfelf from his contemplations. It was his cuftom to fketch whatever he thought beautiful or ftriking; and every curious tinge of light, on all kinds of objects, he marked in his fketches, with a fimilar colour; from which he perfected his landfcapes with fuch a look of real nature, and gave them fuch an appearance of truth, as proved fuperior to any artift that had ever painted in that ftyle.

The beauties of his paintings are derived from nature herfelf, which he examined with uncommon affiduity; and Sandrart relates, that Claude ufed to explain to him, as they walked through the fields, the caufes of the different appearances of the fame profpect at different hours of the day, from the reflections or refractions of light, from dews or vapours in the evening or morning, with all the precifion of a philofopher. He worked on his pictures with great care, endeavouring to bring them to perfection, by touching them frequently over again; and if any performance did not anfwer his ideas, it was cuftomary with him to alter, to deface, and repaint it feveral times over till it correfponded with the image pictured in his mind. But whatever ftruck his imagination, while he obferved nature abroad, it was fo ftrongly impreffed on his memory, that on his return to his work, he never failed to make the happieft ufe of it.

His fkies are warm and full of luftre, and every object is properly illumined. His diftances are admirable, and in every part a delightful union and harmony not only excite our applaufe but our admiration. His invention is pleafing, his colouring delicate, and his tints have fuch an agreeable fweetnefs and variety, as have been but imperfectly imitated by the beft fubfequent artifts, but were never equalled. He frequently gave an uncommon tendernefs to his finifhed trees by glazing; and in his large compofitions which he painted in frefco, he was fo exact that the diftinct fpecies of every tree might readily be diftinguifhed. As to his figures, when he painted them himfelf, they are very indifferent; but he was fo confcious of his deficiency in this refpect, that he ufually engaged other artifts who were eminent to paint them for him; of which number were Courtois and Philippo Laura. His pictures are now very rare, efpecially fuch as are undamaged; and thofe are at this time fo valued, that no price, however great, is thought to be fuperior to their merit. In order to avoid a repetition of the fame fubject, and alfo to detect fuch copies of his works as might be injurious to his fame, by being fold for originals, it was his cuftom to draw (in a paper book prepared for this purpofe) the defigns of all thofe pictures which were tranfmitted to different countries; and on the back of the drawings, he wrote the name of the perfon who had been the purchafer. That book, which he titled *Libro di Verita*, is now in the poffeffion of the duke of Devonfhire.

CLAUDE, *John*, a Proteftant divine, born in the province of Angenois in 1619. Meff. de Port Royal ufing their utmoft endeavours to convert M. de Turenne to the Catholic faith, prefented him with a piece calculated to that end, which his lady engaged Mr Claude to anfwer; and his performance gave rife to the moft famous controverfy that was ever carried on in France between the Roman Catholics and Proteftants.

ftants. On the revocation of the edict of Nantz, he retired to Holland, where he met with a kind reception, and was honoured with a confiderable penfion by the prince of Orange. He died in 1687; and left a fon, Ifaac Claude, whom he lived to fee minifter of the Walloon church at the Hague, and who publifhed feveral excellent works of his deceafed father.

CLAUDIA, a veftal virgin at Rome, who being fufpected of unchaftity, is faid to have been cleared from that imputation in the following manner: the image of Cybele being brought out of Phrygia to Rome in a barge, and it happening to ftick fo faft in the river Tiber that it could not be moved, fhe tying her girdle, the badge of chaftity, to the barge, drew it along to the city, which a thoufand men were unable to do.

CLAUDIA Aqua (Frontinus), water conveyed to Rome by a canal or aqueduct of eleven miles in length, the contrivance of Appius Claudius the Cenfor, and the firft ftructure of the kind, in the year of Rome 441. Called alfo *Aqua Appia*.

CLAUDIA Copia (Infcriptions), a name of *Lugdunum*, or Lyons in France, the birthplace of the emperor Claudius: a Roman colony called *Claudia*, from its benefactor the emperor; and *Copia* from its plenty of all neceffaries, efpecially corn. See LUGDUNUM.

CLAUDIA, or *Clodia Via* (Ovid), was that road which, beginning at the Pons Milvius, joined the Flaminia, paffing through Etruria on the fouth fide of the Lacus Sabatinus, and ftriking off from the Caffia, and leading to Luca (Antonine): large remains of it are to be feen above Bracciano (Holftenius).

CLAUDIA Lex, de Comitiis, was enacted by M. Cl. Marcellus in the year of Rome 702. It ordained, that at public elections of magiftrates no notice fhould be taken of the votes of fuch as were abfent. Another, *de Ufura*, which forbade people to lend money to minors on condition of payment, after the deceafe of their parents. Another, *de Negotiatione*, by Q. Claudius the tribune, 535. It forbade any fenator or father of a fenator to have any veffel containing above 300 amphoræ, for fear of their engaging themfelves in commercial fchemes. The fame law alfo forbade the fame thing to the fcribes and the attendants of the queftors, as it was naturally fuppofed that people who had any commercial connexions could not be faithful to their truft, nor promote the intereft of the ftate. Another, 576, to permit the allies to return to their refpective cities, after their names were inrolled. Liv. 41. c. 8. Another, to take away the freedom of the city of Rome from the colonifts which Cæfar had carried to Novicomum.

CLAUDIANUS, CLAUDIUS, a Latin poet, flourifhed in the 4th century, under the emperor Theodofius, and under his fons Arcadius and Honorius. It is not agreed of what country he was a native; but he came to Rome in the year of Chrift 395, when he was about 20 years old; and there infinuated himfelf into Stilicho's favour; who, being a perfon of great abilities both for civil and military affairs, though a Goth by birth, was fo confiderable a perfon under Honorius, that he may be faid for many years to have governed the weftern empire. Stilicho afterwards fell into difgrace, and was put to death; and it is more than probable that the poet was involved in the misfortunes of his patrons, and feverely perfecuted in his perfon and fortunes by Hadrian, an Egyptian by birth, who was captain of the guards to Honorius, and fucceeded Stilicho. There is reafon, however, to think that he rofe afterwards to great favour, and obtained feveral honours both civil and military. The princefs Serena had a great efteem for Claudian, and recommended and married him to a lady of great quality and fortune in Libya. There are a few little poems on facred fubjects, which through miftake have been afcribed by fome critics to Claudian; and fo have made him be thought a Chriftian. But St Auftin, who was cotemporary with him, exprefsly fays that he was a Heathen. The time of Claudian's death is uncertain, nor do we know any farther particulars of his life than what are to be collected from his works, and which we have already related above. He is thought to have more of Virgil in his ftyle than all the other imitators of him.

CLAUDIUS I. Roman emperor, A. D. 41. The beginning of his reign was very promifing; but it was foon difcovered that little better than an idiot filled the throne, who might eafily be made a tyrant: accordingly he became a very cruel one, through the influence of his emprefs, the infamous Meffalina: after her death, he married his niece Agrippina, who caufed him to be poifoned to make room for Nero, A. D. 54. See (*Hiftory of*) ROME.

CLAUDIUS II. *Aurelius*, furnamed *Gothicus*, fignalized himfelf by his courage and prudence under the reigns of Valerian and Julian; and on the death of the latter was declared emperor in 268. He put to death Aureolus, the murderer of Gallienus; defeated the Germans; and in 269 marched againft the Goths, who ravaged the empire with an army of 300,000 men, which he at firft haraffed, and next year entirely defeated; but a contagious difeafe, which had fpread through that vaft army, was caught by the Romans; and the emperor himfelf died of it a fhort time after, aged 56. Pollio fays, that this prince had the moderation of Auguftus, the virtue of Trajan, and the piety of Antoninus.

CLAVES INSULÆ, a term ufed in the Ifle of Man, where all weighty and ambiguous caufes are referred to a jury of twelve, who are called *claves infulæ*, the keys of the ifland.

CLAVICHORD, and CLAVICITHERIUM, two mufical inftruments ufed in the 16th century. They were of the nature of the fpinet, but of an oblong figure. The firft is ftill ufed by the nuns in convents; and that the practitioners may not difturb the fifters in the dormitory, the ftrings are muffled with fmall bits of fine woollen cloth.

CLAVICLE. See ANATOMY *Index*.

CLAVICYMBALUM, in antiquity, a mufical inftrument of 30 ftrings. Modern writers apply the name to our harpfichords.

CLAVI VESTIUM, were flowers or ftuds of purple, interwoven with or fewed upon the garments of knights or fenators; only, for diftinction, the former ufed them narrow, the latter broad.

CLAVIS properly fignifies a KEY; and is fometimes ufed in Englifh to denote an explanation of fome obfcure paffages of any book in writing.

CLAVIUS, CHRISTOPHER, a German Jefuit, born

born at Bamberg, excelled in the knowledge of the mathematics, and was one of the chief persons employed to rectify the kalendar; the defence of which he also undertook against those who censured it, especially Scaliger. He died at Rome in 1612, aged 75. His works have been printed in five volumes folio; the principal of which is his Commentary on Euclid's Elements.

CLAUSE, in *Grammar*, denotes a member of a period or sentence.

CLAUSE signifies also an article or particular stipulation in a contract, a charge or condition in a testament, &c.

CLAUSENBURG, a large city of Transilvania, situated on the river Samos, in E. Long. 23. 20. N. Lat. 46. 53.

CLAVUS, in antiquity, an ornament upon the robes of the Roman senators and knights, which was more or less broad, according to the dignity of the person; hence the distinction of tunica angusti-clavia and lati-clavia.

CLAVUS, in *Medicine* and *Surgery*, is used in several significations: 1. Clavus hystericus, is a shooting pain in the head, between the pericranium and cranium, which affects such as have the green sickness. 2. Clavus oculorum, according to Celsus, is a callous tubercle on the white of the eye taking its denomination from its figure. 3. Clavus imports indurated tubercles of the uterus. 4. It also imports a chirurgical instrument of gold, mentioned by Amatus Lusitanus, designed to be introduced into an exulcerated palate, for the better articulation of the voice. And, 5. It signifies a callus, or corn on the foot.

CLAVUS Annalis, in antiquity. So rude and ignorant were the Romans towards the rise of their state, that the driving or fixing a nail was the only method they had of keeping a register of time; for which reason it was called *clavus annalis*. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right side of the temple of Jupiter Opt. Max. towards Minerva's temple. This custom of keeping an account of time by means of fixing nails was not peculiar to the Romans; for the Etrurians used likewise to drive nails into the temple of their goddess Nortia with the same view.

CLAW, among zoologists, denotes the sharp pointed nails with which the feet of certain quadrupeds and birds are furnished.

CLAY, in *Natural History*, is applied to earths, the characters of which are these: They are firmly coherent, weighty, and compact; stiff, viscid, and ductile to a great degree, whilst moist; smooth to the touch; not easily breaking between the fingers, nor readily diffusible in water; and, when mixed, not readily subsiding from it. See CHEMISTRY and MINERALOGY *Index*.

CLAY, a town of Norfolk in England, seated on an arm of the sea between two rivers, in E. Long. 0. 30. N. Lat. 47. 28.

CLAY-Lands, those abounding with clay, whether black, blue, yellow, white, &c. of which the black and the yellow are the best for corn.

All clay soils are apt to chill the plants growing on them in moist seasons, as they retain too much water: in dry seasons, on the contrary, they turn hard and choke the plants. The natural produce of clay soils is goose-grass, large daisies, thistles, docks, poppies, &c. Some bear clover, and rye-grass; and, if well manured, produce the best grain: they hold manure the best of all lands; and the most proper for them are horse-dung, pigeons-dung, some kinds of marle, folding of sheep, malt-dust, ashes, chalk, lime, soot, &c.

CLAYTON, DR ROBERT, a prelate of great learning, of distinguished worth and probity, and a respectable member of the Royal and Antiquarian Societies at London, was advanced to the bishopric of Killala, Jan. 23. 1729; translated to the see of Corke, Dec. 19. 1735; to that of Clogher, Aug. 26. 1745; and died much lamented, Feb. 25. 1758. His publications are, 1. A Letter in the Philosophical Transactions, N° 461. p. 813. giving an account of a Frenchman 70 years old (at Inishanan, in his diocese of Corke), who said he gave suck to a child.—2. The Chronology of the Hebrew Bible vindicated, &c. 1751, 4to.—3. An impartial Inquiry into the time of the Coming of the Messiah, 1751, 8vo.—4. An Essay on Spirit, 1751, 8vo.—5. A Vindication of the Histories of the Old and New Testament, in answer to the Objections of the late Lord Bolingbroke; in Two Letters to a young Nobleman, 1752, 8vo, reprinted in 1753.—6. A Defence of the Essay on Spirit, with Remarks on the several pretended Answers; and which may serve as an antidote against all that shall ever appear against it, 1753, 8vo.—7. A Journal from Grand Cairo to Mount Sinai, and back again, translated from a manuscript, written by the Prefetto of Egypt, in Company with some Missionaries *de propaganda fide* at Grand Cairo: to which are added, Remarks on the Origin of Hieroglyphics, and the Mythology of the ancient Heathens, 1753, 8vo, two editions, 4to and 8vo. It was soon after this publication that his Lordship became (in March 1754) a fellow of the Society of Antiquarians.—8. Some Thoughts on Self-love, Innate Ideas, Free-will, Taste, Sentiments, Liberty, and Necessity, &c. occasioned by reading Mr Hume's Works, and the short Treatise written in French by Lord Bolingbroke on Compassion, 1754, 8vo.—9. A Vindication of the Histories of the Old and New Testament, Part II. Adorned with several Explanatory Cuts, 1754, 8vo.—10. Letters between the bishop of Clogher and Mr William Penn, concerning Baptism, 1755, 8vo.—11. A speech made in the House of Lords in Ireland, on Monday, February 2. 1756, for omitting the Nicene and Athanasian Creeds out of the Liturgy, &c. 1756, 8vo.—12. A Vindication, Part III. 1758, 8vo. The three parts of the Essay on Spirit were reprinted by Mr Bowyer, in one vol. 8vo, 1759; with some additional notes, and an index of texts of Scripture illustrated or explained.

CLAYTONIA. See BOTANY *Index*.

CLAZOMENÆ, -ARUM, (Herodotus, Strabo, Velleius, Pliny); *Clazomena*, *-æ*, (Mela); one of the twelve ancient cities of Ionia. The country of Anaxagoras; situated in the neighbourhood of Colophon. The city was small, its port on the N. N. W. side of the island. Dr Chandler informs us, that traces of the walls are found by the sea; and in a hill are vestiges of a theatre. Three or four trees grew on it; and

by one is a cave hewn in the rock, and affording water. A vaulted room with a chimney at one end, and a hovel or two made with ſtones piled, are all the preſent ſtructures; and theſe are chiefly frequented by fiſhermen and by perſons employed to watch and to drive away birds when the grain ripens. Referring to this confined ſituation of Clazomenæ, a famous ſophiſt, when importuned to adorn his native city by reſiding in it rather than at Smyrna, replied, *The nightingale refuſes to ſing in a cage.*

CLEANTHES, a Stoic philoſopher, diſciple of Zeno, flouriſhed 240 years before Chriſt. He maintained himſelf in the day by working in the night: being queſtioned by the magiſtrates how he ſubſiſted, he brought a woman for whom he kneaded bread, and a gardener for whom he drew water; and refuſed a preſent from them. He compoſed ſeveral works, of which there are now only a few fragments remaining.

CLEAR, as a naval term, is variouſly applied to the weather, the ſea-coaſts, cordage, navigation, &c. The weather is ſaid to be clear when it is fair and open, as oppoſed to cloudy or foggy. The ſea coaſt is called clear when the navigation is not interrupted, or rendered dangerous by rocks, ſands, or breakers, &c. It is expreſſed of cordage, cables, &c. when they are unembarraſſed or diſentangled, ſo as to be ready for immediate ſervice. It is uſually oppoſed to *foul* in all theſe ſenſes.

CLEARCHUS, a tyrant of Heraclea in Pontus, who was killed by Chion and Leonidas, Plato's pupils, during the celebration of the feſtivals of Bacchus. He had enjoyed the ſovereign power during 12 years. A Lacedæmonian ſent to quiet the Byzantines. He was recalled, but refuſed to obey, and fled to Cyrus the younger, who made him captain of 13,000 Greek ſoldiers. He obtained a victory over Artaxerxes, who was ſo enraged at the defeat, that when Clearchus fell into his hands by the treachery of Tiſſaphernes, he put him immediately to death.

CLEATS, in naval affairs, pieces of wood having one or two projecting ends whereby to faſten the ropes: ſome of them are faſtened to the ſhrouds below for this purpoſe, and others nailed to different places of the ſhip's deck or ſides.

CLECHE, in *Heraldry*, a kind of croſs, charged with another croſs of the ſame figure, but of the colour of the field.

CLEDGE, among miners, denotes the upper ſtratum of fullers earth.

CLEDONISM, Cledonismus, a kind of divination, in uſe among the ancients. The word is formed from κληδων, which ſignifies two things, *rumor*, "a report," and *avis*, "a bird." In the firſt ſenſe, cledoniſm ſhould denote a kind of divination drawn from words occaſionally uttered. Cicero obſerves, that the Pythagoreans made obſervation not only of the words of the gods, but of thoſe of men; and accordingly believed the pronouncing of certain words, e. g. *incendium*, at a meal, very unhappy. Thus, inſtead of priſon, they uſed the word *domicilium;* and to avoid *erinnys*, furies, ſaid *eumenides.* In the ſecond ſenſe, *cledoniſm* ſhould ſeem a divination drawn from birds; the ſame with ornithomantia.

CLEEVERS. See Clivers.

CLEF, or Cliff, in *Muſic*, derived from the Latin word *clavis*, "a key;" becauſe by it is expreſſed the fundamental ſound in the diatonic ſcale, which requires a determined ſucceſſion of tones or ſemitones, whether major or minor, peculiar to the note from whence we ſet out, and reſulting from its poſition in the ſcale. Hence, as it opens a way to this ſucceſſion, and diſcovers it, the technical term *key* is uſed with great propriety. But clefs rather point out the poſition of different muſical parts in the general ſyſtem, and the relations which they bear one to another.

A clef, ſays Rouſſeau, is a character in muſic placed at the beginning of a ſtave, to determine the degree of elevation occupied by that ſtave in the general claviary or ſyſtem, and to point out the names of all the notes which it contains in the line of that clef.

Anciently the letters by which the notes of the gamut were ſignified were called *clefs*. Thus the letter A was the clef of the note *la*, C the clef of *ut*, E the clef of *mi*, &c. In proportion as the ſyſtem was extended, the embarraſſment and ſuperfluity of this multitude of clefs were felt.

Gui d'Arezzo, who had invented them, marked a letter or clef at the beginning of each line in the ſtave; for as yet he had placed no notes in the ſpaces. In proceſs of time they marked no more than one of the ſeven clefs at the beginning of one of the lines only; and this was ſufficient to fix the poſition of all the reſt, according to their natural order: at laſt, of theſe ſeven lines or clefs they ſelected four, which were called *claves ſignatæ*, or *diſcriminating clefs*, becauſe they ſatisfied themſelves with marking one of them upon one of the lines, from which the powers of all the others might be recognized. Preſently afterwards they even retrenched one of theſe four, viz. the gamma, of which they made uſe to mark the *ſol* below, that is to ſay, the hypoproſlambanomene added to the ſyſtem of the Greeks.

In reality Kircher aſſerts, that if we underſtood the characters in which ancient muſic was written, and examined minutely the forms of our clefs, we ſhould find that each of them repreſents the letter a little altered in its form, by which the note was originally named. Thus the clef of *ſol* was originally a G, the clef of ut a C, and the clef of *fa* an F.

We have then three clefs, one a fifth above the other: the clef of F, or *fa*, which is the loweſt; the clef of *ut*, or C, which is the fifth above the former; and the clef of *ſol*, or G, which is a fifth above that of *ut*. Theſe clefs, both as marked by foreigners and in Britain, may be ſeen in art. 170 of Music; upon which it is neceſſary to remark, that by a remain of ancient practice, the clef is always placed upon a line, and never in a ſpace. It deſerves notice, that the clef of *fa* is marked in three different manners: one in muſic which is printed; another in muſic which is written or engraved; and a third in the full harmony of the chorus.

Plate CXLIV. fig. 9. Vol. V.

By adding four lines above the clef of *ſol*, and three lines beneath the clef of *fa*, which gives both above and below the greateſt extent of permanent or eſtabliſhed lines, it appears, that the whole ſcale of notes which can be placed upon the gradations relative to theſe clefs amounts to 24; that is to ſay, three octaves and

and a fourth from the F, or *fa*, which is found beneath the first line, to the *si*, or B, which is found above the last, and all this together forms what we call the *general claviary*; from whence we may judge, that this compass has, for a long time, constituted the extent of the system. But as at present it is continually acquiring new degrees, as well above as below, the degrees are marked by larger lines, which are added above or below as occasion requires.

Instead of joining all the lines, as has been done by Rousseau in his Dictionary, (plate A, fig. 5.) to mark the relation which one clef bears to another, they separate them five by five; because it is pretty nearly within the degrees to which the compass of ordinary voices extends. This collection of five lines is called a *stave*; and in these they place a clef, to determine the names of the notes, the positions of semitones, and to show what station the stave occupies in the claviary or general scale.

In whatever manner we take five successive lines in the claviary, we shall find one clef comprehended; nay, sometimes two, in which case one may be retrenched as useless. Custom has even prescribed which of the two should be retrenched, and which retained; it is this likewise which has determined the number of positions assigned to each clef.

If I form a stave of the first five lines in the claviary, beginning from below, I find the clef of *fa* in the fourth line. This then is one position of the clef, and this position evidently relates to the lowest note; thus likewise it is that of the base clef.

If I wish to gain a third in ascent, I must add a line above; I must then obliterate one below, otherwise the stave will contain more than five lines. The clef of *fa* then is found transferred from the fourth to the third, and the clef of *ut* is likewise found upon the fifth; but as two clefs are useless, they retrench here that of *ut*. It is evident, that the stave of this clef is a third higher than the former.

By throwing away still one line below to gain another above, we have a third kind of a stave, where the clef of *fa* will be found upon the second line, and that of *ut* upon the fourth. Here we leave out the clef of *fa*, and retain that of *ut*. We have now gained another third above, and lost it below.

By continuing these alterations from line to line, we pass successively through four different positions of the clef of *ut*. Having arrived at that of *sol*, we find it placed upon the second line, and then upon the first. This position includes the five highest lines, and gives the sharpest diapason which the clefs can signify.

The reader may see in Rousseau's Musical Dictionary, Plate A, fig. 5. this succession of clefs from the lowest to the highest; which in all constitutes eight staves, clefs, or different positions of clefs.

Whatever might be the character and genius of any voice or instrument, if its extent above or below does not surpass that of the general claviary, in this number may be found a station and a clef suitable to it; and there are, in reality, clefs determined for all the parts in music. If the extent of a part is very considerable, so that the number of lines necessary to be added above or below may become inconvenient, the clef is then changed in the course of the music. It may be plainly perceived by the figure, what clef it is necessary to choose, for raising or depressing any part, under whatever clef it may be actually placed.

It will likewise appear, that in order to adjust one clef to another, both must be compared by the general claviary, by means of which we may determine what every note under one of the clefs is with respect to the other. It is by this exercise repeated that we acquire the habit of reading with ease all the parts.

From this manœuvre it follows, that we may place whatever note we please of the gamut upon any line or space whatever of the stave, since we have the choice of eight different positions, which is equal to the number of notes in the octave. Thus you may mark a whole tune upon the same line, by changing the clef at each gradation. The 7th fig. of the same plate in Rousseau's Musical Dictionary, to which we formerly referred, shows by the series of clefs the order of the notes, *re*, *fa*, *la*, *ut*, *mi*, *sol*, *si*, *re*, rising by thirds, although all placed upon the same line. The fig. following represents upon the order of the same clefs the note *ut*, which appears to descend by thirds upon all the lines of the stave; and further, which yet, by means of changing the clef, still preserves its unison. It is upon such examples as this, that scholars ought to exercise themselves, in order to understand at the first glance the powers of all the clefs, and their simultaneous effect.

There are two of their positions, viz. the clef of *sol* upon the first line, and that of *fa* upon the third, which seem daily to fall more and more into desuetude. The first of these may seem less necessary, because it produces nothing but a position entirely similar to that of *fa* upon the fourth line, from which, however, it differs by two octaves. As to the clef of *fa*, it is plain, that in removing it entirely from the third line, we shall no longer have any equivalent position, and that the composition of the claviary, which is at present complete, will by these means become defective.

Thus much for Rousseau's account of clefs. He proceeds to explain their transposition; but as this would render the present article too long and intricate, we refer the curious to his *Musical Dictionary*, vol. i. page 162. See also *Malcom's Dissertation on Music*.

CLEFT, in a general sense, is a space made by the separation of parts. Green timber is very apt to split and cleave in several places, after it is wrought into form; and these cracks in it are very disagreeable to the sight. The common method of the country carpenters is to fill up these cracks with a mixture of grease and saw dust; but the neatest way of all is, the soaking both sides well with the fat of beef broth, and then dipping pieces of spunge into the same broth, and filling up all the cracks with them: they swell out so as to fill the whole crack; and accommodate themselves so well to it, that the deficiency is hardly seen.

CLEFTS, or *Cracks*, in *Farriery*, appear on the bought of the pasterns, and are caused by a sharp and malignant humour. See FARRIERY *Index*.

CLEMA, in antiquity, a twig of the vine, which serves as a badge of the centurion's office.

CLEMATIS, VIRGINS'-BOWER. See BOTANY *Index*.

Clemency.

CLEMENCY, denotes much the ſame with mercy, and implies a remiſſion of ſeverity towards offenders. The term is moſt generally uſed in ſpeaking of the forgiveneſs exerciſed by princes or perſons of high authority. It is the reſult, indeed, of a diſpoſition which ought to be cultivated by all ranks, though its effects cannot be equally conſpicuous or extenſive. In praiſe of clemency joined with power, it is obſerved, that it is not only the privilege, the honour, and the duty of a prince, but it is alſo his ſecurity, and better than all his garriſons, forts, and guards, to preſerve himſelf and his dominions in ſafety: That that prince is truly royal, who maſters himſelf; looks upon all injuries as below him; and governs by equity and reaſon, not by paſſion or caprice. In illuſtration of this ſubject, the following examples are ſelected out of many recorded in hiſtory.

Sueton. c 9.

1. Two patricians having conſpired againſt Titus the Roman emperor, were diſcovered, convicted, and ſentenced to death by the ſenate; but the good-natured prince ſent for them, and in private admoniſhed them, that in vain they aſpired to the empire, which was given by deſtiny; exhorting them to be ſatisfied with the rank in which by Providence they had been placed, and offering them any thing elſe which was in his power to grant. At the ſame time he diſpatched a meſſenger to the mother of one of them, who was then at a great diſtance, and under deep concern about the fate of her ſon, to aſſure her, that her ſon was not only alive, but forgiven.

Zoſ. ii. 674.

2. Licinius having raiſed a numerous army, Zoſimus ſays 130,000 men, endeavoured to wreſt the government out of the hands of his brother-in-law Conſtantine the emperor. But his army being defeated, Licinius fled with what forces he could rally to Nicomedia, whither Conſtantine purſued him, and immediately inveſted the place; but on the ſecond day of the ſiege, the emperor's ſiſter intreating him, with a flood of tears, by the tenderneſs he had ever ſhown for her, to forgive her huſband, and grant him at leaſt his life, he was prevailed upon to comply with her requeſt; and the next day, Licinius, finding no means of making his eſcape, preſented himſelf before the conqueror, and throwing himſelf at his feet, yielded to him the purple and the other enſigns of ſovereignty. Conſtantine received him in a very friendly manner, entertained him at his table, and afterwards ſent him to Theſſalonica, aſſuring him, that he ſhould live unmoleſted ſo long as he raiſed no new diſturbances.

3. The council of thirty, eſtabliſhed at Athens by Lyſander, committed the moſt execrable cruelties. Upon pretence of reſtraining the multitude within their duty, and to prevent ſeditions, they had cauſed guards to be aſſigned them, had armed 3000 of the citizens for that purpoſe, and at the ſame time diſarmed all the reſt. The whole city was in the utmoſt terror and diſmay. Whoever oppoſed their injuſtice and violence fell a victim to their reſentment. Riches were a crime that never failed of drawing a ſentence upon their owners, always followed with death and the confiſcation of eſtates; which the thirty tyrants divided amongſt themſelves. They put more people to death (ſays Xenophon) in eight months of a peace, than their enemies had done in a war of thirty years. All the citizens of any conſideration in Athens, and who retained a love of liberty, quitted a place reduced to ſo hard and ſhameful a ſlavery, and ſought elſewhere an aſylum and retreat where they might live in ſafety. At the head of theſe was Thraſybulus, a perſon of extraordinary merit, who beheld with the moſt lively affliction the miſeries of his country.

Clemency.

The Lacedæmonians had the inhumanity to endeavour to deprive thoſe unhappy fugitives of this laſt reſource. They publiſhed an edict to prohibit the cities of Greece from giving them refuge, decreed that they ſhould be delivered up to the thirty tyrants, and condemned all ſuch as ſhould contravene the execution of this edict to pay a fine of five talents. Only two cities rejected with diſdain ſo unjuſt an ordinance, Megara and Thebes; the latter of which made a decree to puniſh all perſons whatſoever that ſhould ſee an Athenian attacked by his enemies without doing his utmoſt to aſſiſt him. Lyſias, an orator of Syracuſe who had been baniſhed by the thirty, raiſed 500 ſoldiers at his own expence, and ſent them to the aid of the common country of Eloquence. Thraſybulus loſt no time. After having taken Phyta, a ſmall fort in Attica, he marched to the Piræus, of which he made himſelf maſter. The thirty flew thither with their troops, and a battle enſued. The tyrants were overthrown. Critias, the moſt ſavage of them all, was killed on the ſpot: and as the army was taking to flight, Thraſybulus cried out, "Wherefore do you fly from me as from a victor, rather than aſſiſt me as the avenger of your liberty? We are not enemies, but fellow-citizens, nor have we declared war againſt the city, but againſt the thirty tyrants." He continued to remind them, that they had the ſame origin, country, laws, and religion: he exhorted them to compaſſionate their exiled brethren, to reſtore their country to them, and reſume their own liberty. This diſcourſe had the deſired effect. The army, upon their return to Athens, expelled the thirty, and ſubſtituted ten perſons to govern in their room, whoſe conduct proved no better than theirs; but King Pauſanias, moved with compaſſion for the deplorable condition to which a city, once ſo flouriſhing, was reduced, had the generoſity to favour the Athenians in ſecret, and at length obtained a peace for them. It was ſealed with the blood of the tyrants, who having taken arms to reinſtate themſelves in the government, were all put to the ſword, and left Athens in the full poſſeſſion of its liberty. All the exiles were recalled. Thraſybulus at that time propoſed the celebrated amneſty, by which the citizens engaged upon oath, that all paſt tranſactions ſhould be buried in oblivion. The government was re-eſtabliſhed upon its ancient footing, the laws were reſtored to their priſtine vigour, and magiſtrates elected with the uſual form.

This (ſays Rollin) is one of the fineſt events in ancient hiſtory, worthy the Athenian clemency and benevolence, and has ſerved as a model to ſucceeding ages in all good governments. Never had tyranny been more cruel and bloody than that which the Athenians had lately thrown off. Every houſe was in mourning, every family bewailed the loſs of ſome relation: it had been a ſeries of public robbery and rapine, in which licenſe and impunity had authorized all manner of crimes. The people ſeemed to have a right to demand the blood of all accomplices in ſuch notorious malverſations,

Clemency.

ſations, and even the intereſt of the ſtate to authorize ſuch a claim, that by the exemplary ſeverities ſuch enormous crimes might be prevented for the future. But Thraſybulus riſing above theſe ſentiments, from the ſuperiority of his more extenſive genius, and the views of a more diſcerning and profound policy, foreſaw, that by giving into the puniſhment of the guilty, eternal ſeeds of diſcord and enmity would remain, to weaken the public by domeſtic diviſions, when it was neceſſary to unite againſt the common enemy, and alſo occaſion the loſs to the ſtate of a great number of citizens, who might render it important ſervices from the view of making amends for paſt miſbehaviour.

4. Such conduct, after great troubles in a ſtate, has always appeared to the ableſt politicians, the moſt certain and ready means to reſtore the public peace and tranquillity. Cicero, when Rome was divided into two factions upon the occaſion of Cæſar's death, who had been killed by the conſpirators, calling to mind this celebrated amneſty, propoſed, after the example of the Athenians, to bury all that had paſſed in eternal oblivion.

5. Cardinal Mazarine obſerved to Don Lewis de Haro, prime miniſter of Spain, that this gentle and humane conduct in France had prevented the troubles and revolts of that kingdom from having any fatal conſequences, and "that the king had not loſt a foot of land by them to that day;" whereas "the inflexible ſeverity of the Spaniards was the occaſion that the ſubjects of that monarchy, whenever they threw off the maſk, never returned to their obedience but by the force of arms; which ſufficiently appears (ſays he) in the example of the Hollanders, who are in the peaceable poſſeſſion of ſo many provinces, that not an age ago were the patrimony of the king of Spain."

Herod. l. ix. 77, 78.

6. Leonidas the Lacedæmonian having, with 300 men only, diſputed the paſs of Thermopylæ againſt the whole army of Xerxes, and being killed in that engagement, Xerxes, by the advice of Mardonius one of his generals, cauſed his dead body to be hung upon a gallows, making thereby the intended diſhonour of his enemy his own immortal ſhame. But ſome time after, Xerxes being defeated, and Mardonius ſlain, one of the principal citizens of Ægina came and addreſſed himſelf to Pauſanias, deſiring him to avenge the indignity that Mardonius and Xerxes had ſhown to Leonidas, by treating Mardonius's body after the ſame manner. As a farther motive for doing ſo, he added, that by thus ſatisfying the manes of thoſe who were killed at Thermopylæ, he would be ſure to immortalize his own name throughout all Greece, and make his memory precious to the lateſt poſterity. "Carry thy baſe counſels elſewhere (replied Pauſanias); thou muſt have a very wrong notion of true glory to imagine, that the way for me to acquire it is to reſemble the barbarians. If the eſteem of the people of Ægina is not to be purchaſed but by ſuch a proceeding, I ſhall be content with preſerving that of the Lacedæmonians only, amongſt whom the baſe and ungenerous pleaſure of revenge is never put in competition with that of ſhowing clemency and moderation to their enemies, eſpecially after their death. As for the ſouls of my departed countrymen, they are ſufficiently avenged by the death of the many thouſand Perſians ſlain upon the ſpot in the laſt engagement."

Clemens, Clement.

CLEMENS Romanus, biſhop of Rome, where he is ſaid to have been born; and to have been fellow-labourer with St Peter and St Paul. We have nothing remaining of his works that is clearly genuine, excepting one epiſtle, written to quiet ſome diſturbances in the church of Corinth; which, next to holy writ, is eſteemed one of the moſt valuable remains of eccleſiaſtical antiquity.

CLEMENS Alexandrinus, ſo called to diſtinguiſh him from the former, was an eminent father of the church, who flouriſhed at the end of the ſecond and beginning of the third centuries. He was the ſcholar of Pantænus, and the inſtructor of Origen. The beſt edition of his works is that in 2 vols folio, publiſhed in 1715, by Archbiſhop Potter.

CLEMENT V. Pope, the firſt who made a public ſale of indulgences. He tranſplanted the holy ſee to Avignon in France; greatly contributed to the ſuppreſſion of the knights templars; and was author of a compilation of the decrees of the general councils of Vienne, ſtyled *Clementines*. He died in 1314.

Clement VII. *Julius de Medicis*, Pope, memorable for his refuſing to divorce Catharine of Arragon from Henry VIII.; and for the bull he publiſhed upon the king's marriage with Anne Boleyn, which, according to the Romiſh authors, loſt him England. He died in 1534.

Clement XIV. *Francis Laurentius Ganganelli*, Pope, was born at St Angelo, in the duchy of Urbino, in October 1705; and choſen pope, though not yet a biſhop, in 1769: at which time the ſee of Rome was involved in a moſt diſagreeable and dangerous conteſt with the houſe of Bourbon. His reign was rendered troubleſome by the colliſion of parties on the affairs of the Jeſuits; and it is pretended that his latter days were embittered by the apprehenſions of poiſon. Though this report was probably apocryphal, it is ſaid that he often complained of the heavy burden which he was obliged to bear; and regretted, with great ſenſibility, the loſs of that tranquillity which he enjoyed in his retirement when only a ſimple Franciſcan. He was, however, fortunate in having an opportunity, by a ſingle act, to diſtinguiſh a ſhort adminiſtration of five years in ſuch a manner as will ever prevent its ſinking into obſcurity. His death was immediately attributed to poiſon, as if an old man of 70, loaded with infirmities and diſorders, could not quit the world without violence. His proceedings againſt the Jeſuits furniſhed a plauſible pretence for this charge, and the malevolence of their enemies embelliſhed it with circumſtances. It even ſeems as if the miniſters of thoſe powers who had procured their diſſolution did not think it beneath them to countenance the report; as if falſehood was neceſſary to prevent the revival of a body which had already ſunk, in its full ſtrength, under the weight of real miſconduct. The charge was the more ridiculous, as the pontiff had undergone a long and painful illneſs, which originally proceeded from a ſuppreſſion of urine, to which he was ſubject; yet the report was propagated with the greateſt induſtry; and though the French and Spaniſh miniſters were preſent at the opening of his body, the moſt horrible circumſtances were publiſhed relative to that operation. It was confidently told that the head fell off from the body, and that the ſtench poiſoned and killed the

the operators. It availed but little that the operators showed themselves alive and in good health, and that the surgeons and physicians proved the falsehood of every part of the report. Clement XIV. appears to have been a man of a virtuous character, and possessed of considerable abilities. He died much regretted by his subjects.

CLEMENTINE, a term used among the Augustins, who apply it to a person who, after having been nine years a superior, ceases to be so, and becomes a private monk, under the command of a superior. The word has its rise hence, that Pope Clement, by a bull, prohibited any superior among the Augustins from continuing above nine years in his office.

CLEMENTINES, in the canon law, are the constitutions of Pope Clement V. and the canons of the council of Vienne.

CLENARD, NICHOLAS, a celebrated grammarian in the 16th century, was born at Diest; and after having taught humanity at Louvain, travelled into France, Spain, Portugal, and Africa. He wrote in Latin, 1. Letters relating to his Travels, which are very curious and scarce. 2. A Greek Grammar, which has been revised and corrected by many grammarians; and other works. He died at Grenoble in 1542.

CLEOBIS and BITON, two youths, sons of Cydippe the priestess of Juno at Argos. When oxen could not be procured to draw their mother's chariot to the temple of Juno, they put themselves under the yoke, and drew it 45 stadia to the temple, amidst the acclamations of the multitude, who congratulated the mother on account of the piety of her sons. Cydippe intreated the goddess to reward the piety of her sons with the best gift that could be granted to a mortal. They went to rest and awoke no more; and by this the goddess showed that death is the only true happy event that can happen to a man. The Argives raised them statues at Delphi.

CLEOBULUS, son of Evagoras, and one of the Grecian sages; he was valiant, a lover of learning, and an enemy to vice. Flourished about 560 years before Christ.

CLEOMBROTUS, a king of Sparta, son of Anaxandrides. He was deterred from building a wall across the isthmus of Corinth against the approach of the Persians, by an eclipse of the sun. He died in the 75th Olympiad, and was succeeded by Plistarchus, son of Leonidas, a minor.

CLEOMBROTUS II. son of Pausanias king of Sparta, after his brother Agesipolis I. He made war against the Bœotians, and lest he should be suspected of treacherous communications with Epaminondas, he gave that general battle at Leuctra, in a very disadvantageous place. He was killed in the engagement, and his army destroyed, in the year of Rome 382.

CLEOMBROTUS III. a son-in-law of Leonidas king of Sparta, who for a while usurped the kingdom after the expulsion of his father-in-law. When Leonidas was recalled, Cleombrotus was banished, and his wife Chelonis, who had accompanied her father, now accompanied her husband in his exile.

CLEOME, in *Botany*, a genus of the siliquosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 25th order, *Putamineæ*. There are three nectariferous glandules, one at each sinus of the calyx except the lowest; the petals all rising upwards; the siliqua unilocular and bivalved. There are 15 species, all of them, except two, natives of warm climates. They are herbaceous plants, rising from one to two feet high; and are adorned with flowers of various colours, as red, yellow, flesh-colour, &c. They are propagated by seeds, and require no other care than what is common to other exotics which are natives of warm countries.

CLEOMENES, king of Sparta, conquered the Argives, and freed Athens from the tyranny of the Pisistratidæ. By bribing the oracle, he pronounced Demaratus, his colleague on the throne, illegitimate, because he refused to punish the people of Ægina, who had deserted the Greeks. He killed himself in a fit of madness.

CLEOMENES II. succeeded his brother Agesipolis II. He reigned 34 years in the greatest tranquillity, and was father to Acrotatus and Cleonymus. He was succeeded by Areus I. son of Acrotatus.

CLEOMENES III. succeeded his father Leonidas. He was of an enterprising spirit, and resolved to restore the ancient discipline of Lycurgus in its full force. He killed the Ephori, and removed by poison his royal colleague Eurydamides, and made his own brother Euclidas king, against the laws of the state, which forbade more than one of the same family to sit on the throne. He made war against the Achæans, and attempted to destroy the Achæan league. Aratus the general of the Achæans, who supposed himself inferior to his enemy, called Antigonus to his assistance; and Cleomenes, when he had fought the unfortunate battle of Sellasia, retired into Egypt to the court of Ptolemy Euergetes, where his wife and children had gone before him. Ptolemy received him with great cordiality; but his successor, weak and suspicious, soon expressed his jealousy of this noble stranger, and imprisoned him. Cleomenes killed himself, and his body was flayed and exposed on a cross, 140 Olymp.

CLEON, the name of several noted men of antiquity. 1. Of an Athenian, who, though originally a tanner, became general of the armies of the state by his intrigues and eloquence. He took Thoron in Thrace, and was killed at Amphipolis in a battle with Brasidas the Spartan general, Olymp. 89th. 2. A general of Messenia, who disputed with Aristodemus for the sovereignty. 3. A statuary. 4. A poet, who wrote a poem on the Argonauts. 5. An orator of Halicarnassus who composed an oration for Lysander, in which he intimated the propriety of making the kingdom of Sparta elective. 6. A Magnesian who wrote some commentaries, in which he speaks of portentous events, &c.

CLEONÆ, in *Ancient Geography*, a town of Argolis, above Mycenæ, on the road which leads from Argos to Corinth; standing on an eminence, on every side occupied by houses. In the forest near this town was slain by Hercules the huge lion (Sil. Italicus, Seneca). *Cleonæus* the epithet. *Cleonæum Sidus*, the lion.——Another *Cleonæ* on Mount Athos in Chalcidice.

CLEOPATRA, the celebrated queen of Egypt, was daughter of Ptolemy Auletes. By her extraordinary beauty, she subdued the two renowned Roman generals Julius Cæsar and Mark Antony; the latter of whom, it is thought, lost the empire of Rome by his attachment

attachment to her. At length Mark Antony being ſubdued by Octavius Cæſar, ſhe tried the force of her declining charms upon the conqueror, but in vain; upon which, expecting no mercy from him, ſhe poiſoned herſelf, 30 years before Chriſt. According to ſome authors, ſhe was the reſtorer of the Alexandrian library, to which ſhe added that of Pergamos; and it is ſaid, that ſhe ſtudied philoſophy to conſole her for the abſence of Antony. With her death ended the family of the Ptolemies in Egypt, after it had reigned from the death of Alexander 294 years: for Egypt, after this, was reduced to a Roman province, in which dependence it remained till it was taken from them by the Saracens, A. D. 641.

CLEOPATRIS, in *Ancient Geography*, a town of Egypt, on the Arabian gulf. See ARSINOE. Now ſaid to be *Suez*, ſituated at the bottom of the gulf of the Red ſea. E. Long. 34. 30. N. Lat. 30. 0.

CLEOSTRATUS, a celebrated aſtronomer, born in Tenedos, was, according to Pliny, the firſt who diſcovered the ſigns of the zodiac; others ſay, that he only diſcovered the ſigns Aries and Sagittarius. He alſo corrected the errors of the Grecian year about the 306th year before Chriſt.

CLEPSYDRA, an inſtrument or machine ſerving to meaſure time by the fall of a certain quantity of water.

The word comes from κλεπτω, *condo*, and υδωρ, *aqua*, "water;" though there have likewiſe been clepſydræ made with mercury.

The Egyptians, by this machine, meaſured the courſe of the ſun. Tycho Brahe, in our days, made uſe of it to meaſure the motion of the ſtars, &c. and Dudley uſed the ſame contrivance in making all his maritime obſervations. The uſe of clepſydræ is very ancient; they were invented in Egypt under the Ptolemies, as were alſo ſun-dials. Their uſe was chiefly in the winter; the ſun-dials ſerved in the ſummer. They had two great defects; the one, that the water ran out with a greater or leſs facility, as the air was more or leſs denſe; the other, that the water ran more readily at the beginning than towards the concluſion. M. Amontons has invented a clepſydra free from both theſe inconveniences; and which has theſe three grand advantages, of ſerving the ordinary purpoſe of clocks, of ſerving in navigation for the diſcovery of the longitude, and of meaſuring the motion of the arteries.

Conſtruction of a CLEPSYDRA. To divide any cylindric veſſel into parts to be emptied in each diviſion of time; the time wherein the whole, and that wherein any part, is to be evacuated, being given.

Suppoſe, for example, a cylindric veſſel, whoſe charge of water throws out in 12 hours, were required to be divided into parts to be evacuated each hour. 1. As the part of time 1 is to the whole time 12; ſo is the ſame time 12 to a fourth proportional, 144. 2. Divide the altitude of the veſſel into 144 equal parts: here the laſt will fall to the laſt hour; the three next above to the laſt part but one; the five next to the tenth hour, &c.; laſtly, the 23 laſt to the firſt hour. For ſince the times increaſe in the ſeries of the natural numbers, 1, 2, 3, 4, 5, &c. and the altitudes, if the numeration be in retrograde order from the twelfth hour, increaſe in the ſeries of the unequal numbers 1, 3, 5, 7, 9, &c. the altitude, computed from the twelfth hour, will be as the ſquares of the times, 1, 4, 9, 16, 25, &c. therefore the ſquare of the whole time 144 comprehends all the parts of the altitude of the veſſel to be evacuated. But a third proportional to 1 and 12 is the ſquare of 12, and conſequently it is the number of equal parts into which the altitude is to be divided, to be diſtributed according to the ſeries of the unequal numbers, through the equal intervals of hours. Since in lieu of parts of the ſame veſſel, other leſs veſſels equal thereto may be ſubſtituted, the altitude of a veſſel emptied in a given ſpace of time being given, the altitude of another veſſel to be emptied in a given time may be found; viz. by making the altitudes as the ſquares of the time. For a further deſcription, ſee HYDRODYNAMICS *Index*.

CLERC, JOHN LE, a moſt celebrated writer and univerſal ſcholar, born at Geneva in 1657. After he had paſſed through the uſual courſe of ſtudy at Geneva, and had loſt his father in 1676, he went to France in 1678; but returning the year after, he was ordained with the general applauſe of all his examiners. In 1682, Le Clerc viſited England with a view to learning the language. He preached ſeveral times in the French churches in London, and viſited ſeveral biſhops and men of learning; but the ſmoky air of the town not agreeing with his lungs, he returned to Holland within the year, where he at length ſettled. He preached before a ſynod held at Rotterdam by the remonſtrants in 1684; and was admitted profeſſor of philoſophy, polite literature, and the Hebrew tongue, in their ſchool at Amſterdam. The remainder of his life affords nothing but the hiſtory of his works, and of the controverſies he was engaged in; but theſe would lead into too extenſive a detail. He continued to read regular lectures; and becauſe there was no ſingle author full enough for his purpoſe, he drew up and publiſhed his Logic, Ontology, Pneumatology, and Natural Philoſophy. He publiſhed *Ars Critica;* a Commentary on the Old Teſtament; a Compendium of Univerſal Hiſtory; an Eccleſiaſtical Hiſtory of the two firſt Centuries; a French Tranſlation of the New Teſtament, &c. In 1686, he began, jointly with M. de Croſe, his *Bibliotheque Univerſelle et Hiſtorique*, in imitation of other literary journals; which was continued to the year 1693 incluſive, in 26 vols. In 1703, he began his *Bibliotheque Choiſie*, and continued it to 1714, and then commenced another work on the ſame plan, called *Bibliotheque Ancienne et Moderne*, which he continued to the year 1728; all of them juſtly deemed excellent ſtores of uſeful knowledge. In 1728 he was ſeized with a palſy and fever; and after ſpending the laſt ſix years of his life with little or no underſtanding, died in 1736.

CLERC, *John le*, called *Chevalier*, an eminent hiſtorical painter, was born at Nanci in 1587, but ſtudied in Italy, where he reſided for 20 years; and was a diſciple of Carlo Venetiano, with whom he worked a long time, and whoſe ſtyle he ſo effectually ſtudied and imitated, that ſeveral of the pictures which were finiſhed by Le Clerc were taken for the work of Venetiano. He was moſt highly eſteemed at Venice for his extraordinary merit; and as a token of public reſpect, he was made a knight of St Mark. His freedom of hand was remarkable; he had a light pencil; and

Clerc, Clergy.

and in his colouring he resembled his master. He died in 1633.

Clerc, *Sebastian le*, engraver, and designer in ordinary to the French king, was born at Metz in 1637. After having learnt designing, he applied himself to mathematics, and was engineer to the marshal de la Ferté. He went to Paris in 1665, where he applied himself to designing and engraving with such success, that M. Colbert gave him a pension of 600 crowns. In 1672 he was admitted into the royal academy of painting and sculpture; and in 1680 was made professor of geometry and perspective in the same academy. He published, besides a great number of designs and prints, 1. A Treatise on theoretical and practical Geometry. 2. A Treatise on Architecture; and other works: and died in 1714.—He was an excellent artist, but chiefly in the petit style. His genius seldom exceeds the dimensions of six inches. Within those limits he could draw up 20,000 men with great dexterity. No artist except Callot and Della Bella could touch a small figure with so much spirit. His most esteemed prints are: 1. The *passion of our Saviour*, on 36 small plates, lengthwise, from his own compositions. The best impressions are without the borders. 2. The *miracle of the feeding five thousand*, a middling sized plate, lengthwise. In the first impressions, which are very rare, a town appears in the back-ground; in place of which a mountain is substituted in the common ones. 3. The *elevation of the large stones used in building the front of the Louvre*, a large plate, lengthwise. The first impressions are without the date 1677, which was afterwards added. 4. The *academy of the sciences*, a middling sized plate, lengthwise. The first impressions are before the skeleton of the stag and tortoise were added. The second impressions are before the shadow was enlarged at the bottom, towards the right-hand side of the print. Both these impressions are very scarce. The first is rarely met with. This print was copied for Chambers's Dictionary. 5. The *May of the Gobelins*, a middle-sized plate, lengthwise. The first impression is before the woman was introduced, who covers the wheel of the coach. 6. The *four conquests*, large plates, lengthwise, representing the taking of Tournay, the taking of Douay, the defeat of the compte de Marsin, and the Switzerland alliance. 7. The *battles of Alexander*, from Le Brun, six small long plates, including the title, which represents the picture gallery at the Gobelins. The first impressions of the tent of Darius, which plate makes part of this set, is distinguished by the shoulder of the woman, who is seated in the front, being without the shadow, which was afterwards added; for which reason they are called the *prints with the naked shoulder*. 8. The *entry of Alexander into Babylon*, a middle-sized plate, lengthwise. In the first impressions, the face of Alexander is seen in profile; in the second, it is a three-quarter face, and therefore called *the print with the head turned*.

Clerc, *George le*. See Buffon.

CLERGY, a general name given to the body of ecclesiastics of the Christian church, in contradistinction to the laity. See Laity.

The distinction of Christians into clergy and laity was derived from the Jewish church, and adopted into the Christian by the apostles themselves: whenever any number of converts was made, as soon as they were capable of being formed into a congregation or church, a bishop or presbyter, with a deacon, were ordained to minister to them. Of the bishops, priests, and deacons, the clergy originally consisted; but in the third century, many inferior orders were appointed, as subservient to the office of deacon, such as Acoluthists, Readers, &c.

Clergy.

This venerable body of men being separated and set apart from the rest of the people, in order to attend the more closely to the service of Almighty God, have therefore large privileges allowed them by our municipal laws; and had formerly much greater, which were abridged at the time of the reformation, on account of the ill use which the Popish clergy had endeavoured to make of them. For, the laws having exempted them from almost every personal duty, they attempted a total exemption from every secular tie. But it is observed by Sir Edward Cooke, that as the overflowing of waters doth many times make the river to lose its proper channel, so, in times past, ecclesiastical persons seeking to extend their liberties beyond their due bounds, either lost, or enjoyed not, those which of right belonged to them. The personal exemptions do indeed for the most part continue: a clergyman cannot be compelled to serve on a jury, nor to appear at a court-leet, or view of frank-pledge, which almost every other person is obliged to do; but if a layman is summoned on a jury, and before the trial takes orders, he shall notwithstanding appear and be sworn. Neither can he be chosen to any temporal office, as bailiff, reeve, constable, or the like; in regard of his own continual attendance on the sacred function. During his attendance on divine service, he is privileged from arrests in civil suits. In cases also of felony, a clerk in orders shall have the benefit of his clergy, without being branded in the hand; and may likewise have it more than once; in both which particulars he is distinguished from a layman. But, as they have their privileges, so also they have their disabilities, on account of their spiritual avocations. Clergymen are incapable of sitting in the house of commons; and by statute 21 Hen. VIII. c. 13. are not in general allowed to take any lands or tenements to farm, upon pain of 10l. per month, and total avoidance of the lease; nor, upon like pain, to keep any tap-house or brew-house; nor engage in any manner of trade, nor sell any merchandise, under forfeiture of treble value. Which prohibition is consonant to the canon law.

Blackst. Comment.

Benefit of CLERGY, is an ancient privilege whereby one in orders claimed to be delivered to his ordinary to purge himself of felony.

After trial and conviction * of a criminal, the judgment of the court regularly follows, unless suspended or arrested by some intervening circumstances, of which the principal is *benefit of clergy*; a title of no small curiosity as well as use; and concerning which, therefore, it may not be improper to enquire, 1. Into its original, and the various mutations which this privilege of the clergy has sustained. 2. To what persons it is to be allowed at this day. 3. In what cases. 4. The consequences of allowing it.

* See the articles *Arraignment, Plea, Trial*, and *Conviction*.

I. Clergy, the *privilegium clericale*, or (in common speech, the benefit of clergy) had its original from the pious

Blackst. Comment.

Clergy.

pious regard paid by Christian princes to the church in its infant state, and the ill use which the popish ecclesiastics soon made of that pious regard. The exemptions which they granted to the church were principally of two kinds: 1. Exemptions of places consecrated to religious duties from criminal arrests; which was the foundation of sanctuaries. 2. Exemption of the persons of clergymen from criminal process before the secular judge in a few particular cases; which was the true original and meaning of the *privilegium clericale.*

But the clergy increasing in wealth, power, honour, number, and interest, soon began to set up for themselves; and that which they obtained by the favour of the civil government, they now claimed as their inherent right, and as a right of the highest nature, indefeasible, and *jure divino.* By their canons, therefore, and constitutions, they endeavoured at, and where they met with easy princes, obtained, a vast extension of those exemptions; as well in regard to the crimes themselves, of which the list became quite universal, as in regard to the persons exempted; among whom were at length comprehended, not only every little subordinate officer belonging to the church or clergy, but even many that were totally laymen.

In England, however, although the usurpations of the pope were very many and grievous, till Henry VIII. totally exterminated his supremacy, yet a total exemption of the clergy from secular jurisdiction could never be thoroughly effected, though often endeavoured by the clergy; and therefore, though the ancient *privilegium clericale* was in some capital cases, yet it was not universally allowed. And in those particular cases, the use was for the bishop or ordinary to demand his clerks to be remitted out of the king's courts as soon as they were indicted; concerning the allowance of which demand there was for many years a great uncertainty; till at length it was finally settled in the reign of Henry VI. that the prisoner should first be arraigned; and might either then claim his benefit of clergy by way of declinatory plea; or, after conviction, by way of arrest of judgment. This latter way is most usually practised, as it is more to the satisfaction of the court to have the crime previously ascertained by confession or the verdict of a jury; and also it is more advantageous to the prisoner himself, who may possibly be acquitted, and so need not the benefit of his clergy at all.

Originally the law was held that no man should be admitted to the benefit of clergy, but such as had the *habitum et tonsuram clericalem.* But, in process of time, a much wider and more comprehensive criterion was established; every one that could read (a great mark of learning in those days of ignorance and her sister superstition) being accounted a clerk, or *clericus*, and allowed the benefit of clerkship, though neither initiated in clerkship, nor trimmed with the holy tonsure. But when learning, by means of the invention of printing, and other concurrent causes, began to be more generally disseminated than formerly, and reading was no longer a competent proof of clerkship, or being in holy orders; it was found that as many laymen as divines were admitted to the *privilegium clericale;* and therefore by statute 4 Henry VII. c. 13. a distinction was once more drawn between mere lay scholars and clerks that were really in orders. And, though it was thought reasonable still to mitigate the severity of the law with regard to the former, yet they were not put upon the same footing with actual clergy; being subjected to a slight degree of punishment, and not allowed to claim the clerical privilege more than once. Accordingly the statute directs, that no person, once admitted to the benefit of clergy, shall be admitted thereto a second time, until he produces his orders; and in order to distinguish their person, all laymen who are allowed this privilege, shall be burned with a hot iron in the brawn of the left thumb. This distinction between learned laymen and real clerks in orders, was abolished for a time by the statutes 28 Hen. VIII. c. 1. and 32 Hen. VIII. c. 3.; but is held to have been virtually restored by statute 1 Edw. VI. c. 12. which statute also enacts, that lords of parliament and peers of the realm may have the benefit of their peerage, equivalent to that of clergy, for the first offence (although they cannot read, and without being burnt in the hand), for all offences then clergyable to commoners, and also for the crimes of housebreaking, highway robbery, horse-stealing, and robbing of churches.

After this burning, the laity, and before it the real clergy, were discharged from the sentence of the law in the king's courts, and delivered over to the ordinary, to be dealt with according to the ecclesiastical canons. Whereupon the ordinary, not satisfied with the proofs adduced in the profane secular court, set himself formally to make a purgation of the offender by a new canonical trial; although he had been previously convicted by his country, or perhaps by his own confession. This trial was held before the bishop in person, or his deputy; and by a jury of twelve clerks: And there, first, the party himself was required to make oath of his own innocence; next, there was to be the oath of twelve compurgators, who swore they believed he spoke the truth; then, witnesses were to be examined upon oath, but on behalf of the prisoner only; and, lastly, the jury were to bring in their verdict upon oath, which usually acquitted the prisoner; otherwise, if a clerk, he was degraded or put to penance. A learned judge, in the beginning of last century, remarks with much indignation the vast complication of perjury and subornation of perjury, in this solemn farce of a mock trial; the witnesses, the compurgators, and the jury, being all of them partakers in the guilt: the delinquent party also, though convicted in the clearest manner, and conscious of his own offence, yet was permitted, and almost compelled to swear himself not guilty; nor was the good bishop himself, under whose countenance this scene was transacted, by any means exempt from a share of it. And yet, by this purgation, the party was restored to his credit, his liberty, his lands, and his capacity of purchasing afresh, and was entirely made a new and an innocent man.

This scandalous prostitution of oaths, and the forms of justice, in the almost constant acquittal of felonious clerks by purgation, was the occasion that, upon very heinous and notorious circumstances of guilt, temporal courts would not trust the ordinary with the trial of the offender, but delivered over to him the convicted

Clergy. convicted clerk, *absque purgatione faciendo*; in which situation the clerk convict could not make purgation; but was to continue in prison during life, and was incapable of acquiring any personal property, or receiving the profits of his lands, unless the king should please to pardon him. Both these courses were in some degree exceptionable; the latter perhaps being too rigid, as the former was productive of the most abandoned perjury. As therefore these mock trials took their rise from factious and popish tenets, tending to exempt one part of the nation from the general municipal law, it became high time, when the reformation was thoroughly established, to abolish so vain and impious a ceremony.

Accordingly the statute 18 Eliz. c. 7. enacts, that, for the avoiding such perjuries and abuses, after the offender has been allowed his clergy, he shall not be delivered to the ordinary as formerly; but, upon such allowance, and burning of the hand, he shall forthwith be enlarged and delivered out of prison, with proviso, that the judge may, if he thinks fit, continue the offender in gaol for any time not exceeding a year. And thus the law continued unaltered for above a century; except only, that the statute 21 Jac. I. c. 6. allowed, that women convicted of simple larcenies under the value of 10s. should (not properly have the benefit of clergy, for they were not called upon to read; but) be burned in the hand, whipped, or stocked, or imprisoned for any time not exceeding a year. And a similar indulgence by the statutes 3 and 4 Will. and Mary, c. 9. and 4 and 5 Will. and Mary, c. 24. was extended to women guilty of any clergyable felony whatever; who were allowed once to claim the benefit of the statute, in like manner as men might claim the benefit of clergy, and to be discharged upon being burned in the hand, and imprisoned for any time not exceeding a year. All women, all peers, and all male commoners who could read, were therefore discharged in such felonies absolutely, if clerks in orders; and for the first offence upon burning in the hand, if lay; yet all liable (except peers), if the judge saw occasion, to imprisonment not exceeding a year. And these men who could not read, if under the degree of peerage, were hanged.

Afterwards, indeed, it was considered, that education and learning were not extenuations of guilt, but quite the reverse; and that if the punishment of death for simple felony was too severe for those who had been liberally instructed, it was, *à fortiori*, too severe for the ignorant also. And thereupon, by statute 5 Anne, c. 6. it was enacted that the benefit of clergy should be granted to all those who were entitled to ask it, without requiring them to read by way of conditional merit. And experience having shown that so universal a lenity was frequently inconvenient, and an encouragement to commit the lower degrees of felony; and that though capital punishments were too rigorous for these inferior offences, yet no punishment at all (or next to none, as branding or whipping), was as much too gentle; it was enacted by the same statute 5 Anne, c. 6. that when any person is convicted of any theft or larceny, and burnt in the hand for the same, he shall, at the discretion of the judge, be committed to the house of correction or public work-house, to be there kept to hard labour for any time not less than six months, and not exceeding two years; with a power of inflicting a double confinement in case of the party's escape from the first. And it is also enacted by the statutes 4 Geo. I. c. 11. and 6 Geo. I. c. 23. that when any persons shall be convicted of any larceny, either grand or petit, or any felonious stealing or taking of money or goods and chattels, either from the person or the house of any other, or in any other manner, and who by the law shall be entitled to the benefit of clergy, and liable only to the penalties of burning in the hand, or whipping; the court in their discretion, instead of such burning in the hand, or whipping, may direct such offenders to be transported to America for seven years; and if they return, or are seen at large in this kingdom within that time, it shall be felony without benefit of clergy.

In this state does the benefit of clergy at present stand; very considerably different from its original institution; the wisdom of the English legislature having, in the course of a long and laborious process, extracted, by a noble alchemy, rich medicines out of poisonous ingredients; and converted, by gradual mutations, what was at first an unreasonable exemption of particular popish ecclesiastics, into a merciful mitigation of the general law with respect to capital punishments.

From the whole of this detail, we may collect, that however in times of ignorance and superstition, that monster in true policy may for a while subsist, of a body of men residing in a state, and yet independent of its laws; yet when learning and rational religion have a little enlightened men's minds, society can no longer endure an absurdity so gross, as must destroy its very fundamentals. For, by the original contract of government, the price of protection by the united force of individuals, is that of obedience to the united will of the community. This united will is declared in the laws of the land; and that united force is exerted in their due, and universal, execution.

II. We are next to inquire, to what persons the benefit of clergy is to be allowed at this day; and this must chiefly be collected from what has been observed in the preceding article. For, upon the whole, we may pronounce, that all clerks in orders are, without any branding, and of course without any transportation (for that is only substituted in lieu of the other), to be admitted to this privilege, and immediately discharged, or at most only confined for one year; and this as often as they offend. Again, all lords of parliament, and peers of the realm, by the statute 1 Edw. VI. c. 12. shall be discharged in all clergyable and other felonies provided for by the act without any burning in the hand, in the same manner as real clerks convict; but this is only for the first offence. Lastly, all the commons of the realm, not in orders, whether male or female, shall, for the first offence, be discharged of the punishment of felonies, within the benefit of clergy, upon being burnt in the hand, and suffering discretionary imprisonment; or, in case of larceny, upon being transported for seven years, if the court shall think proper.

III. The third point to be considered is, for what crimes the *privilegium clericale*, or benefit of clergy, is to be allowed. And it is to be observed, that nei-

Clergy.

ther in high treaſon, nor in petit larceny, nor in any mere miſdemeanors, it was indulged at the common law; and therefore we may lay it down as a rule, that it was allowable only in petit treaſon and capital felonies; which for the moſt part became legally entitled to this indulgence by the ſtatute *de clero*, 25 Edw. III. ſtat. 3. c. 4. which provides, that clerks convict for treaſon or felonies, touching other perſons than the king himſelf or his royal majeſty, ſhall have the privilege of holy church. But yet it was not allowed in all caſes whatſoever; for in ſome it was denied even in common law, viz. *inſidatio viarum*, or lying in wait for one on the highway; *depopulatio agrorum*, or deſtroying and ravaging a country; *combuſtio domorum*, or arſon, that is, burning of houſes; all which are a kind of hoſtile acts, and in ſome degree border upon treaſon. And farther, all theſe identical crimes, together with petit treaſon, and very many other acts of felony, are ouſted of clergy by particular acts of parliament.

Upon the whole, we may obſerve the following rules. 1. That in all felonies, whether new created, or by common law, clergy is now allowable, unleſs taken away by act of parliament. 2. That where clergy is taken away from the principal, it is not of courſe taken away from the acceſſory, unleſs he be alſo particularly included in the words of the ſtatute. 3. That when the benefit of clergy is taken away from the offence (as in caſe of murder, buggery, robbery, rape, and burglary), a principal in the ſecond degree, being preſent, aiding and abetting the crime, is as well excluded from his clergy as he that is a principal in the firſt degree: but, 4. That where it is only taken away from the perſon committing the offence (as in the caſe of ſtabbing, or committing larceny in a dwelling-houſe), his aiders and abettors are not excluded, through the tenderneſs of the law, which hath determined that ſuch ſtatutes ſhall not be taken literally.

IV. Laſtly, We are to inquire what the conſequences are to the party, of allowing him this benefit of clergy. We ſpeak not of the branding, impriſonment, or tranſportation; which are rather concomitant conditions, than conſequences, of receiving this indulgence. The conſequences are ſuch as affect his preſent intereſt, and future credit and capacity; as having been once a felon, but now purged from that guilt by the privilege of clergy; which operates as a kind of ſtatute pardon. And we may obſerve, 1. That, by his conviction, he forfeits all his goods to the king; which, being once veſted in the crown, ſhall not afterwards be reſtored to the offender. 2. That, after conviction, and till he receives the judgment of the law by branding or the like, or elſe is pardoned by the king, he is, to all intents and purpoſes, a felon; and ſubject to all the diſabilities and other incidents of a felon. 3. That, after burning or pardon, he is diſcharged for ever of that, and all other felonies before committed, within the benefit of clergy; but not of felonies from which ſuch benefit is excluded; and this by ſtatutes 8 Eliz. c. 4. and 18 Eliz. c. 7. 4. That by the burning, or pardon of it, he is reſtored to all capacities and credits, and the poſſeſſion of his lands, as if he had never been convicted. 5. That what is ſaid with regard to the advantages of commoners and laymen, ſubſequent to the burning in the hand, is equally applicable to all peers and clergymen, although never branded at all. For they have the ſame privileges, without any burning, to which others are entitled after it.

Clerk.

CLERK (*clericus*), a word formerly uſed to ſignify a learned man, or man of letters. The word comes from the Greek κληρος, uſed for *clergy;* but more properly ſignifying *lot* or *heritage*, in regard the lot and portion of clerks or eccleſiaſtics is to ſerve God. Accordingly *clerus* was at firſt uſed to ſignify thoſe who had a particular attachment to the ſervice of God. The origin of the expreſſion is derived from the Old Teſtament, where the tribe of Levi is called the *lot*, *heritage*, κληρος; and God is reciprocally called *their portion;* by reaſon that tribe was conſecrated to the ſervice of God, and lived on the offerings made to God, without any other ſettled proviſion as the reſt had. Thus, Paſquier obſerves, the officers of the counts (*comites*) were anciently created under the title of *clerks of accompts;* and ſecretaries of ſtate were called *clerks of the ſecret.* So *clericus domini regis*, in the time of Edward I. was Engliſhed, *the king's ſecretary*, or *clerk of his council.* The term was applied indifferently to all who made any profeſſion of learning; or who knew how to manage the pen; though originally it was appropriated to eccleſiaſtics. As the nobility and gentry were uſually brought up to the exerciſe of arms, there were none but the clergy left to cultivate the ſciences: hence, as it was the clergy alone who had made any profeſſion of letters, a very learned man came to be called a *great clerk*, and a ſtupid ignorant man a *bad clerk.*

CLERK is alſo applied to ſuch as by their courſe of life exerciſe their pens in any court or office; of which there are various kinds: thus,

CLERK of the Bails, an officer in the court of king's bench, whoſe buſineſs is to file all bail-pieces taken in that court, where he always attends.

CLERK of the Check, an officer belonging to the king's court; ſo called, becauſe he has the check and controulment of the yeomen that belong to the king, queen, or prince. He likewiſe, by himſelf or deputy, ſets the watch in the court. There is alſo an officer in the navy of the ſame name, belonging to the king's yards.

CLERK of the Crown, an officer in the king's bench, who frames, reads, and records all indictments againſt offenders, there arraigned or indicted of any public crime. He is likewiſe termed *clerk of the crown-office*, in which capacity he exhibits information by order of the court for divers offences.

CLERK of the Crown, in chancery, an officer whoſe buſineſs it is conſtantly to attend the lord chancellor in perſon or by deputy; to write and prepare for the great ſeal ſpecial matters of ſtate by commiſſion, both ordinary and extraordinary, viz. commiſſions of lieutenancy, of juſtices of aſſize, oyer and terminer, gaol-delivery, and of the peace; all general pardons, granted either at the king's coronation, or in parliament; the writs of parliament, with the names of the knights, citizens, and burgeſſes, are alſo returned into his office. He alſo makes out ſpecial pardons and writs of execution on bonds of ſtatute-ſtaple forfeited.

CLERK of the Deliveries of the Ordnance. See ORDNANCE.

Clerk.

CLERK of the Errors, in the court of common pleas, an officer who tranfcribes and certifies into the king's bench the tenor of the record of the action on which the writ of error, made out by the curfitor, is brought there to be determined. In the king's bench, the clerk of the errors tranfcribes and certifies the records of caufes, by bill, in that court, into the exchequer. And the bufinefs of the clerk of the errors in the exchequer, is to tranfcribe the records certified thither out of the king's bench, and to prepare them for judgment in the exchequer chamber.

CLERK of the Effoins, in the court of common pleas, keeps the effoin roll, or enters effoins: he alfo provides parchment, cuts it into rolls, marks the numbers on them, delivers out all the rolls to every officer, and receives them again when written. See ESSOIN.

CLERK of the Eftreats, an officer in the exchequer, who every term receives the eftreats out of the lord-treafurer's remembrancer's office, and writes them out to be levied for the crown.

CLERK of the Green Cloth, formerly an officer in chancery, but now abolifhed.

CLERK of the Hamper or *Hanaper*, an officer in chancery, whofe bufinefs is to receive all money due to the king for the feals of charters, letters patent, commiffions, and writs; alfo the fees due to the officers for enrolling and examining them.

CLERK-Comptroller of the King's Houfehold, an officer of the king's court, authorifed to allow or difallow the charges of purfuivants, meffengers of the green-cloth, &c. to infpect and controul all defects of any of the inferior officers; and to fit in the counting-houfe with the lord-fteward and other officers of the houfehold for regulating fuch matters.

CLERK of the King's Silver, an officer of the common pleas, to whom every fine is brought, after it has paffed the office of the *cuftos brevium;* and who enters the effect of writs of covenant, into a book kept for that purpofe, according to which all the fines of that term are recorded in the rolls of the court.

CLERK of the Market, an officer of the king's houfe, to whom is given the charge of the king's meafure and weights, the ftandards of thofe that ought to be ufed all over England.

CLERK of the Nichils or *Nihils*, an officer of the exchequer, who makes a roll of all fuch fums as are nichilled by the fheriffs upon their eftreats of green wax, and delivers them into the remembrancer of the treafury, to have execution done upon them for the king. See NIHIL.

CLERK of the Ordnance. See ORDNANCE.

CLERK of the Outlawries, an officer of the common pleas, and deputy to the attorney-general, for making out all writs of *capias utlegatum* after outlawry, to which there muft be the king's attorney's name.

CLERK of the Paper-office, an officer belonging to the king's bench, whofe bufinefs is to make up the paper-books of fpecial pleadings in that court.

CLERK of the Peace, an officer belonging to the feffions of the peace, whofe bufinefs is to read indictments, inrol the proceedings, and draw the procefs: he likewife certifies into the king's bench tranfcripts of indictments, outlawries, attainders, and convictions had before the juftices of peace, within the time limited by ftatute, under a certain penalty. This office is in the gift of the *cuftos rotulorum*, and may be executed by deputy.

2

Clerk.

CLERK of the Pells, an officer that belongs to the exchequer, whofe bufinefs is to enter every teller's bill into a parchment roll called *pellis receptorum;* and to make another roll of payments called *pellis exituum.*

CLERK of the Petty Bag, an officer of the court of chancery, whereof there are three, the mafter of the rolls being the chief: their bufinefs is to record the return of all inquifitions out of every fhire; to make out patents of cuftomers, gaugers, comptrollers, &c.; liberates upon extent of ftatutes-ftaple; *conge d'elires* for bifhops; fummons of the nobility, clergy, and burgeffes to parliament; and commiffions directed to knights and others of every fhire, for affeffing fubfidies and taxes.

CLERK of the Pipe, an officer of the exchequer, who having the account of all debts due to the king, delivered out of the remembrancer's office, charges them in a great roll folded up like a pipe. He writes out warrants to fheriffs, to levy the faid debts on the goods and chattels of the debtors; and if they have no goods, then he draws them down to the treafurer's remembrancer to write eftreats againft their lands.

CLERK of the Pleas, an officer of the exchequer, in whofe office all the officers of the court, having fpecial privilege, ought to fue or to be fued in any action. In this office alfo actions at law may be profecuted by other perfons, but the plaintiff ought to be tenant or debtor to the king, or fome way accountable to him. The under clerks are attorneys in all fuits.

CLERKS of the Privy-feal, four officers that attend the lord privy feal, for writing and making out all things that are fent by warrant from the fignet to the privy feal, and to be paffed the great feal; and likewife to make out privy feals, upon fpecial occafions of his majefty's affairs, as for loan of money or the like.

CLERK of the Rolls, an officer of the chancery, whofe bufinefs is to make fearches after, and copies of deeds, officers, &c.

CLERK of the Signet, an officer continually attending upon his majefty's principal fecretary, who has the cuftody of the privy fignet, as well for fealing the king's private letters as thofe grants which pafs the king's hand by bill figned. There are four of thefe officers who have their diet at the fecretary's table.

Six CLERKS, officers in chancery next in degree below the twelve mafters, whofe bufinefs is to inrol commiffions, pardons, patents, warrants, &c. which pafs the great feal. They were anciently *clerici*, and forfeited their places if they married. Thefe are alfo attorneys for parties in fuits depending in the court of chancery.

CLERK of the Treafury, an officer belonging to the court of common pleas, who has the charge of keeping the records of the court, makes out all records of *nifi prius*, and likewife all exemplifications of records being in the treafury. He has the fees due for all fearches; and has under him an under keeper, who always keeps one key of the treafury-door.

CLERK of the Warrants, an officer of the common pleas, whofe bufinefs is to enter all warrants of attorney for plaintiffs and defendants in fuit; and to inrol deeds of bargain and fale, that are acknowledged in court, or before a judge. His office is likewife to eftreat

estreat into the exchequer all issues, fines, estreats, and amercements, which grow due to the crown in that court.

CLERKE, Captain Charles, a celebrated English navigator, was bred up in the navy from his youth, and was present in several actions during the war of 1755. In the engagement between the Bellona and Courageux he was in great danger; for having been stationed in the mizen-top on board the former, the mast was carried overboard, by a shot, and he fell into the sea along with it; but, however, was taken up without having received any injury. When Commodore Byron made his first voyage round the world, Mr Clerke served on board his ship in quality of a midshipman; and was afterwards on the American station. In the year 1768, he sailed round the world a second time in the Endeavour, on board of which he served in the station of master's mate; but, during the voyage, succeeded to a lieutenancy. He returned in 1775, and was soon after appointed master and commander. When Captain Cook undertook his last voyage, Mr Clerke was appointed captain of the Discovery; and in consequence of the death of Captain Cook, naturally succeeded to the supreme command. He did not, however, long enjoy his new dignity. Before his departure from England, he had manifest symptoms of a consumption. Of this disease he lingered during the whole of the voyage; and his long residence in the cold northern climates cut off all hopes of recovery; but though sensible that the only chance he had of prolonging his life was by a speedy return to a warmer climate, his attention to his duty was so great, that he persevered in search of a passage between the Asiatic and American continents until every one of the officers was of opinion that it was impracticable. He bore his distemper with great firmness and equanimity, retaining a good flow of spirits to the last; and died on the 22d of August 1778, in the 38th year of his age, the ship then being within view of the coast of Kamtschatka.

Clerke's Island lies on the western side of the American continent, in N. Lat. 63. 15. and E. Long. 169. 30. It was discovered by Captain Cook in his last voyage, but a landing could not be effected. At a distance it appeared to be of considerable extent, and to have several hills connected with the low grounds in such a manner as to make it look like a group of islands. Near its eastern extremity is a little island remarkable for having three elevated rocks upon it. Both the large and small island are uninhabited.

CLERMONT, a considerable, rich, and populous town of France, in Auvergne, with a bishop's see. The cathedral, the public squares, and the walks, are very fine. Here is a bridge naturally formed, as they pretend, by the petrifying quality of a fountain. E. Long. 3. 10. N. Lat. 45. 47.

Clermont Manuscript, is a copy of St Paul's Epistles, found in the monastery of Clermont in France, and used by Beza, together with the Cambridge MS. in preparing his edition of the New Testament. This copy is in the octavo form, and is written on fine vellum in Greek and Latin, with some mutilations. Beza supposes that it is of equal antiquity with the Cambridge copy; but both were probably written by a Latin scribe in a later period than he assigns to them. The various readings of this MS. were communicated to Archbishop Usher, and they are preserved by Walton. The MS. itself was in the possession of Morinus; and after his death deposited among the MS. copies of the royal library at Paris, N° 2245.

CLEROMANCY, a kind of divination performed by the throwing of dice, or little bones; and observing the points, or marks, turned up. The word comes from κληρος, "lot," and μαντεια "divination." At Bura, a city of Achaia, was a temple and celebrated oracle of Hercules, where such as consulted the oracle, after praying to the idol, threw four dice, the points whereof being well scanned by the priest, he was supposed to draw an answer from them.

Something of this kind seems to have been practised with regard to Jonah.

CLERVAL, a town of France, in the Franche Comté, seated on the river Doux, belonging to the house of Wirtemburgh, but depends on the crown of France. E. Long. 5. 57. N. Lat. 46. 35.

CLERVAUX, one of the most celebrated and finest abbeys of France, in Champagne, five miles from Bar-sur-Aube, and seated in a valley surrounded with woods and mountains. It is the chief of the Cistercian order. Here is the famous Tun of St Bernard, which will hold 800 tuns of wine. Near this abbey is a small town.

CLESIDES, a Greek painter, about 276 years before Christ, in the reign of Antiochus I. He revenged the injuries he had received from Queen Stratonice, by representing her in the arms of a fisherman. However indecent the painter might represent the queen, she was drawn with such personal beauty, that she preserved the piece and liberally rewarded the artist.

CLETHRA. See Botany *Index*.

CLEVELAND, a district in the north riding of Yorkshire in England, from whence the noble family of Fitzroy took the title of duke, but which is now extinct.

Cleveland, *John*, an English poet of some eminence in his time, who during the civil war under Charles I. engaged as a literary champion in the royal cause against the parliamentarians. He died in 1658, and was much extolled by his party. His works, which consist of poems, characters, orations, epistles, &c. were printed in octavo in 1677.

CLEVES, the duchy of, a province of the circle of Westphalia, in Germany. It is divided into two parts by the Rhine, and is about 40 miles in length from east to west, and 20 in breadth from north to south. It is a fine agreeable country, and pretty populous. The towns are Cleves, the capital, Calcar, Gennet, Santen, Orsoy, Burcck, and Greit. These lie on the left side of the river. On the right, Daysburgh, Wese, Rees, and Emmerick. There have been great contests about this duchy, but it now belongs to the king of Prussia.

Cleves, a city of Germany, in the duchy of Cleves, of which it is the capital. It stands upon a pleasant hill, about a mile from the Rhine, with which it communicates, by means of a canal which is large enough for great barges. The castle stands upon a mountain, and, though old, is very agreeable. It was built in the time of Julius Cæsar. It was taken by the French

French in 1794. Calvinifts, Lutherans, and Roman Catholics, are all tolerated in this city. E. Long. 5. 50. N. Lat. 51. 45.

CLIENT, among the Romans, a citizen who put himfelf under the protection of fome great man, who in refpect of that relation was called *patron*.

This patron affifted his client with his protection, intereft, and goods; and the client gave his vote for his patron, when he fought any office for himfelf or his friends. Clients owed refpect to their patrons, as thefe owed them their protection.

The right of patronage was appointed by Romulus, to unite the rich and poor together, in fuch a manner as that one might live without contempt and the other without envy; but the condition of a client, in courfe of time, became little elfe than a moderate flavery.

CLIENT is now ufed for a party in a law-fuit, who has turned over his caufe into the hands of a counfellor or folicitor.

CLIFFORTIA. See BOTANY *Index*.

CLIMACTERIC, among phyficians, (from *climacter*, "a ladder"), a critical year in a perfon's life.

According to fome, this is every feventh year; but others allow only thefe years produced by multiplying 7 by the odd number 3, 5, 7, and 9, to be climacterical. Thefe years, they fay, bring with them fome remarkable change with refpect to health, life, or fortune: the grand climacteric is the 63d year; but fome, making two, add to this the 81ft: the other remarkable climacterics are the 7th, 21ft, 35th, 49th, and 56th.

CLIMATE, or CLIME, in *Geography*, a part of the furface of the earth, bounded by two circles parallel to the equator, and of fuch a breadth, as that the longeft day in the parallel neareft the pole exceeds the longeft day in that next the equator by fome certain fpaces, viz. half an hour. The word comes from the Greek κλιμα, *inclinamentum*, "an inclination."

The *beginning* of the climate is a parallel circle wherein the day is the fhorteft. The *end* of the climate, is that wherein the day is the longeft. The climates therefore are reckoned from the equator to the pole; and are fo many bands, or zones, terminated by lines parallel to the equator; though, in ftrictnefs, there are feveral climates in the breadth of one zone. Each climate only differs from its contiguous ones, in that the longeft day in fummer is longer or fhorter by half an hour in the one place than in the other. As the climates commence from the equator, the firft climate at its beginning has its longeft day precifely 12 hours long; at its end, 12 hours and a half: the fecond, which begins where the firft ends, viz. at twelve hours and a half, ends at 13 hours; and fo of the reft, as far as the polar circles, where, what the geographers call *hour-climates*, terminate, and *month-climates* commence. An hour climate is a fpace comprifed between two parallels of the equator, in the firft of which the longeft day exceeds that in the latter by half an hour; fo the month-climate is a fpace terminated between two circles parallel to the polar circles, whofe longeft day is longer or fhorter than that of its contiguous one by a month or 30 days.

The ancients who confined the climates to what they imagined the habitable parts of the earth, only allowed of feven. The firft they made to pafs through Meroë, the fecond through Sienna, the third through Alexandria, the fourth through Rhodes, the fifth through Rome, the fixth through Pontus, and the feventh through the mouth of the Boryfthenes. The moderns, who have failed further toward the poles, make 30 climates on each fide; and, in regard the obliquity of the fphere makes a little difference in the length of the longeft day, inftead of half an hour, fome of them only make the difference of climates a quarter.

Vulgarly the term *climate* is beftowed on any country or region differing from another either in refpect of the feafons, the quality of the foil, or even the manners of the inhabitants; without any regard to the length of the longeft day. Abulfeda, an Arabian author, diftinguifhes the firft kind of climates by the term *real climates*, and the latter by that of *apparent climates*. Varenius gives us a table of 30 climates; but without any regard to the refraction. Ricciolus furnifhes a more accurate one, wherein the refractions are allowed for; an abftract of which follows:

Middle of *Clim.*	Longeft Day.		Latit.		Middle of *Clim.*	Longeft Day.		Latit.		Middle of *Clim.*	Latit.		Cont. Light.	North Night.	Cont. Light.	South Night.
I	12th	30	7°	18	VIII	16th	0	48	15	XV	66	53	31ᵈ	27ᵈ	30ᵈ	28ᵈ
II	13	0	15	36	IX	17	0	53	46	XVI	69	30	62	58	60	59
III	13	30	23	8	X	18	0	57	44	XVII	73	0	93	87	89	88
IV	14	0	29	49	XI	19	0	60	39	XVIII	78	6	124	117	120	118
V	14	30	35	35	XII	20	0	62	44	XIX	84	0	156	148	150	149
VI	15	0	40	32	XIII	22	0	65	10	XX	90	0	188	180	178	177
VII	15	30	44	42	XIV	24	0	65	54							

CLIMAX, or GRADATION, in *Rhetoric*, a figure wherein the word or expreffion which ends the firft member of a period begins the fecond, and fo on; fo that every member will make a diftinct fentence, taking its rife from the next foregoing, till the argument and period be beautifully finifhed; as in the following gradation of Dr Tillotfon. "After we have practifed good actions a while, they become eafy; and when they are eafy, we begin to take pleafure in them; and when they pleafe us we do them frequently; and by frequency of acts, a thing grows into a habit; and confirmed habit is a kind of fecond nature: and fo far as any

any thing is natural, ſo far it is neceſſary; and we can hardly do otherwiſe; nay, we do it many times when we do not think of it."

CLINCH, in the ſea language, that part of a cable which is bended about the ring of the anchor, and then ſeized or made faſt.

CLINCHING, in the ſea language, a kind of ſlight caulking uſed at ſea, in a proſpect of foul weather, about the poſts: it conſiſts in driving a little oakum into their ſeams, to prevent the water coming in at them.

CLINIC, a term applied by the ancient church-hiſtorians to thoſe who receive baptiſm on their death-bed.

CLINIC Medicine, was particularly uſed for the method of viſiting and treating ſick perſons in bed, for the more exact diſcovery of all the ſymptoms of their diſeaſe.

CLINIAS, a Pythagorean philoſopher, and muſician, in the 65th Olympiad. He was wont to aſſuage his paſſion, being very choleric, by his lyre.

CLINOPODIUM, FIELD BASIL. See BOTANY *Index*.

CLIO, in Pagan mythology, the firſt of the muſes, daughter of Jupiter and Mnemoſyne. She preſided over hiſtory. She is repreſented crowned with laurels, holding in one hand a trumpet, and a book in the other. Sometimes ſhe holds a plectrum or quill with a lute. Her name ſignifies honour and reputation, κλεος, *gloria*; and it was her office faithfully to record the actions of brave and illuſtrious heroes. She had Hyacintha by Pierius, ſon of Magnes.

CLIO, in *Zoology*, a genus of inſects belonging to the order of vermes molluſca. The body is oblong and fitted for ſwimming; and it has two membranaceous wings placed oppoſite to each other. The ſpecies are three, principally diſtinguiſhed by the ſhape of their vagina, and are all natives of the ocean.

CLIPEUS, an old term in *Natural Hiſtory*, which is given to the flat depreſſed centroniæ, from their reſembling a ſhield.

CLISTHENES, a famous Athenian magiſtrate, the author of the mode of baniſhing ambitious citizens by oſtraciſm, or writing their names upon a ſhell; the intention was patriotic, but it was abuſed like all other human inſtitutions: ſome of the worthieſt citizens of Athens being thus exiled. He died 510 years before Chriſt.

CLITOMACHUS, the philoſopher, flouriſhed about 140 years before Chriſt. He was born at Carthage; quitted his country at 40 years of age; and went to Athens, where he became the diſciple and ſucceſſor of Carneades. He compoſed many books, but they are all loſt.

CLITORIA. See BOTANY *Index*.

CLITORIS, in *Anatomy*, is a part of the external pudenda, ſituated at the angle which the nymphæ form with each other. Like the penis it has an erection, and is thought to be the principal ſeat of venereal pleaſure. The clitoris is of different ſizes in different women; but in general it is ſmall, and covered with the labia. The preternaturally enlarged clitoris is what conſtitutes a hermaphrodite. When the clitoris is too large, it may be ſo extirpated as to remove the unneceſſary part; but this requires much care, for a farther extirpation ſubjects the patient to an involuntary diſcharge of urine.

CLITUMNUS, in *Ancient Geography*, a river of Umbria, on this ſide the Apennines. According to Pliny, it was a fountain conſiſting of ſeveral veins, ſituated between Hiſpellum and Spoletium; which ſoon after ſwelled into a very large and navigable river, running from eaſt to weſt into the Tinia, and both together into the Tiber. A river famous for its milk-white flocks and herds, (Virgil). The god of the river was called *Clitumnus*.

CLITUS, brother to Alexander the Great's nurſe, followed that prince in his conqueſts, and ſaved his life by cutting off the hand of Roſaces, who held an axe lifted up to kill him at the paſſage of the Granicus. Alexander, who had a great regard for him, ſome time after invited him to ſupper; when Clitus, at the end of the repaſt, being heated with wine, diminiſhed the exploits of that prince, in order to magnify thoſe of Philip his father. This ſo enraged Alexander, that he killed him with his own hand; but he was afterwards ſo afflicted at it, that he attempted his own life.

CLIVE, ROBERT, Lord, ſon of Richard Clive, Eſq. of Styche near Drayton in Salop, was born in 1725. Toward the cloſe of the war in 1741, he was ſent as a writer in the Eaſt India ſervice to Madras; but being fonder of the camp than the compting-houſe, he ſoon availed himſelf of an opportunity to exchange his pen for a pair of colours. He firſt diſtinguiſhed himſelf at the ſiege of Pondicherry in 1748; acted under Major Laurence at the taking of Devi Cotta in Tanjore, who wrote of his military talents in high terms; commanded a ſmall party for the taking of Arcot, and afterwards defended that place againſt the French; and performed many other exploits, which, conſidering the remoteneſs of the ſcene of action, would require a long detail to render ſufficiently intelligible. He was, however, in brief, looked upon and acknowledged as the man who firſt rouſed his countrymen to ſpirited action, and raiſed their reputation in the Eaſt; ſo that when he came over to England in 1753, he was preſented, by the court of directors, with a rich ſword ſet with diamonds, as an acknowledgment of paſt, and an incitement to future, ſervices. Captain Clive returned to India, in 1755, as governor of Fort St David, with the rank of lieutenant-colonel in the king's troops; when as commander of the company's troops, he, in conjunction with Admiral Watſon, reduced Angria the pirate, and became maſter of Geria, his capital, with all his accumulated treaſure. On the loſs of Calcutta, and the well known barbarity of the ſoubah Surajah Dowla, they ſailed to Bengal; where they took Fort William, in January 1757; and Colonel Clive defeating the ſoubah's army ſoon after, accelerated a peace. Surajah Dowla's perfidy, however, ſoon produced freſh hoſtilities, which ended in his ruin; he being totally defeated by Colonel Clive at the famous battle of Plaſſey. The next day, the conqueror entered Muxadabad in triumph; and placed Jaffier Ally Cawn, one of the principal generals, on the throne; the depoſed ſoubah was ſoon after taken, and privately put to death by Jaffier's ſon. Admiral Watſon died at Calcutta; but Colonel Clive commanded in Bengal the two ſucceeding years; he was-

was honoured by the Mogul with the dignity of an omrah of the empire; and was rewarded by the new soubah with a grant of lands, or a jaghire, producing 27,000l. a-year. In 1760, he returned to England, where he received the unanimous thanks of the company, was elected member of parliament for Shrewsbury, and was raised to an Irish peerage by the title of Lord Clive, Baron of Plassey. In 1764, fresh disturbances taking place in Bengal, Lord Clive was esteemed the only man qualified to settle them, and was accordingly again appointed to that presidency; after being honoured with the order of the Bath, and with the rank of major-general. When he arrived in India, he exceeded the most sanguine expectation, in restoring tranquillity to the province without striking a blow, and fixed the highest ideas of the British power in the minds of the natives. He returned home in 1767; and in 1772, when a parliamentary inquiry into the conduct of the East India Company was agitated, he entered into an able justification of himself in a masterly speech in the house of commons. He died *suddenly* towards the close of the year 1774.

CLOACÆ, in antiquity, the common sewers of Rome, to carry off the dirt and soil of the city into the Tiber; justly reckoned among the grand works of the Romans. The first common sewer, called *Cloaca Maxima*, was built by Tarquinius, some say Priscus, others Superbus, of huge blocks of stone joined together without any cement, in the manner of the edifices of those early times, consisting of three rows of arches one above another, which at length conjoin and unite together; measuring in the clear 18 palms in height, and as many in width. Under these arches, they rowed in boats, which made Pliny say that the city was suspended in air, and that they sailed beneath the houses. Under these arches also were ways through which carts loaded with hay could pass with ease. It began in the Forum Romanum; measured 300 paces in length; and emptied itself between the temple of Vesta and the Pons Senatorius. There were as many principal sewers as there were hills. Pliny concludes their firmness and strength from their standing for so many ages the shocks of earthquakes, the fall of houses, and the vast loads and weights moved over them.

CLOACINA, the goddess of jakes and common sewers, among the Romans.

CLOCK, a machine constructed in such a manner, and regulated so by the uniform motion of a pendulum (A), as to measure time, and all its subdivisions, with great exactness.

The invention of clocks with wheels is referred to Pacificus, archdeacon of Verona, who lived in the time of Lotharius son of Louis the Debonnair, on the credit of an epitaph quoted by Ughelli, and borrowed by him from Panvinius. They were at first called *nocturnal dials*, to distinguish them from sun-dials, which showed the hour by the sun's shadow. Others ascribe the invention to Boethius, about the year 510. Mr Derham makes clock-work of a much older standing; and ranks Archimedes's sphere mentioned by Claudian, and that of Posidonius mentioned by Cicero, among the machines of this kind: not that either their form or use was the same with those of ours, but that they had their motion from some hidden weights or springs, with wheels or pullies, or some such clock-work principle. But be this as it will, it is certain the art of making clocks, such as are now in use, was either first invented, or at least retrieved, in Germany, about 200 years ago. The water-clocks, or clepsydræ, and sun-dials, have both a much better claim to antiquity. The French annals mention one of the former kind sent by Aaron, king of Persia, to Charlemagne, about the year 807, which seemed to bear some resemblance to the modern clocks: it was of brass, and showed the hours by twelve little balls of the same metal, which fell at the end of each hour, and in falling struck a bell and made it sound. There were also figures of 12 cavaliers, which at the end of each hour came forth at certain apertures or windows in the side of the clock, and shut them again, &c.

The invention of pendulum clocks is owing to the happy industry of the last age: the honour of it is disputed by Huygens and Galileo. The former, who has written a volume on the subject, declares it was first put in practice in the year 1657, and the description thereof printed in 1657. Becker, *de Nova Temporis dimetiendi Theoria, anno* 1680, contends for Galileo; and relates, though at second-hand, the whole history of the invention; adding, that one Tresler, at that time clock-maker to the father of the Grand Duke of Tuscany, made the first pendulum-clock at Florence, by direction of Galileo Galilei; a pattern of which was brought into Holland. The Academy del' Cimenta say expressly, that the application of the pendulum to the movement of a clock was first proposed by Galileo, and first put in practice by his son Vincenzo Galilei, in 1649. Be the inventor who he will, it is certain the invention never flourished till it came into Huygen's hands, who insists on it, that if ever Galileo thought of such a thing, he never brought it to any degree of perfection. The first pendulum-clock made in England was in the year 1662, by Mr Fromantil, a Dutchman.

Among the modern clocks, those of Strasburg and Lyons are very eminent for the richness of their furniture, and the variety of their motions and figures. In the first, a cock claps his wings, and proclaims the hour; the angel opens a door and salutes the virgin; and the Holy Spirit descends on her, &c. In the second, two horsemen encounter, and beat the hour on each other; a door opens, and there appears on the theatre the Virgin, with Jesus Christ in her arms; the Magi with their retinue, marching in order, and presenting their gifts; two trumpeters sounding all the while to proclaim the procession. These, however, are excelled by two lately made by English artists, and intended as a present from the East India Company to the emperor of China. The clocks we speak of are in the form of chariots, in which are placed, in a fine attitude,

(A) A balance not unlike the fly of a kitchen-jack was formerly used in place of the pendulum.

Clock.

attitude, a lady, leaning her right hand upon a part of the chariot, under which is a clock of curious workmanſhip, little larger than a ſhilling, that ſtrikes and repeats, and goes eight days. Upon her finger ſits a bird finely modelled, and ſet with diamonds and rubies, with its wings expanded in a flying poſture, and actually flutters for a conſiderable time on touching a diamond button below it; the body of the bird (which contains part of the wheels that in a manner give life to it) is not the bigneſs of the 16th part of an inch. The lady holds in her left hand a gold tube not much thicker than a large pin, on the top of which is a ſmall round box, to which a circular ornament ſet with diamonds not larger than a ſixpence is fixed, which goes round near three hours in a conſtant regular motion. Over the lady's head, ſupported by a ſmall fluted pillar no bigger than a quill, is a double umbrella, under the largeſt of which a bell is fixed at a conſiderable diſtance from the clock, and ſeems to have no connection with it; but from which a communication is ſecretly conveyed to a hammer, that regularly ſtrikes the hour, and repeats the ſame at pleaſure, by touching a diamond button fixed to the clock below. At the feet of the lady is a gold dog; before which from the point of the chariot are two birds fixed on ſpiral ſprings; the wings and feathers of which are ſet with ſtones of various colours, and appear as if flying away with the chariot, which, from another ſecret motion, is contrived to run in a ſtraight, circular, or any other direction; a boy that lays hold of the chariot, behind, ſeems alſo to puſh it forward. Above the umbrella are flowers and ornaments of precious ſtones; and it terminates with a flying dragon ſet in the ſame manner. The whole is of gold, moſt curiouſly executed, and embelliſhed with rubies and pearls.

Plate CXLVI. fig. 1.

Of the general Mechaniſm of CLOCKS, *and how they meaſure Time.* The firſt figure of Plate CXLVI. is a profile of a clock: P is a weight that is ſuſpended by a rope that winds about the cylinder or barrel C, which is fixed upon the axis *a a;* the pivots *b b* go into holes made in the plates TS, TS, in which they turn freely. Theſe plates are made of braſs or iron, and are connected by means of *four pillars* ZZ; and the whole together is called the *frame.*

The weight P, if not reſtrained, would neceſſarily turn the barrel C with an uniformly accelerated motion, in the ſame manner as if the weight was falling freely from a height. But the barrel is furniſhed with a ratchet-wheel KK, the right ſide of whoſe teeth ſtrikes againſt the click, which is fixed with a ſcrew to the wheel DD, as repreſented in fig. 2. ſo that the action of the weight is communicated to the wheel DD, the teeth of which act upon the teeth of the ſmall wheel *d* which turns upon the pivots *c c*. The communication or action of one wheel with another is called the *pitching;* a ſmall wheel like *d* is called a *pinion*, and its teeth are leaves of the pinion. Several things are requiſite to form a good pitching, the advantages of which are obvious in all machinery where teeth and pinions are employed. The teeth and pinion leaves ſhould be of a proper ſhape, and perfectly equal among themſelves; the ſize alſo of the pinion ſhould be of a juſt proportion to the wheel acting into it; and its place muſt be at a certain diſtance from the wheel, beyond or within which it will make a bad pitching.

The wheel EE is fixed upon the axis of the pinion *d;* and the motion communicated to the wheel DD by the weight is tranſmitted to the pinion *d*, conſequently to the wheel EE, as likewiſe to the pinion *e* and wheel FF, which moves the pinion *f*, upon the axis of which the crown or balance wheel GH is fixed. The pivots of the pinion *f* play in holes of the plates LM, which are fixed horizontally to the plates TS. In a word, the motion begun by the weight is tranſmitted from the wheel GH to the palettes IK, and, by means of the fork UX rivetted on the palettes, communicates motion to the pendulum AB, which is ſuſpended upon the hook A. The pendulum AB deſcribes, round the point A, an arc of a circle alternately going and returning. If then the pendulum be once put in motion by a puſh of the hand, the weight of the pendulum at B will make it return upon itſelf, and it will continue to go alternately backward and forward, till the reſiſtance of the air upon the pendulum, and the friction at the point of ſuſpenſion at A, deſtroy the originally impreſſed force. But as, at every vibration of the pendulum, the teeth of the balance-wheel GH, act ſo upon the palettes IK (the pivots upon the axis of theſe palettes play in two holes of the potence *s t*), that after one tooth H has communicated motion to the palette K, that tooth eſcapes; then the oppoſite tooth G acts upon the palette I, and eſcapes in the ſame manner; and thus each tooth of the wheel eſcapes the palettes IK, after having communicated their motion to the palettes in ſuch a manner that the pendulum, inſtead of being ſtopt, continues to move.

The wheel EE revolves in an hour; the pivot *c* of the wheel paſſes through the plate, and is continued to *r;* upon the pivot is a wheel NN with a long ſocket faſtened in the centre; upon the extremity of this ſocket *r* the minute-hand is fixed. The wheel NN acts upon the wheel O; the pinion of which *p* acts upon the wheel *g g*, fixed upon a ſocket which turns along with the wheel N. This wheel *gg* makes its revolution in 12 hours, upon the ſocket of which the hour-hand is fixed.

From the above deſcription it is eaſy to ſee, 1. That the weight *p* turns all the wheels, and at the ſame time continues the motion of the pendulum. 2. That the quickneſs of the motion of the wheel is determined by that of the pendulum. 3. That the wheels point out the parts of time divided by the uniform motion of the pendulum.

When the cord from which the weight is ſuſpended is entirely run down from off the barrel, it is wound up again by means of a key, which goes on the ſquare end of the arbor at Q by turning it in a contrary direction from that in which the weight deſcends. For this purpoſe, the inclined ſide of the teeth of the wheel R (fig. 2.) removes the click C, ſo that the ratchet-wheel R turns while the wheel D is at reſt; but as ſoon as the cord is wound up, the click falls in between the teeth of the wheel D, and the right ſide of the teeth again act upon the end of the click, which obliges the wheel D to turn along with the barrel; and the ſpring A keeps the click between the teeth of the ratchet-wheel R.

Fig. 2.

We ſhall now explain how time is meaſured by the motion of the pendulum; and how the wheel E, upon the

Clock.

the axis of which the minute-hand is fixed, makes but one precise revolution in an hour. The vibrations of a pendulum are performed in a shorter or longer time in proportion to the length of the pendulum itself. A pendulum of 3 feet 8½ French lines in length, makes 3600 vibrations in an hour, *i. e.* each vibration is performed in a second of time, and for that reason it is called a *second pendulum.* But a pendulum of 9 inches 2¼ French lines makes 7200 vibrations in an hour, or two vibrations in a second of time, and is called *a half-second pendulum.* Hence, in constructing a wheel whose revolution must be performed in a given time, the time of the vibrations of the pendulum which regulates its motion must be considered. Supposing, then, that the pendulum A B makes 7200 vibrations in an hour, let us consider how the wheel E shall take up an hour in making one revolution. This entirely depends on the number of teeth in the wheels and pinions. If the balance-wheel consists of 30 teeth, it will turn once in the time that the pendulum makes 60 vibrations; for at every turn of the wheel, the same tooth acts once on the palette I, and once on the palette K, which occasions two separate vibrations in the pendulum; and the wheel having 30 teeth, it occasions twice 30, or 60 vibrations. Consequently, this wheel must perform 120 revolutions in an hour; because 60 vibrations, which it occasions at every revolution, are contained 120 times in 7200, the number of vibrations performed by the pendulum in an hour. Now, in order to determine the number of teeth for the wheels EF, and the pinions *e f*, it must be remarked, that one revolution of the wheel E must turn the pinion *e* as many times as the number of teeth in the pinions is contained in the number of teeth in the wheel. Thus, if the wheel E contains 72 teeth, and the pinion *e* 6, the pinion will make 12 revolutions in the time that the wheel makes 1; for each tooth of the wheel drives forward a tooth of the pinion, and when the 6 teeth of the pinion are moved, a complete revolution is performed; but the wheel E has by that time only advanced 6 teeth, and has still 66 to advance before its revolution be completed, which will occasion 11 more revolutions of the pinion. For the same reason, the wheel F having 60 teeth, and the pinion *f* 6, the pinion will make 10 revolutions while the wheel performs one. Now, the wheel F being turned by the pinion *e*, makes 12 revolutions for one of the wheel E; and the pinion *f* makes 10 revolutions for one of the wheel F; consequently, the pinion *f* performs 10 times 12 or 120 revolutions in the time the wheel E performs one. But the wheel G, which is turned by the pinion *f*, occasions 60 vibrations in the pendulum each time it turns round; consequently the wheel G occasions 60 times 120 or 7200 vibrations of the pendulum while the wheel E performs one revolution; but 7200 is the number of vibrations made by the pendulum in an hour, and consequently the wheel E performs but one revolution in an hour; and so of the rest.

From this reasoning, it is easy to discover how a clock may be made to go for any length of time without being wound up: 1. By increasing the number of teeth in the wheels; 2. By diminishing the number of teeth in the pinions; 3. By increasing the length of the cord that suspends the weight; 4. By increasing the length of the pendulum; and, 5. By adding to the number of wheels and pinions. But in proportion as the time is augmented, if the weight continues the same, the force which it communicates to the last wheel GH will be diminished.

It only remains to take notice of the number of teeth in the wheels which turn the hour and minute-hands.

The wheel E performs one revolution in an hour; the wheel NN, which is turned by the axis of th wheel E, must likewise make only one revolution in the same time; and the minute-hand is fixed to the socket of this wheel. The wheel N has 30 teeth, and acts upon the wheel O, which has likewise 30 teeth, and the same diameter; consequently the wheel O takes one hour to a revolution: now the wheel O carries the pinion *p*, which has 6 teeth, and which acts upon the wheel *q q* of 72 teeth; consequently the pinion *p* makes 12 revolutions while the wheel *q q* makes one, and of course the wheel *q q* takes 12 hours to one revolution; and upon the socket of this wheel the hour hand is fixed. All that has been said here concerning the revolutions of the wheels, &c. is equally applicable to watches as to clocks.

The ingenious Dr Franklin contrived a clock to show the hours, minutes, and seconds, with only three wheels and two pinions in the whole movement. The dial-plate (fig. 3.) has the hours engraven upon it in spiral spaces along two diameters of a circle containing four times 60 minutes. The index A goes round in four hours, and counts the minutes from any hour by which it has passed to the next following hour. The time, therefore, in the position of the index shown in the figure is either 32¼ minutes past XII. III. or VIII.; and so in every other quarter of the circle it points to the number of minutes after the hours which the index last left in its motion. The small hand B, in the arch at top, goes round once in a minute, and shows the seconds. The wheel-work of this clock may be seen in fig. 4. A is the first or great wheel, containing 160 teeth, and going round in four hours with the index A in fig. 3. let down by a hole on its axis. This wheel turns a pinion B of 10 leaves, which therefore goes round in a quarter of an hour. On the axis of this pinion is the wheel C of 120 teeth; which goes round in the same time, and turns a pinion D of eight leaves round in a minute, with the second hand B of fig. 3. fixed on its axis, and also the common wheel E of 30 teeth for moving a pendulum (by palettes) that vibrates seconds, as in a common clock. This clock is wound up by a line going over a pulley on the axis of the great wheel, like a common thirty hour clock. Many of these admirably simple machines have been constructed, which measure time exceedingly well. It is subject, however, to the inconvenience of requiring frequent winding by drawing up the weight, and likewise to some uncertainty as to the particular hour shown by the index A. Mr Ferguson has proposed to remedy these inconveniences by the following construction. In the dial-plate of his clock (fig. 5.) there is an opening, *a b c d*, below the centre, through which appears part of a flat plate, on which the 12 hours, with their divisions into quarters, are engraved. This plate turns round in 12 hours; and the index A points out the true hour, &c. B is the

Fig. 3. Fig. 4. Fig. 5.

Clock.

the minute-hand, which goes round the large circle of 60 minutes whilſt the plate *a b c d* ſhifts its place one hour under the fixed index A. There is another opening, *e f g*, through which the ſeconds are ſeen on a flat moveable ring at the extremity of a fleur-de-lis engraved on the dial-plate. A in fig. 6. is the great wheel of this clock, containing 120 teeth, and turning round in 12 hours. The axis of this wheel bears the plate of hours, which may be moved by a pin paſſing through ſmall holes drilled in the plate, without affecting the wheel-work. The great wheel A turns a pinion B of ten leaves round in an hour, and carries the minute hand B on its axis round the dial-plate in the ſame time. On this axis is a wheel C of 120 teeth, turning round a pinion D of ſix leaves in three minutes; on the axis of which there is a wheel E of 90 teeth, that keeps a pendulum in motion, vibrating ſeconds by palettes, as in a common clock, when the pendulum-wheel has only 30 teeth, and goes round in a minute. In order to ſhow the ſeconds by this clock, a thin plate muſt be divided into three times ſixty, or 180 equal parts, and numbered 10, 20, 30, 40, 50, 60, three times ſucceſſively; and fixed on the ſame axis with the wheel of 90 teeth, ſo as to turn round near the back of the dial-plate; and theſe diviſions will ſhow the ſeconds through the opening *e f g h*, fig. 5. This clock will go a week without winding, and always ſhow the preciſe hour; but this clock, as Mr Ferguſon candidly acknowledges, has two diſadvantages of which Dr Franklin's clock is free. When the minute-hand B is adjuſted, the hour-plate muſt alſo be ſet right by means of a pin; and the ſmallneſs of the teeth in the pendulum-wheel will cauſe the pendulum-ball to deſcribe but ſmall arcs in its vibrations; and therefore the momentum of the ball will be leſs, and the times of the vibrations will be more affected by any unequal impulſe of the pendulum-wheel on the palettes. Beſides, the weight of the flat ring on which the ſeconds are engraved will load the pivots of the axis of the pendulum-wheel with a great deal of friction, which ought by all poſſible means to be avoided. To remedy this inconvenience, the ſecond plate might be omitted.

A clock ſimilar to Dr Franklin's was made in Lincolnſhire about the end of the 17th century or beginning of the 18th; and is ſaid to be in London in the poſſeſſion of a grandſon of the perſon who made it.

A clock, ſhowing the apparent diurnal motions of the ſun and moon, the age and phaſes of the moon, with the time of her coming to the meridian, and the times of high and low water, by having only two wheels and a pinion added to the common movement, was contrived by Mr Ferguſon, and deſcribed in his Select Exerciſes. The dial-plate of this clock (fig. 7.) contains all the twenty-four hours, of the day and night. S is the ſun, which ſerves as an hour index by going round the dial-plate in twenty-four hours; and M is the moon, which goes round in twenty-four hours fifty minutes and a half, the time of her going round in the heavens from one meridian to the ſame meridian again. The ſun is fixed to a circular plate (ſee fig. 8.) and carried round by the motion of that plate on which the twenty-four hours are engraven; and within them is a circle divided into twenty-nine and a half equal parts for the days of the moon's age, reckoning from new moon to new moon; and each day ſtands directly under the time, in the twenty-four hour circle, of the moon's coming to the meridian; the XII under the ſun ſtanding for noon, and the oppoſite XII for midnight. The moon M is fixed to another circular plate (fig. 6.) of the ſame diameter with that which carries the ſun, part of which may be ſeen through the opening, over which the ſmall wires *r* and *b* paſs in the moon-plate. The wire *a* ſhows the moon's age and time of her coming to the meridian, and *b* ſhows the time of high-water for that day in the ſun-plate. The diſtance of theſe wires anſwers to the difference of time between the moon's coming to the meridian and high-water at the place for which the clock is made. At London their difference is two hours and a half. Above the moon-plate there is a fixed plate N, ſupported by a wire A, joined to it at one end, and fixed at right angles into the dial plate at the midnight XII. This plate may repreſent the earth, and the dot L London, or the place to which the clock is adapted. Around this plate there is an elliptic ſhade on the moon-plate, the higheſt points of which are marked high-water, and the loweſt low-water. As this plate turns round below the plate N, theſe points come ſucceſſively even with L, and ſtand over it at the times when it is high or low water at the given place; which times are pointed by the ſun S on the dial-plate; and the plate H above XII at noon riſes or falls with the tide. As the ſun S goes round the dial-plate in twenty-four hours, and the moon M in twenty-four hours fifty minutes and a half, it is plain that the moon makes only twenty-eight revolutions and a half, whilſt the ſun makes twenty-nine and a half; ſo that it will be twenty-nine days and a half from conjunction to conjunction. And thus the wire *a* ſhifts over one day of the moon's age on the ſun-plate in twenty-four hours. The phaſes of the moon for every day of her age may be ſeen through a round hole *m* in the moon-plate: thus at conjunction or new-moon, the whole ſpace ſeen through *m* is black; at oppoſition or full moon this ſpace is white; at either quadrature half black and half white; and at every poſition the white part reſembles the viſible part of the moon for every day of her age. The black-ſhaded ſpace N *f* F *l* (fig. 8.) on the ſun-plate ſerves for theſe appearances. N repreſents the new moon, F the full moon, and *f* her firſt quarter, and *l* her laſt quarter, &c. The wheel-work and tide-work of this clock are repreſented in fig. 9. A and B are two wheels of equal diameters; A has fifty-ſeven teeth, with a hollow axis that paſſes through the dial of the clock, and carries the ſun-plate with the ſun S. B has fifty-nine teeth, with a ſolid ſpindle for its axis, which turns within the hollow axis of A, and carries the moon-plate with the moon M: both wheels are turned round by a pinion C of nineteen leaves, and this pinion is turned round by the common clock-work in eight hours; and as nineteen is the third part of fifty-ſeven, the wheel A will go round in twenty-four hours; and the wheel B in twenty-four hours fifty minutes and a half; fifty-ſeven being to twenty-four as fifty-nine to twenty-four hours fifty minutes and a half very nearly. On the back of the wheel B is fixed an elliptical ring D, which, in its revolution, raiſes and lets down a lever EF, whoſe centre of motion is on a pin at F; and this, by the upright

Clock.

right bar G, raiſes and lets down the tide-plate H twice in the time of the moon's revolving from the meridian to the meridian again : this plate moves between four rollers R, R, R, R. A clock of this kind was adapted by Mr Ferguſon to the movement of an old watch : the great wheel of a watch goes round in four hours ; on the axis of this he fixed a wheel of twenty teeth, to turn a wheel of forty teeth on the axis of the pinion C ; by which means that pinion was turned round in eight hours, the wheel A in twenty-four, and the wheel B in twenty-four hours fifty minutes and a half.

To this article we ſhall ſubjoin a brief account of two curious contrivances. The firſt, for giving motion to the parts of a clock by making it to deſcend along an inclined plane, is the invention of Mr Maurice Wheeler ; the clock itſelf was formerly ſeen in Don Saltero's coffee-houſe at Chelſea. DE, fig. 10. is the inclined plane on which the clock ABC deſcends ; this conſiſts externally of a hoop about an inch broad, and two ſides or plates ſtanding out beyond the hoop about one-eighth of an inch all round, with indented edges, that the clock may not ſlide, but turn round whilſt it moves down. One of theſe plates is inſcribed with the twenty-four hours, which paſs ſucceſſively under the index LP, fig. 11. which is always in a poſition perpendicular to the horizon, and ſhows the hour on the top of the machine : for this reaſon the lower part of the index, or HL, is heavieſt, that it may preponderate the other HP, and always keep it pendulous, with its point to the vertical hour, as the movement goes on. Inſtead of this index, an image may be fixed for ornament on the axis *g*, which with an erected finger performs the office of an index. In order to deſcribe the internal part or mechaniſm of this clock, let LETQ be the external circumference of the hoop, and *ff* the ſame plate, on which is placed the train of wheel work 1, 2, 3, 4, which is much the ſame as in other clocks, and is governed by a balance and regulator as in them. But there is no need of a ſpring and fuſee in this clock : their effects being otherwiſe anſwered as we ſhall ſee. In this machine the great wheel of 1 is placed in the centre, or upon the axis of the movement, and the other wheels and parts towards one ſide, which would therefore prove a bias to the body of the clock, and cauſe it to move, even on a horizontal plane, for ſome ſhort diſtance : this makes it neceſſary to fix a thin plate of lead at C, on the oppoſite part of the hoop, to reſtore the equilibrium of the movement. This being done, the machine will abide at reſt in any poſition on the horizontal plane HH ; but if that plane be changed into the inclined plane DE, it will touch it in the point D ; but it cannot reſt there, becauſe the centre of gravity at M acting in the direction MI, and the point T having nothing to ſupport it, muſt continually deſcend, and carry the body down the plane. But now if any weight P be fixed on the other ſide of the machine, ſuch as ſhall remove the centre of gravity from M to the point V in the line LD which paſſes through the point D, it will then reſt upon the inclined plane, as in the caſe of the rolling cylinder. If this weight P be ſuppoſed not fixed, but ſuſpended at the end of an arm, or vectis, which arm or lever is at the ſame time faſtened to a centrical wheel 1, moving on the axis M of the machine, which wheel by its teeth ſhall communicate with the train of wheels, &c. on the other ſide, and the power of the weight be juſt equal to the friction or reſiſtance of the train, it will remain motionleſs as it did before when it was fixed ; and conſequently the clock alſo will be at reſt on the inclined plane. But ſuppoſing the power of the weight P to be ſuperior to the reſiſtance of the train, it will then put it into motion, and of courſe the clock likewiſe ; which will then commence a motion down the plane ; while the weight P, its vectis PM, and the wheel 1, all conſtantly retain the ſame poſition which they have at firſt when the clock begins to move. Hence it is eaſy to underſtand, that the weight P may have ſuch an intrinſic gravity as ſhall cauſe it to act upon the train with any required force, ſo as to produce a motion in the machine of any required velocity ; ſuch, for inſtance, as ſhall carry it once round in twenty-four hours : then, if the diameters of the plates ABC be four inches, it will deſcribe the length of their circumference, viz. 1256 inches, in one natural day ; and therefore, if the plane be of a ſufficient breadth, ſuch a clock may go ſeveral days, and would furniſh a perpetual motion, if the plane were infinitely extended. Let SD be drawn through M perpendicular to the inclined plane in the point D ; alſo let LD be perpendicular to the horizontal line HH, paſſing through D ; then is the angle HDE=LDS=DMT ; whence it follows that the greater the angle of the plane's elevation is, the greater will be the arch DT ; and conſequently the further will the common centre of gravity be removed from M ; therefore the power of P will be augmented, and of courſe the motion of the whole machine accelerated. Thus it appears, that by duly adjuſting the intrinſic weight of P, at firſt to produce a motion ſhowing the mean time as near as poſſible, the time may be afterwards corrected, or the clock made to go faſter or ſlower by raiſing or depreſſing the plane, by means of the ſcrew at S. The angle to which the plane is firſt raiſed is about ten degrees. The marquis of Worceſter is alſo ſaid to have contrived a watch that moved on a declivity. See farther *Phil. Tranſ. Abr.* vol. i. p. 468, &c. or N° 161.

Plate CXLVIII. fig. 10.

Fig. 11.

The other contrivance is that of M. de Gennes for making a clock aſcend on an inclined plane. To this end let ABC (fig. 12.) be the machine on the inclined plane EDE, and let it be kept at reſt upon it, or in equilibrio by the weight P at the end of the level PM. The circular area CF is one end of a ſpring barrel in the middle of the movement, in which is included a ſpring as in a common watch. To this end of the barrel the arm or lever PM is fixed upon the centre M ; and thus, when the clock is wound up, the ſpring moves the barrel, and therefore the lever and weight P in the ſituation PM. In doing this, the centre of gravity is conſtantly removed farther from the centre of the machine, and therefore it muſt determine the clock to move upwards, which it will continue to do as long as the ſpring is unbending itſelf ; and thus the weight and its lever PM will preſerve the ſituation they firſt have, and to do the office of a chain and fuſee. *Phil. Tranſ.* N° 140. or Abridg. vol. i. p. 467.

Fig. 12.

By ſtat. 9 and 10 W. III. cap. 28. § 2. no perſon ſhall export, or endeavour to export out of this kingdom,

Clock.

dom, any outward or inward box-caſe or dial-plate, of gold, ſilver, braſs, or other metal, for clock or watch, without the movement in or with every ſuch box, &c. made up fit for uſe, with the maker's name engraven thereon; nor ſhall any perſon make up any clock or watch without putting his name and place of abode or freedom, and no other name or place, on every clock or watch; on penalty of forfeiting every ſuch box, caſe, and dial-plate, clock and watch, not made up and engraven as aforeſaid; and 20l. one moiety to the king, the other to thoſe that ſhall ſue for the ſame.

Clocks, *Portable*, or *Pocket*, commonly denominated *Watches*. See the article Watch.

Clock-Work, properly ſo called, is that part of the movement which ſtrikes the hours, &c. on a bell; in contradiſtinction to that part of the movement of a clock or watch which is deſigned to meaſure and exhibit the time on a dial-plate, and which is termed *Watch-work.*

Plate XLVIII. fig. 13.

I. Of the *Clock* part. The wheels compoſing this part are: The great or firſt wheel H, which is moved by the weight or ſpring at the barrel G: in ſixteen or thirty-hour clocks, this has uſually pins, and is called the *pin-wheel;* in eight-day pieces, the ſecond wheel I is commonly the pin-wheel, or ſtriking wheel, which is moved by the former. Next the ſtriking wheel is the detent-wheel, or hoop-wheel K, having a hoop almoſt round it, wherein is a vacancy at which the clock locks. The next is the third or fourth wheel, according to its diſtance from the firſt, called the *warning-wheel* L. The laſt is the flying pinion Q, with a fly or fan, to gather air, and ſo bridle the rapidity of the clock's motion. To theſe muſt be added the pinion of report, which drives round the locking-wheel, called alſo the *count-wheel;* ordinarily with eleven notches in it, unequally diſtant, to make the clock ſtrike the hours.

Beſides the wheels, to the clock part belongs the raſh or ratch; a kind of wheel with twelve large fangs, running concentrical to the dial-wheel, and ſerving to lift up the detents every hour, and make the clock ſtrike: the detents or ſtops, which being lifted up and let fall, lock and unlock the clock in ſtriking the hammer, as S, which ſtrikes the bell R; the hammer-tails, as T, by which the ſtriking pins draw back the hammers; latches, whereby the work is lifted up and unlocked; and lifting-pieces, as P, which lift up and unlock the detents.

The method of calculating the numbers of a piece of clock-work having ſomething in it very entertaining, and at the ſame time very eaſy and uſeful, we ſhall give our readers the rules relating thereto: 1. Regard here needs only be had to the counting-wheel, ſtriking-wheel, and detent-wheel, which move round in this proportion: the court-wheel commonly goes round once in 12 or 24 hours; the detent-wheel moves round every ſtroke the clock ſtrikes, or ſometimes but once in two ſtrokes: wherefore it follows, that, 2. As many pins as are in the pin-wheel, ſo many turns hath the detent-wheel in one turn of the pin-wheel; or, which is the ſame, the pins of the pin-wheel are the quotients of that wheel divided by the pinion of the detent-wheel. But if the detent-wheel moves but once round in two ſtrokes of the clock, then the ſaid quotient is but half the number of pins. 3. As many turns of the pin-wheel as are required to perform the ſtrokes of 12 hours (which are 78), ſo many turns muſt the pinion of report have to turn round the count-wheel once; or thus the quotient of 78, divided by the number of ſtriking-pins, ſhall be the quotient for the pinion of report and the count wheel; and this is in caſe the pinion of report be fixed to the arbor of the pin-wheel, which is commonly done.

An example will make all plain: The locking-wheel being 48, the pinion of report 8, the pin-wheel 78, the ſtriking pins are 13, and ſo of the reſt. Note alſo, that 78 divided by 13 gives 6, the quotient of the pinion of report, As for the warning-wheel and fly-wheel, it matters little what numbers they have; their uſe being only to bridle the rapidity of the motion of the other wheels.

8) 48 (6

6) 78 (13
6) 60 (10
6) 48 (8

The following rules will be of great ſervice in this calculation. 1. *To find how many ſtrokes a clock ſtrikes in one turn of the fuſee or barrel:* As the turns of the great wheel or fuſee are to the days of the clock's continuance; ſo is the number of ſtrokes in 24 hours, viz. 156, to the ſtrokes of one turn of the fuſee.

2. *To find how many days a clock will go:* As the ſtrokes in 24 hours are to thoſe in one turn of the fuſee; ſo are the turns of the fuſee to the days of the clock's going.

3. *To find the number of turns of the fuſee or barrel:* As the ſtrokes in one turn of the fuſee are to thoſe of 24 hours; ſo is the clock's continuance to the turns of the fuſee or great wheel.

4. *To find the number of leaves in the pinion of report on the axis of the great wheel:* As the number of ſtrokes in the clock's continuance is to the turns of the fuſee; ſo are the ſtrokes in 12 hours, viz. 78, to the quotient of the pinion of report fixed on the arbor of the great wheel.

5. *To find the ſtrokes in the clock's continuance:* As 12 is to 78; ſo are the hours of the clock's continuance to the number of ſtrokes in that time.

By means of the following table, clocks and watches may be ſo regulated as to meaſure true equal time.

The ſtars make 366 revolutions from any point of the compaſs to the ſame point again in 365 days and one minute; and therefore they gain a 365th of a revolution every 24 hours of mean ſolar time, near enough for regulating any clock or watch.

This acceleration is at the rate of 3 min. 55 ſec. 53 thirds, 59 fourths in 24 hours; or in the neareſt round numbers, 3 minutes, 56 ſeconds; by which quantity of time every ſtar comes round ſooner than it did on the day before.

Therefore if you mark the preciſe moment ſhown by a clock or watch when any ſtar vaniſhes behind a chimney, or any other object, as ſeen through a ſmall hole in a thin plate of metal, fixed in a window-ſhutter;

Days.	H.	M.	S.
1	0	3	56
2	0	7	52
3	0	11	48
4	0	15	44
5	0	19	40
6	0	23	36
7	0	27	32
8	0	31	28
9	0	35	24
10	0	39	20
11	0	43	16
12	0	47	12
13	0	51	8
14	0	55	4
15	0	59	0
16	1	2	56
17	1	6	52

Days.	H. M. S.
18	1 10 48
19	1 14 44
20	1 18 40
21	1 22 36
22	1 26 32
23	1 30 28
24	1 34 24
25	1 38 20
26	1 42 16
27	1 46 12
28	1 50 8
29	1 54 4
30	1 58 0

and do this for ſeveral nights ſucceſſively (as ſuppoſe twenty); if, at the end of that time, the ſtar vaniſhes as much ſooner than it did the firſt night, by the clock, as anſwers to the time denoted in the table for ſo many days, the clock goes true; otherwiſe not. If the difference between the clock and ſtar be leſs than the table ſhows, the clock goes too faſt; if greater, it goes too ſlow; and muſt be regulated accordingly, by letting down or raiſing up the ball of the pendulum, by little and little, by turning the ſcrew-nut under the ball, till you find it keeps true equal time.

Thus ſuppoſing the ſtar ſhould diſappear behind a chimney, any night when it is XII. by the clock; and that, on the 20th night afterward, the ſame ſtar ſhould diſappear when the time is 41 minutes 22 ſeconds paſt X, by the clock; which being ſubtracted from 12 hours 0 min. 0 ſec. leaves remaining 1 hour 18 minutes 40 ſeconds for the time the ſtar is then faſter than the clock: look in the table, and againſt 20, in the left hand column, you will find the acceleration of the ſtar to be 1 hour 18 min. 40 ſec. agreeing exactly with what the difference ought to be between the clock and ſtar; which ſhows that the clock meaſures true equal time, and agrees with the mean ſolar time, as it ought to do.

II. Of the *Watch* part of a clock or watch. This is that part of the movement which is deſigned to meaſure and exhibit the time on a dial-plate; in contradiſtinction to that part which contributes to the ſtriking of the hour, &c.

The ſeveral members of the watch part are, 1. The balance, conſiſting of the rim, which is its circular part; and the verge, which is its ſpindle; to which belong two palettes or leaves, that play in the teeth of the crown-wheel. 2. The potence, or pottance, which is the ſtrong ſtud in pocket watches, whereon the lower pivot of the verge plays, and in the middle of which one pivot of the balance wheel plays; the bottom of the pottance is called the foot, the middle part the noſe, and the upper part the ſhoulder. 3. The cock, which is the piece covering the balance. 4. The regulator, or pendulum ſpring, which is the ſmall ſpring, in the new pocket-watches, underneath the balance. 5. The pendulum (fig. 13.); whoſe parts are, the verge *x*, palettes 5, 5, cocks *yyy*, the rod, the fork, *z*, the flatt 2, the bob or great ball 3, and the corrector or regulator, 4, being a contrivance of Dr Derham for bringing the pendulum to its nice vibrations. 6. The wheels, which are the crown wheel F in pocket-pieces, and ſwing-wheel in pendulums; ſerving to drive the balance or pendulum. 7. The contrate-wheel E, which is that next the crown-wheel, &c. and whoſe teeth and hoop lie contrary to thoſe of other wheels; whence the name. 8. The great, or firſt wheel C; which is that the fuſee B, &c. immediately drives, by means of the chain or ſtring of the ſpring-box or barrel A; after which are the ſecond wheel D, third wheel, &c. Laſtly, between the frame and dial-plate, is the pinion of report, which is that fixed on the arbor of the great wheel; and ſerves to drive the dial-wheel, as that ſerves to carry the hand.

For the illuſtration of this part of the work which lies concealed, let ABC (fig. 14.) repreſent the uppermoſt ſide of the frame-plate, as it appears when detached from the dial-plate: the middle of this plate is perforated with a hole, receiving that end of the arbor of the centre wheel which carries the minute hand; near the plate is fixed the pinion of report *a b* of 10 teeth; this drives a wheel *c d* of 40 teeth; this wheel carries a pinion *e f* of 12 teeth; and this again drives a wheel *g h* with 36 teeth.

Fig. 14.

As in the body of the watch the wheels everywhere divide the pinions; here, on the contrary, the pinions divide the wheels, and by that means diminiſh the motion, which is here neceſſary; for the hour hand, which is carried on a ſocket fixed on the wheel *g h*, is required to move but once round, while the pinion *a b* moves twelve times round. For this purpoſe the motion of the wheel *c d* is $\frac{1}{4}$ of the pinion *a b*. Again, while the wheel *c d*, or the pinion *e f*, goes once round, it turns the wheel *g h* but $\frac{1}{3}$ part round; conſequently the motion of *g h* is but $\frac{1}{3}$ of $\frac{1}{4}$ of the motion of *a b*; but $\frac{1}{3}$ of $\frac{1}{4}$ is $\frac{1}{12}$; *i. e.* the hour-wheel *g h* moves once round in the time that the pinion of report, on the arbor of the centre of the minute wheel, makes 12 revolutions, as required. Hence the ſtructure of that part of a clock or watch which ſhows the time may be eaſily underſtood.

The cylinder A (fig. 13.) put into motion by a weight or incloſed ſpring moves the fuſee B, and the great wheel C, to which it is fixed by the line or cord that goes round each, and anſwers to the chain of a watch.

The method of calculation is eaſily underſtood by the ſequel of this article; for, ſuppoſe the great wheel C goes round once in 12 hours, then if it be a royal pendulum clock, vibrating ſeconds, we have $60 \times 60 \times 12 = 43200$ ſeconds or beats in one turn of the great wheel. But becauſe there are 60 ſwings or ſeconds in one minute, and the ſeconds are ſhown by an index on the end of the arbor of the ſwing-wheel, which in thoſe clocks is in an horizontal poſition; therefore it is neceſſary that the ſwing-wheel F ſhould have 30 teeth; whence $\frac{43200}{60} = 720$, the number to be broken into quotients for finding the number of teeth for the other wheels and pinions.

In ſpring-clocks, the diſpoſition of the wheels in the watch part is ſuch as is here repreſented in the figure, where the crown-wheel F is in an horizontal poſition; the ſeconds not being ſhown there by an index, as is done in the large pendulum clocks. Whence in theſe clocks the wheels are diſpoſed in a different manner, as repreſented in fig. 15. where C is the great wheel, and D the centre or minute wheel, as before: but the contrate wheel E is placed on one ſide, and F the ſwing-wheel is placed with its centre in the ſame perpendicular line GH with the minute-wheel, and with its plane perpendicular to the horizon, as are all the others. Thus the minute and hour hands turn on the end of the arbor of the minute wheel at *a*, and the ſecond hand on the arbor of the ſwing-wheel at *b*.

Fig. 15.

Theory and calculation of the Watch-part, as laid down by

by the Rev. Dr Derham.—1. The ſame motion, it is evident, may be performed either by one wheel and one pinion, or many wheels and many pinions; provided the number of turns of all the wheels bear the proportion to all the pinions which that one wheel bears to its pinion: or, which is the ſame thing, if the number produced by multiplying all the wheels together be to the number produced by multiplying all the pinions together, as that one wheel to that one pinion. Thus, ſuppoſe you had occaſion for a wheel of 1440 teeth, and a pinion of 28 leaves; you make it into three wheels of 36, 8, and 5, and three pinions of 4, 7, and 1. For the three wheels, 36, 8, and 5, multiplied together, give 1440 for the wheels, and the three pinions, 4, 7, and 1, multiplied together, give 28 for the pinions. Add, that it matters not in what order the wheels and pinions are ſet, or which pinion runs in which wheel; only for convenience ſake, the biggeſt numbers are commonly put to drive the reſt.

2. Two wheels and pinions of different numbers may perform the ſame motion. Thus, a wheel of 36 drives a pinion of four; the ſame as a wheel of 45 a pinion of 5; or a wheel of 90 a pinion of 10; the turns of each being 9.

3. If, in breaking the train into parcels, any of the quotients ſhould not be liked; or if any other two numbers, to be multiplied together, are deſired to be varied, it may be done by this rule. Divide the two numbers by any other two numbers which will meaſure them; multiply the quotients by the alternate diviſors; the product of theſe two laſt numbers found will be equal to the product of the two numbers firſt given. Thus, if you would vary 46 times 8, divide theſe by any two numbers which will evenly meaſure them: ſo, 36 by 4 gives 9; and 8 by 1 gives 8; now, by the rule, 9 times 1 is 9, and 8 times 4 is 32; ſo that for 36+8, you have 32+9; each equal to 288. If you divide 36 by 6, and 8 by 2, and multiply as before, you have 24+12=36+8=288.

4. If a wheel and pinion fall out with croſs numbers, too big to be cut in wheels, and yet not to be altered by theſe rules; in ſeeking for the pinion of report, find two numbers of the ſame, or a near proportion, by this rule; as either of the two given numbers is to the other, ſo is 360 to a fourth. Divide that fourth number, as alſo 360, by 4, 5, 6, 8, 9, 10, 12, 15, (each of which numbers exactly meaſures 360), or by any of thoſe numbers that bring a quotient neareſt to an integer. As ſuppoſe you had 147 for the wheel, and 170 for the pinion; which are too great to be cut into ſmall wheels, and yet cannot be reduced into leſs, as having no other common meaſure but unity; ſay, as 170 : 147 :: 360 : 311. Or, as 147 : 170 :: 360 : 416. Divide the fourth number and 360 by one of the foregoing numbers; as 311 and 360 by 6, it gives 52 and 60; divide them by 8, you have 39 and 45; and if you divide 360 and 416 by 8, you have 45 and 52 exactly. Wherefore, inſtead of the two numbers 147 and 170, you may take 52 and 60, or 39 and 45, or 45 and 52, &c.

5. To come to practice in calculating a piece of watch-work: Firſt pitch on the train or beats of the balance in an hour; as, whether a ſwift one of about 20,000 beats (the uſual train of a common 30 hour pocket-watch), or a ſlower of about 16,000 (the train of the new pendulum pocket-watches), or any other train. Next, reſolve on the number of turns the fuſee is intended to have, and the number of hours the piece is to go: ſuppoſe e. gr. 12 turns, and to go 30 hours, or 192 hours (i. e. 8 days), &c. Proceed now to find the beats of the balance or pendulum in one turn of the fuſee; thus in numbers; 12 : 16 :: 20,000 : 26666. Wherefore 26666 are the beats in one turn of the fuſee or great wheel, and are equal to the quotients of all the wheels unto the balance multiplied together. Now this number is to be broken into a convenient parcel of quotients; which is to be done thus: firſt, halve the number of beats, viz. 26666, and you have 13333; then pitch on the number of the crown-wheel, ſuppoſe 17: divide 13333 by 17, and you have 784 for the quotient (or turns) of the reſt of the wheels and pinions; which, being too big for one or two quotients, may be beſt broken into three. Chooſe therefore three numbers; which, when multiplied all together continually, will come neareſt 784: as ſuppoſe 10, 9, and 9, multiplied continually, give 810, which is ſomewhat too much; therefore try again other numbers, 11, 9, 8: theſe, drawn one into another continually, produce 792; which is as near as can be, and is a convenient quotient. Having thus contrived the piece from the great wheel to the balance, but the numbers not falling out exactly, as you firſt propoſed, correct the work thus: firſt multiply 792, the product of all the quotients pitched upon, by 17 (the notches of the crown-wheel); the product is 13464, which is half the number of beats in one turn of the fuſee: Then find the true number of beats in an hour. Thus, 16 : 12 :: 13464 : 10098 which is half the beats in an hour. Then find what quotient is to be laid upon the pinion of report (by the rule given under that word). Thus, 16 : 12 :: 12 : 9. the quotient of the pinion of report. Having thus found your quotients, it is eaſy to determine what numbers the wheels ſhall have, for chooſing what numbers the pinions ſhall have, and multiplying the pinions by their quotients, the product is the number for the wheels. Thus the number of the pinion of report is 4, and its quotient is 9; therefore the number for the dial-wheel muſt be 4×9, or 36: ſo the next pinion being 5, its quotient 11, therefore the great wheel muſt be 5×11=55; and ſo of the reſt.

4) 36 (9
―――――
5) 55 (11
5) 45 (9
5) 40 (8
―――――
17

Such is the method of calculating the numbers of a 16 hour watch. Which watch may be made to go longer by leſſening the train, and altering the pinion of report. Suppoſe you could conveniently ſlacken the train to 16000; then ſay, As ½ 16000 or 8000 : 13464 :: 12 : 20; ſo that this watch will go 20 hours. Then, for the pinion of report, ſay (by the rule given under that word), as 20 : 12 :: 12 : 7. So that 7 is the quotient of the pinion of report. And as to the numbers, the operation is the ſame as before, only the dial-wheel is but 28; for its quotient is altered to 7.

4) 28 (7
―――――
5) 55 (11
5) 45 (9
5) 40 (8
―――――
17

If you would give numbers to a watch of about 10,000 beats in an hour, to have 12 turns of the fuſee, to go 170 hours, and 17 notches in the crown-wheel; the work is

Clock.

is the fame, in a manner, as in the laft example: and confequently thus: as 12 : 170 :: 10000 : 141666, which fourth number is the beats in one turn of the fufee; its half, 70833, being divided by 17, gives 4167 for the quotient; and becaufe this number is too big for three quotients, therefore choofe four, as 10, 8, 8, 6 $\frac{3}{5}$; whofe product into 17 makes 71808, nearly equal to half the true beats in one turn of the fufee. Then fay, as 170 : 12 : 71808 : 5069, which is half the true train of your watch. And again, 170 : 12 :: 12$\frac{144}{170}$, the denominator of which expreffes the pinion of report, and the numerator is the number of the dial-wheel. But thefe numbers being too big to be cut in fmall wheels, they muft be varied by the fourth rule above. Thus:

As 144 : 170 :: 360 : 425:
Or 170 : 144 :: 360 : 305.

24) 20 ($\frac{20}{24}$
———————
6) 60 (10
6) 48 (8
5) 40 (8
5) 33 (6$\frac{3}{5}$
———————
17

Then dividing 360, and either of thefe two fourth proportionals (as directed by the rule), fuppofe by 15; you will have $\frac{24}{28}$ or $\frac{20}{24}$; then the numbers of the whole movements will ftand as in the margin.

Such is the calculation of ordinary watches, to fhow the hour of the day: in fuch as fhow minutes, and feconds, the procefs is thus:

1. Having refolved on the beats in an hour, by dividing the defigned train by 60, find the beats in a minute; and accordingly, find proper numbers for the crown-wheel and quotients, fo as that the minute-wheel fhall go round once in an hour, and the fecond wheel once in a minute.

Suppofe, you fhall choofe a pendulum of feven inches, which vibrates 142 ftrokes in a minute, and 8520 in an hour. Half thefe fums are 71, and 4260. Now, the firft work is to break this 71 into a good proportion, which will fall into one quotient, and the crown-wheel. Let the crown-wheel have 15 notches; then 71, divided by 15, gives nearly 5; fo a crown-wheel of 15, and a wheel and pinion whofe quotient is 5, will go round in a minute to carry a hand to fhow feconds. For a hand to go round in an hour to fhow minutes, becaufe there are 60 minutes in an hour, it is but breaking 60 into good quotients (fuppofe 10 and 6, or 8 and 7$\frac{1}{2}$, &c.): and it is done. Thus, 4260 is broken as near as can be into proper numbers. But fince it does not fall out exactly into the above mentioned numbers, you muft correct (as before directed), and find the true number of beats in an hour, by multiplying 15 by 5, which makes 75; and 75 by 60 makes 4500, which is half the true train. Then find the beats in one turn of the fufee; thus, 16 : 192 :: 4500 : 54000; which laft is half the beats in one turn of the fufee. This 54000 being divided by 4500 (the true numbers already pitched on), the quotient will be 10; which, not being too big for a fingle quotient, needs not be divided into more: and the work will ftand as in the margin. As to the hour-hand, the great wheel, which performs only one revolution in 12 turns of the minute-wheel, will fhow the hour; or it may be done by the minute-wheel.

8) 40 (5
———————
15

8) 64 (8
8) 60 (7$\frac{1}{2}$
8) 40 (5
———————
15

9) 108 (12
8) 64 (8
8) 60 (7$\frac{1}{2}$
8) 40 (5
———————
15

Clock, Clodia.

It is requifite for thofe who make nice aftronomical obfervations, to have watches that make fome exact number of beats per fecond, without any fraction; but we feldom find a watch that does. As four beats per fecond would be a very convenient number, we fhall here give the train for fuch a watch, which would (like moft others) go 30 hours, but is to be wound up once in 24 hours.

The fufee and firft wheel to go round in four hours. This wheel has 48 teeth, and it turns a pinion of 12 leaves, on whofe axis is the fecond wheel, which goes round in one hour, and carries the minute-hand. This wheel has 60 teeth, and turns a pinion of 10 leaves; on whofe axis is the third wheel of 60 teeth, turning a pinion of 6 leaves; on whofe axis is the fourth (or contrate) wheel, turning round in a minute, and carrying the fmall hand that fhows the feconds, on a fmall circle on the dial-plate, divided into 60 parts: this contrate wheel has 48 teeth, and turns a pinion of 6 leaves; on whofe axis is the crown or balance-wheel of 15 teeth, which makes 30 beats in each revolution.

The crown-wheel goes 480 times round in an hour, and 30 times 480 make 14400, the number of beats in an hour. But one hour contains 3600 feconds; and 14400 divided by 3600 quotes 4, the required number of beats in a fecond.

The fufee muft have 7$\frac{1}{2}$ turns, to let the chain go fo many times round it. Then, as 1 turn is to 4 hours, fo is 7$\frac{1}{2}$ turns to 30 hours, the time the watch would go after it is wound up.

See further the articles MOVEMENT, TURN, &c. And for the hiftory and particular conftruction of *Watches*, properly fo called, fee the article WATCH.

CLODIA LEX, *de Cypro*, was enacted by the tribune Clodius, in the year of Rome 607, to reduce Cyprus into a Roman province, and expofe Ptolemy king of Egypt to fale in his regal ornaments. It empowered Cato to go with the prætorean power and fee the auction of the king's goods, and commiffioned him to return the money to Rome. Another, *de Magiftratibus*, 695, by Clodius the tribune. It forbade the cenfors to put a ftigma or mark of infamy upon any perfon who had not been actually accufed and condemned by both the cenfors. Another, *de Religione*, by the fame, 696, to deprive the prieft of Cybele, a native of Peffinuns, of his office, and confer the priefthood upon Brotigonus, a Gallogrecian. Another, *de Provinciis*, 695, which nominated the provinces of Syria, Babylon, and Perfia, to the conful Gabinus, and Achaia, Theffaly, Macedon, and Greece, to his colleague Pifo, with proconfular power. It empowered them to defray the expences of their march from the public treafury. Another, 695, which required the fame diftribubtion of corn among the people gratis, as had been given them before at fix affes and a triens the bufhel. Another, 695, by the fame, *de Judiciis*. It called to an account fuch as had executed a Roman citizen without a judgment of the people and all the formalities of a trial. Another, by the fame, to pay no attention to the appearances of the heavens while any affair was before

Fig. 3.

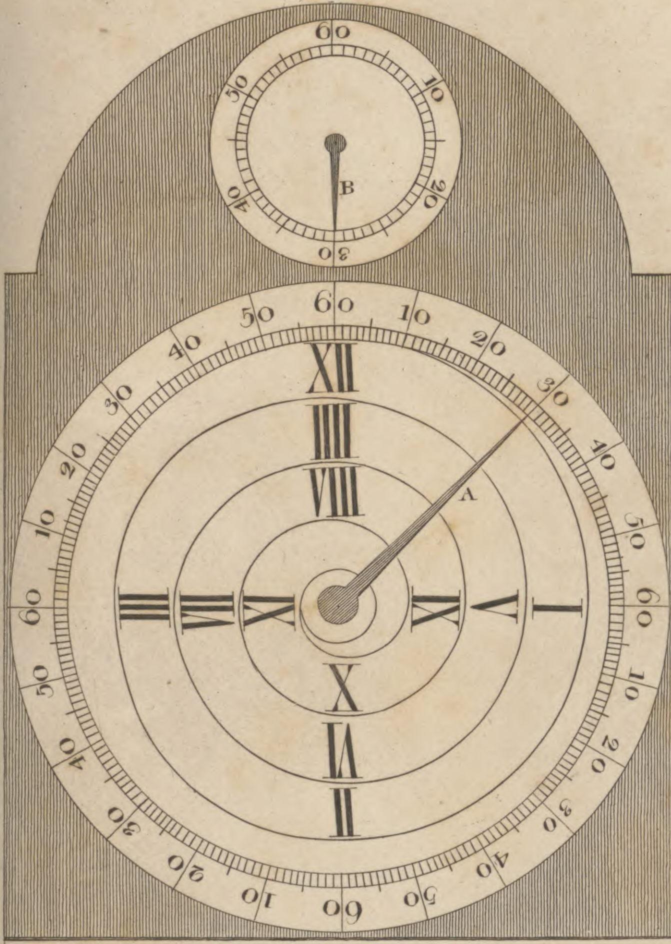


Fig. 1.

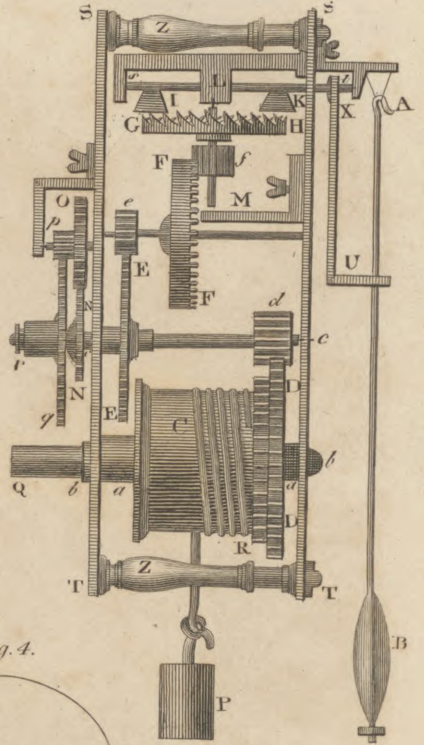


Fig. 4.

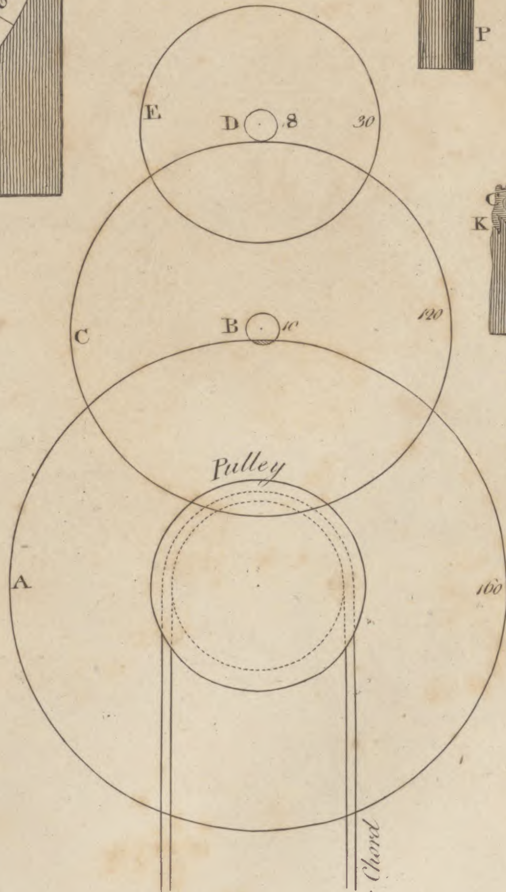


Fig. 2.

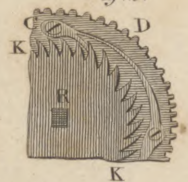


Fig. 5.

E.Mitchell sculpt.

Fig. 7.

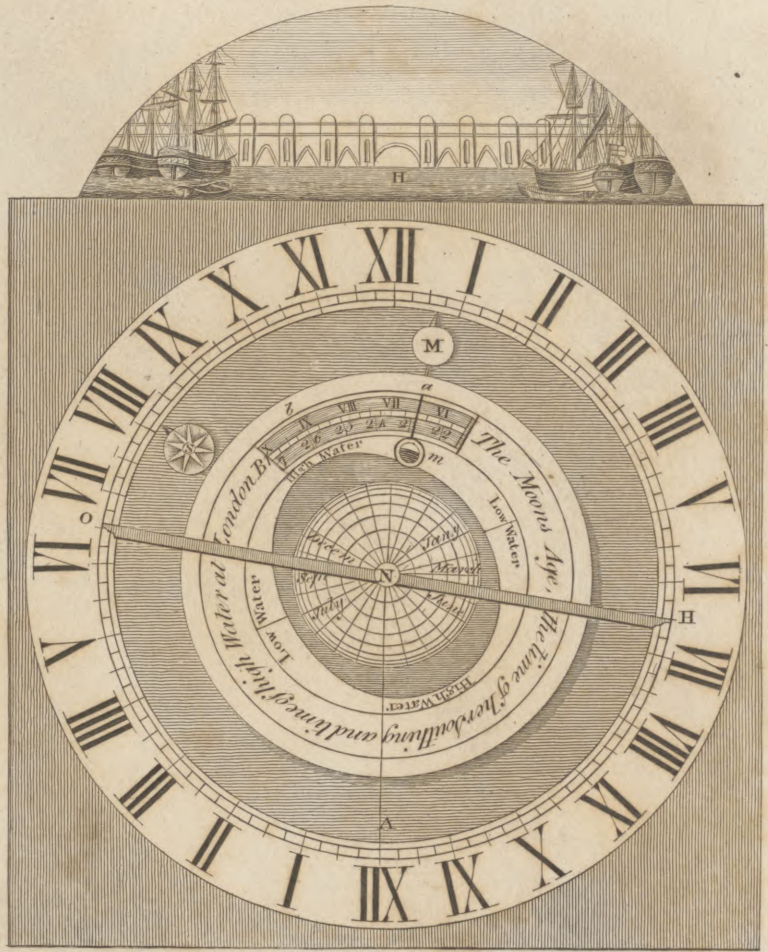


Fig. 6.

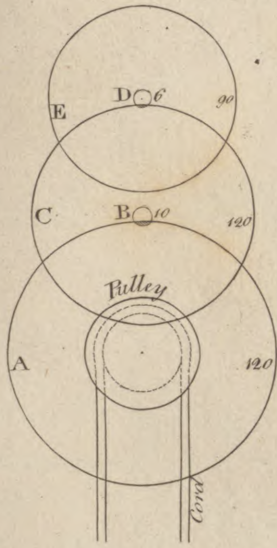


Fig. 9.

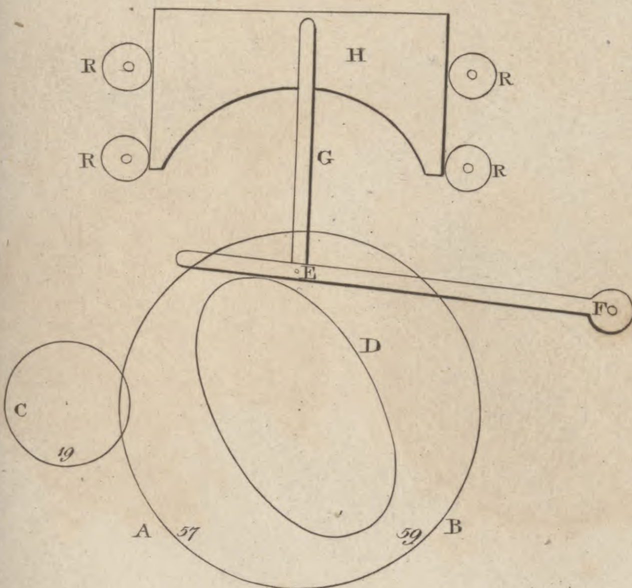
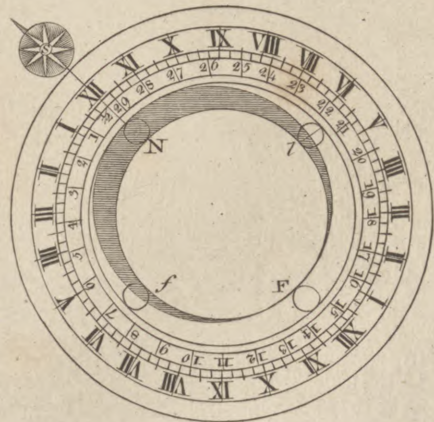
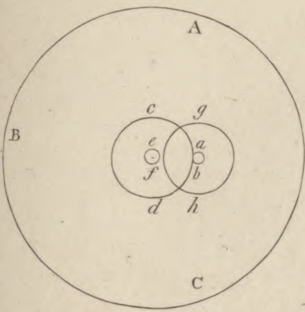
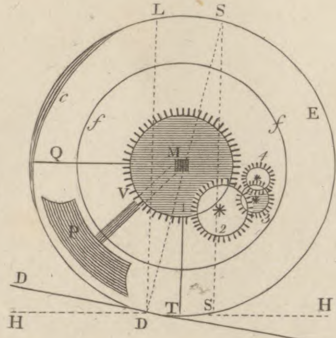


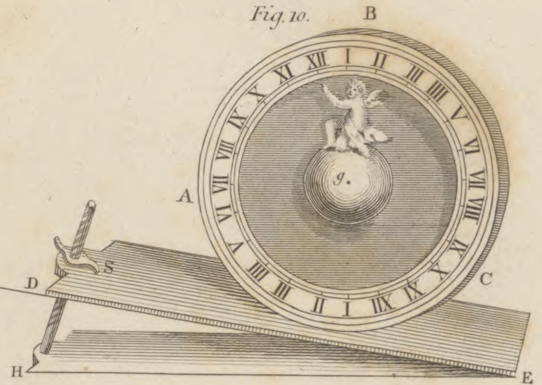
Fig. 8.

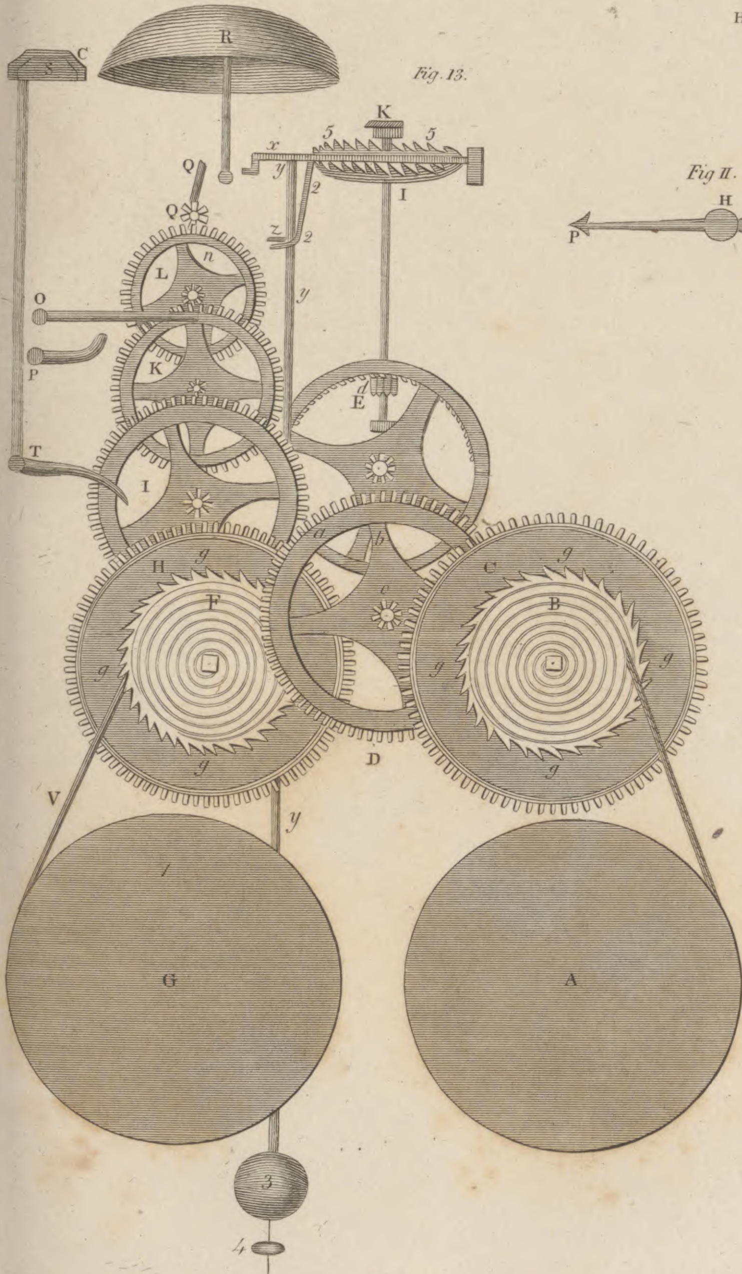


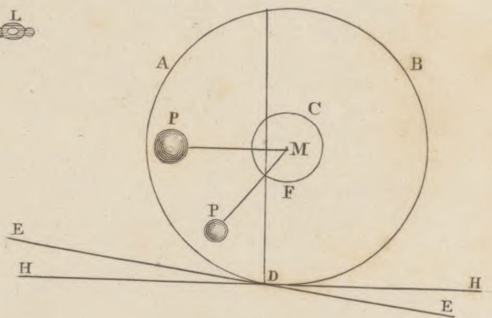
W. Archibald Sculp t

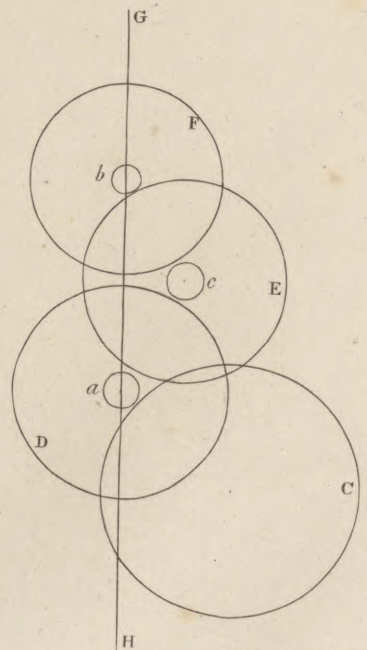




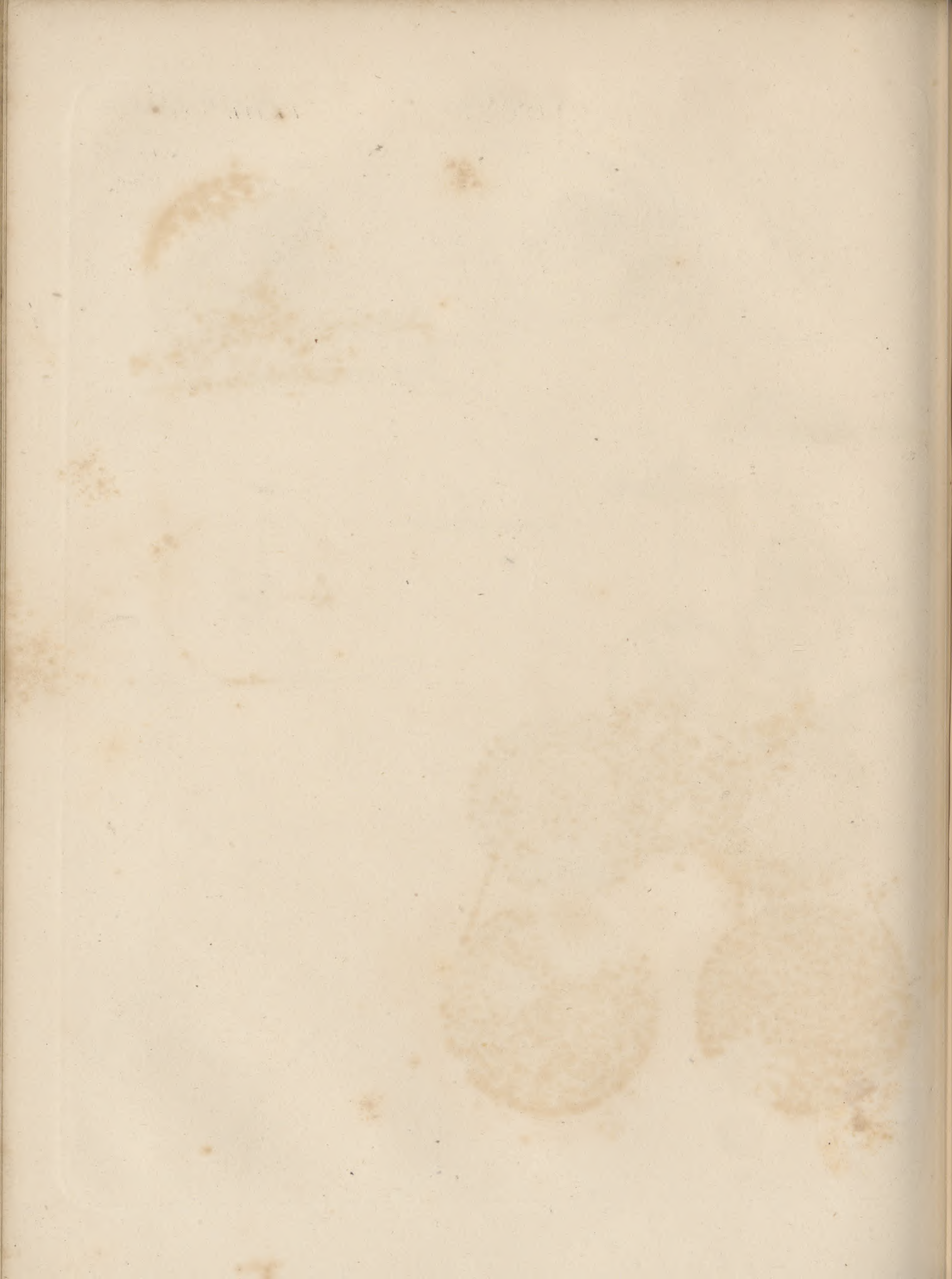








W. Archibald Sculp.



fore the people. Another, to make the power of the tribunes free in making and propofing laws. Another, to re-eftablifh the companies of artifts which had been inftituted by Numa, but fince his time abolifhed.

CLODIUS, Publius, a Roman defcended of an illuftrious family. He made himfelf famous for his licentioufnefs, avarice, and ambition. He committed inceft with his three fifters, and introduced himfelf in women's clothes into the houfe of Julius Cæfar, whilft Pompeia, Cæfar's wife, of whom he was enamoured, was celebrating the myfteries of Ceres, where no man was permitted to appear. He was accufed for this violation of human and divine laws; but he made himfelf tribune, and by that means fcreened himfelf from juftice. He defcended from a patrician into a plebeian family to become a tribune. He was fuch an enemy to Cato, that he made him go with prætorian power, in an expedition againft Ptolemy king of Cyprus, that by the difficulty of the campaign he might ruin his reputation, and deftroy his intereft at Rome during his abfence. Cato, however, by his uncommon fuccefs, fruftrated the defigns of Clodius. He was alfo an inveterate enemy to Cicero, and by his influence he banifhed him from Rome, partly on pretence that he had punifhed with death and without trial the adherents of Catiline. He wreaked his vengeance upon Cicero's houfe, which he burnt, and fet all his goods to fale; which, however, to his great mortification, no one offered to buy. In fpite of Clodius, Cicero was recalled, and all his goods reftored to him. Clodius was fome time after murdered by Milo, whofe defence Cicero took upon himfelf.

CLOGHER, an epifcopal town of Ireland, in the county of Tyrone, and province of Ulfter. It fent two members to the Irifh parliament. In a very early age an abbey of regular canons, dedicated to the Virgin Mary, was founded here. St Patrick is faid to have prefided over the church of Clogher; and having appointed St Kertenn to be his fucceffor, he refigned this government, and went to Armagh, where he founded his celebrated abbey. On the 20th of April 1396, a dreadful fire burnt to the ground the church, the two chapels, the abbey, the court of the bifhops, and thirty-two other buildings, with all the facerdotal veftments, utenfils, &c. belonging to the bifhop's chapter and church. In the year 1610, on the 24th of July whilft George Montgomery was bifhop of Clogher, King James annexed this abbey and its revenues to that fee. The fee (valued in the king's books at 350l. *per annum* by extent returned 15th James I.) is reputed to be worth 4000l. annually. W. Long. 6. 50. N. Lat. 54. 30.

CLOISTER (*Clauftrum*), a habitation furrounded with walls, and inhabited by canons or religious, &c. In a more general fenfe, cloifter is ufed for a monaftery of religious of either fex. In a more reftrained fenfe, cloifter is ufed for the principal part of a regular monaftery, confifting of a fquare built around; ordinarily between the church, the chapter-houfe, and the refectory; and over which is the dormitory. The cloifters ferved for feveral purpofes in the ancient monafte[illegible]. Petrus Blefenfis obferves that it was here the monks held their lectures: the lecture of morality at the north fide, next the church; the fchool on the weft, and the chapter on the eaft; fpiritual meditation, &c. being referved for the church. Lanfranc obferves, that the proper ufe of the cloifter was for the monks to meet in, and converfe together, at certain hours of the day.

The form of the cloifter was fquare; and it had its name *clauftrum*, from *claudo*, "I fhut or clofe;" as being inclofed on its four fides with buildings. Hence in architecture, a building is ftill faid to be in form of a cloifter, when there are buildings on each of the four fides of the court.

CLONMELL, the affize town of the county of Tipperary in Ireland, is fituated on the river Suir, hath a barrack for two troops of horfe, and is governed by a mayor, recorder, bailiffs, and town-clerk. The river is navigable from this town to Carrick and Waterford; and there is fome trade carried on here in the woollen branch, particularly by the Quakers, who are very numerous in this neighbourhood. Near this place is a fpring of Spa water, that iffues from the fide of a rifing ground, and is overlooked by a pretty fteep hill, on that fide of the river Suir, which is in the county of Waterford. The cures performed by drinking this water in the fcurvy, and other chronic diftempers, drew thither, fome years ago, a great refort of people; but fafhion, which reigns with an abfolute authority, has brought other waters of late into higher credit. It was in this town that the celebrated and reverend Laurence Sterne was born, on the 24th of November 1713. The town confifts of four crofs ftreets, and has a fpacious bridge of 20 arches over the river Suir; the market-houfe is ftrong and well built, and there is a charter-fchool here for forty children, to which the late John Dawfon, Efq. and Sir Charles Moore, Bart. were confiderable benefactors. A Dominican friary was founded at Clonmell, in 1269, and dedicated to St Dominick. In the fame year Otho de Grandifon erected one of the moft magnificent in Ireland. In it was kept an image of St Francis, refpecting the miracles wrought by which, many marvellous ftories are circulated. This town is very ancient, being built before the invafion of the Danes: it was formerly defended by a fquare wall. Oliver Cromwell, who found more refiftance from this place than any other of his conquefts in the kingdom, demolifhed the caftles and fortifications, of which now only the ruins remain: the chief Gothic church here is ftill kept in good repair. W. Long. 7. 27. N. Lat. 54. 14.

CLOSE, in *Heraldry*. When any bird is drawn in a coat of arms with its wings clofe down about it, (i. e. not difplayed), and in a ftanding pofture, they blazon it by this word *clofe*; but if it be flying, they call it *volant*. See Volant.

Close, in *Mufic*. See Cadence.

Close-Hauled, in *Navigation*, the general arrangement or trim of a fhip's fails when fhe endeavours to make a progrefs in the neareft direction poffible towards that point of the compafs from which the wind blows. In this manner of failing, the keel commonly makes an angle of fix points with the line of the wind; but floops and fome other fmall veffels are faid to fail almoft a point nearer. All veffels, however, are fuppofed to make nearly a point of leeway when clofehauled, even when they have the advantage of a good

failing

failing breeze and fmooth water. The angle of lee-way, however, increafes in proportion to the increafe of the wind and fea. In this difpofition of the fails, they are all extended fidewife on the fhip, fo that the wind as it croffes the fhip obliquely toward the ftern from forwards, may fill their cavities. But as the current of wind alfo enters the fails in an oblique direction, the effort of it to make the fhip advance is confiderably diminifhed: fhe will therefore make the leaft progrefs when failing in this manner. The fhip is faid to be clofe-hauled, becaufe at this time her *tacks*, or lower corners of the principal fails, are drawn clofe down to her fide to windward, the fheets hauled clofe-aft, and all the bow-lines drawn to their greateft extenfion to keep the fails fteady.

CLOSE-Quarters, certain ftrong barriers of wood, ftretching acrofs a merchant-fhip in feveral places. They are ufed as places of retreat when a fhip is boarded by her adverfary, and are therefore fitted with feveral fmall loop-holes through which to fire the fmall arms, and thereby annoy the enemy, and defend themfelves. They are likewife furnifhed with feveral caifons called *powder-chefts*, which are fixed upon the deck, and filled with powder, old nails, &c. and may be fired at any time from the clofe-quarters upon the boarders.

Falconer's Dict. of the Marine.

We have known an Englifh merchant-fhip of 16 guns, and properly fitted with clofe-quarters, defeat the united efforts of three French privateers who boarded her in the laft war, after having engaged at fome diftance nearly a day and a half, with very few intervals of reft. Two of the cruifers were equipped with twelve guns each, and the other with eight. The French failors were, after boarding, fo much expofed to continued fire of mufquetry and cohorns charged with granadoes, that a dreadful fcene of carnage enfued, in which the decks were foon covered with the dead bodies of the enemy, feveral of which the boarders, in their hurry to efcape, had left behind.

CLOT-BIRD: a fpecies of FRINGILLA. See ORNITHOLOGY *Index*.

CLOTH, in commerce, a manufacture made of wool, wove in the loom.

Cloths are of divers qualities, fine or coarfe. The goodnefs of cloth, according to fome, confifts in the following particulars: 1. That the wool be of a good quality, and well dreffed. 2. It muft be equally fpun, carefully obferving that the thread of the warp be finer and better twifted than that of the woof. 3. The cloth muft be well wrought, and beaten on the loom, fo as to be everywhere equally compact. 4. The wool muft not be finer at one end of the piece than in the reft. 5. The lifts muft be fufficiently ftrong, of the fame length with the ftuff, and muft confift of good wool, hair, or oftrich-feathers; or, what is ftill better, of Danifh dog's hair. 6. The cloth muft be free from knots and other imperfections. 7. It muft be well fcoured with fullers earth, well fulled with the beft white foap, and afterwards wafhed in clear water. 8. The hair or nap muft be well drawn out with the teazel, without being too much opened. 9. It muft be fhorn clofe without making it thread-bare. 10. It muft be well-dried. 11. It muft not be tenter-ftretched, to force it to its juft dimenfions. 12. It muft be preffed cold, not hot-preffed, the latter being very injurious to woollen cloth.

Manufacturing of white Cloths which are intended for dyeing. The beft wool for the manufacturing of cloths are thofe of England and Spain, efpecially thofe of Lincolnfhire and Segovia. To ufe thofe wools to the beft advantage, they muft be fcoured, by putting them into a liquor fomewhat more than luke-warm, compofed of three parts of fair water and one of urine. After the wool has continued long enough in the liquor to foak, and diffolve the greafe, it is drained and well wafhed in running water. When it feels dry, and has no fmell but the natural one of the fheep, it is faid to be duly fcoured.

After this, it is hung to dry in the fhade; the heat of the fun making it harfh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanfe it from duft and the groffer filth; the more it is thus beat and cleanfed, the fofter it becomes, and the better for fpinning. After beating, it muft be well picked, to free it from the reft of the filth that had efcaped the rods.

It is now in a proper condition to be oiled, and carded on large iron cards placed flopewife. Olive oil is efteemed the beft for this purpofe; one-fifth of which fhould be ufed for the wool intended for the woof, and a ninth for that defigned for the warp. After the wool has been well oiled, it is given to the fpinners, who firft card it on the knee, with fmall fine cards, and then fpin it on the wheel, obferving to make the thread of the warp fmaller by one-third than that of the woof, and much compacter twifted.

The thread thus fpun, is reeled, and made into fkeins. That defigned for the woof is wound on little tubes, pieces of paper, or rufhes, fo difpofed as that they may be eafily put in the eye of the fhuttle. That for the warp is wound on a kind of large wooden bobbins, to difpofe of it for warping. When warped, it is ftiffened with fize; the beft of which is that made of fhreds of parchment; and when dry, is given to the weavers, who mount it on the loom.

The warp thus mounted, the weavers, who are two to each loom, one on each fide, tread alternately on the treddle, firft on the right ftep, and then on the left, which raifes and lowers the threads of the warp equally; between which they throw tranfverfely the fhuttle from the one to the other; and every time that the fhuttle is thus thrown, and a thread of the woof inferted within the warp, they ftrike it conjunctly with the fame frame, wherein is faftened the comb or reed, between whofe teeth the threads of the warp are paffed, repeating the ftroke as often as is neceffary.

The weavers having continued their work till the whole warp is filled with the woof, the cloth is finifhed; it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was wove; and now given to be cleanfed of the knots, ends of threads, ftraws, and other filth, which is done with iron nippers.

In this condition it is carried to the fullery, to be fcoured with urine, or a kind of potters clay, well fteeped in water, put along with the cloth in the trough wherein it is fulled. The cloth being again cleared

Cloth ‖ Cloud.

cleared from the earth or urine, is returned to the former hands to have the leſſer filth, ſmall ſtraws, &c. taken off as before: then it is returned to the fuller to be beat and fulled with hot water, wherein a ſuitable quantity of ſoap has been diſſolved; after fulling, it is taken out to be ſmoothed or pulled by the liſts lengthwiſe, to take out the wrinkles, crevices, &c.

The ſmoothing is repeated every two hours, till the fulling be finiſhed, and the cloth brought to its proper breadth; after which it is waſhed in clear water, to purge it of the ſoap, and given wet to the carders to raiſe the hair or nap on the right ſide with the thiſtle or weed. After this preparation, the cloth-worker takes the cloth, and gives it its firſt cut or ſhearing; then the carders reſume it, and after wetting, give it as many more courſes with the teazle, as the quality of the ſtuff requires, always obſerving to begin againſt the grain of the hair, and to end with it; as alſo to begin with a ſmoother thiſtle, proceeding ſtill with one ſharper and ſharper, as far as the ſixth degree.

After theſe operations, the cloth being dried, is returned to the cloth-worker, who ſhears it a ſecond time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the ſurface of the cloth, from one end of the piece to the other.

The cloth thus wove, ſcoured, napped, and ſhorn, is ſent to the dyer; when dyed, it is waſhed in fair water, and the worker takes it again wet as it is, lays the nap with a bruſh on the table, and hangs it on the tenters, where it is ſtretched both in length and breadth ſufficiently to ſmooth it, ſet it ſquare, and bring it to its proper dimenſions, without ſtraining it too much; obſerving to bruſh it afreſh, the way of the nap, while a little moiſt, on the tenters.

When quite dry, the cloth is taken off the tenters, and bruſhed again on the table, to finiſh the laying of the nap; after which it is folded, and laid cold under a preſs, to make it perfectly ſmooth and even, and give it a gloſs.

Laſtly, the cloth being taken out of the preſs, and the papers, &c. for gloſſing it removed, it is in a condition for ſale or uſe. With regard to the manufacture of mixt cloths, or thoſe wherein the wools are firſt dyed, and then mixt, ſpun, and wove of the colours intended, the proceſs, except what relates to the colour, is moſtly the ſame with that juſt repreſented.

CLOTH made from Vegetable Filaments. See BARK and FILAMENTS.

Incombuſtible CLOTH. See ASBESTOS.

CLOTHO, the youngeſt of the three Parcæ, daughters of Jupiter and Themis. She was ſuppoſed to preſide over the moment that we are born. She held the diſtaff in her hand, and ſpun the thread of life, whence her name *κλωθειν, to ſpin.* She was repreſented wearing a crown with ſeven ſtars, and covered with a variegated robe.

CLOUD, a collection of vapours ſuſpended in the atmoſphere.

1 Cauſe of the formation of clouds uncertain.

That the clouds are formed from the aqueous vapours, which before were ſo cloſely united with the atmoſphere as to be inviſible, is univerſally allowed; but it is no eaſy matter to account for the long continuance of ſome very opaque clouds without diſſolving; or to give a reaſon why the vapours, when they have once begun to condenſe, do not continue to do ſo till they at laſt fall to the ground in the form of rain or ſnow, &c. The general cauſe of the formation of clouds, it has been ſuppoſed, is a ſeparation of the latent heat from the water of which the vapour is compoſed. The conſequence of this ſeparation muſt be the condenſation of that vapour, in ſome degree at leaſt: in ſuch caſe, it will firſt appear as a ſmoke, miſt, or fog; which, if interpoſed betwixt the ſun and earth, will form a cloud; and the ſame cauſes continuing to act, the cloud will produce rain or ſnow. But though the ſeparation of this latent heat in a certain degree is the immediate cauſe of the formation of clouds, the remote cauſe, or the changes produced in the atmoſphere, whereby ſuch a ſeparation may be induced, are much more difficult to be diſcovered. In common obſervation, we ſee that vapour is moſt powerfully condenſed by cold ſubſtances, ſuch as metals, water, &c. But cold alone cannot in all caſes cauſe the condenſation of the atmoſpherical vapours, otherwiſe the nights behoved to be always foggy or cloudy, owing to the vapours, raiſed throughout the day by the heat of the ſun, being condenſed by the ſuperior coldneſs of the night. Great rains may happen in very warm weather, when the union of the vapours with the atmoſphere ought rather to be promoted than diſſolved, if cold were the only agent in their condenſation. The ſerenity of the atmoſphere, alſo, in the moſt ſevere froſts, abundantly ſhows that ſome other cauſe beſides mere heat or cold is concerned in the formation of clouds, and condenſation of the atmoſpherical vapours.

2 Not always owing to cold.

3 Electricity probably concerned.

The electric fluid is now ſo generally admitted as an agent in all the great operations of nature, that it is no wonder to find the formation of clouds attributed to it. This hath accordingly been given by S. Beccaria as the cauſe of the formation of all clouds whatſoever, whether of thunder, rain, hail, or ſnow. The firſt, he thinks, are produced by a very great power of electricity, and the others by one more moderate. But though it is certain that all clouds, or even fogs and rain, are electrified in ſome degree, it ſtill remains a queſtion, whether the clouds are formed in conſequence of the vapour whereof they are compoſed being firſt electrified, or whether they become electrified in conſequence of its being firſt ſeparated from the atmoſphere, and in ſome meaſure condenſed. This hath not yet, as far as we know, been aſcertained by the experiments of Beccaria, or any other perſon; and indeed, notwithſtanding the multitude of electrical diſcoveries that have lately been made, there ſeems to be little or no foundation for aſcertaining it. Electricity is known to be in many caſes a promoter of evaporation; but no experiments have yet been brought to prove that electrified air parts with its moiſture more readily than ſuch as is not electrified; ſo that, till the properties of electrified air are farther inveſtigated, it is impoſſible to lay down any rational theory of the formation of clouds upon this principle.

4 Clouds often prodigiouſly electrified.

But whether the clouds are produced, i. e. the inviſible vapours floating in the atmoſphere condenſed ſo as to become viſible, by means of electricity or not, it is certain that they do contain the electric fluid in prodigious

Cloud.

prodigious and inconceivable quantities, and many very terrible and deſtructive phenomena have been occaſioned by clouds very highly electrified. The moſt extraordinary inſtance of this kind perhaps on record happened in the iſland of Java, in the Eaſt Indies, in Auguſt 1772. On the 11th of that month, at midnight, a bright cloud was obſerved covering a mountain in the diſtrict called *Cheribon*, at the ſame time ſeveral reports were heard like thoſe of a gun. The people who dwelt upon the upper parts of the mountain not being able to fly faſt enough, a great part of the cloud, almoſt three leagues in circumference, detached itſelf under them, and was ſeen at a diſtance riſing and falling like the waves of the ſea, and emitting globes of fire ſo luminous, that the night became as clear as day. The effects of it were aſtoniſhing; every thing was deſtroyed for ſeven leagues round; the houſes were demoliſhed; plantations were buried in the earth; and 2140 people loſt their lives, beſides 1500 head of cattle, and a vaſt number of horſes, goats, &c.

5 Terrible deſtruction by an electrified cloud in Java.

6 By another in the iſland of Malta.

Another inſtance of a very deſtructive cloud, the electric quality of which will at preſent ſcarcely be doubted, is related by Mr Brydone, in his Tour through Malta. It appeared on the 29th of October 1757. About three quarters of an hour after midnight, there was ſeen to the ſouth-weſt of the city of Melita, a great black cloud, which, as it approached, changed its colour, till at laſt it became like a flame of fire mixed with black ſmoke. A dreadful noiſe was heard on its approach, which alarmed the whole city. It paſſed over the port, and came firſt on an Engliſh ſhip, which in an inſtant was torn in pieces, and nothing left but the hulk; part of the maſts, ſails, and cordage, were carried to a conſiderable diſtance along with the cloud. The ſmall boats and felloques that fell in its way were all broken to pieces and ſunk. The noiſe increaſed, and became more frightful. A ſentinel, terrified at its approach, ran into his box; but both he and it were lifted up and carried into the ſea, where he periſhed. It then traverſed a conſiderable part of the city, and laid in ruins almoſt every thing that ſtood in its way. Several houſes were laid level with the ground, and it did not leave one ſteeple in its paſſage. The bells of ſome of them, together with the ſpires, were carried to a conſiderable diſtance; the roofs of the churches demoliſhed and beat down, &c. It went off at the north-eaſt point of the city, and demoliſhing the light-houſe, is ſaid to have mounted up into the air with a frightful noiſe; and paſſed over the ſea to Sicily, where it tore up ſome trees, and did other damage; but nothing conſiderable, as its fury had been moſtly ſpent at Malta. The number of killed and wounded amounted to near 200; and the loſs of ſhipping, &c. was very conſiderable.

The effects of thunder-ſtorms, and the vaſt quantity of electricity collected in the clouds which produce theſe ſtorms, are ſo well known, that it is ſuperfluous to mention them. It appears, however, that even the clouds are not ſo highly electrified as to produce their fatal effects on thoſe who are immerſed in them. It is only the diſcharge of part of their electricity upon ſuch bodies as are either not electrified at all, or not ſo highly electrified as the cloud, that does all the miſchief. We have, however, only the following inſtance on record, of any perſons being immerſed in the body of a thunder-cloud. Profeſſor Sauſſure and young Mr Jalabert, when travelling over one of the high Alps, were caught among clouds of this kind; and, to their aſtoniſhment, found their bodies ſo full of electrical fire, that ſpontaneous flaſhes darted from their fingers with a crackling noiſe, and the ſame kind of ſenſation as when ſtrongly electrified by art.

7 Inſtance of two people involved in a thunder-cloud.

2

8 Height of the clouds.

The height of clouds in general is not great; the ſummits of very high mountains being commonly quite free from them, as Mr Brydone experienced in his journey up Mount Ætna; but thoſe which are moſt highly electrified deſcend loweſt, their height being often not above ſeven or eight hundred yards above the ground; nay, ſometimes thunder-clouds appear actually to touch the ground with one of their edges *: but the generality of clouds are ſuſpended at the height of a mile, or little more, above the earth. Some, however, have imagined them to ariſe to a moſt incredible and extravagant height. Maignan of Thouloufe, in his Treatiſe of Perſpective, p. 93, gives an account of an exceeding bright little cloud that appeared at midnight in the month of Auguſt, which ſpread itſelf almoſt as far as the zenith. He ſays that the ſame thing was alſo obſerved at Rome; and from thence concludes that the cloud was a collection of vapours raiſed beyond the projection of the earth's ſhadow, and of conſequence illuminated by means of the ſun. This, however, can by no means be credited; and it is much more probable that this cloud owed its ſplendor to electricity, than to the reflection of the ſolar beams.

* See *Thunder*.

9 Their various colours accounted for.

In the evenings after ſunſet, and mornings before ſunriſe, we often obſerve the clouds tinged with beautiful colours. They are moſtly red; ſometimes orange, yellow, or purple; more rarely bluiſh; and ſeldom or never green. The reaſon of this variety of colours, according to Sir Iſaac Newton, is the different ſize of the globules into which the vapours are condenſed. This is controverted by Mr Melville, who thinks that the clouds reflect the ſun's light preciſely as it is tranſmitted to them through the atmoſphere. This reflects the moſt refrangible rays in the greateſt quantity; and therefore ought to tranſmit the leaſt refrangible ones, red, orange, and yellow to the clouds, which accordingly appear moſt uſually of thoſe colours. In this opinion he was greatly confirmed by obſerving, when he was in Switzerland, that the ſnowy ſummits of the Alps turned more and more reddiſh after ſunſet, in the ſame manner as the clouds; and he imagines that the ſemitranſparency of the clouds, and the obliquity of their ſituation, tend to make the colours in them much more rich and copious than thoſe on the tops of ſnowy mountains.

10 Of the motions of clouds.

The motions of the clouds, though ſometimes directed by the wind, are not always ſo, eſpecially when thunder is about to enſue. In this caſe they ſeem to move very ſlowly, and often to be abſolutely ſtationary for ſome time. The reaſon of this moſt probably is, that they are impelled by two oppoſite ſtreams of air nearly of equal ſtrength; by which means their velocity is greatly retarded. In ſuch caſes both the aerial currents ſeem to aſcend to a very conſiderable height; for Meſſ. Charles and Roberts, when endeavouring to avoid a thunder-cloud in one of their aerial voyages, could

could find no alteration in the courſe of the current, though they aſcended to the height of 4000 feet from the ſurface of the earth. In ſome caſes the motions of the clouds evidently depend on their electricity, independent of any current of air whatever. Thus, in a calm and warm day, we often ſee ſmall clouds meeting each other in oppoſite directions, and ſetting out from ſuch ſhort diſtances, that we cannot ſuppoſe any oppoſite winds to be the cauſe. Theſe clouds, when they meet, inſtead of forming a larger one, become much leſs, and ſometimes vaniſh altogether; a circumſtance undoubtedly owing to the diſcharge of oppoſite electricities into each other. This ſerves alſo to throw ſome light on the true cauſe of the formation of clouds; for if two clouds electrified, the one poſitively and the other negatively, deſtroy each other in contact; it follows, that any quantity of vapour ſuſpended in the atmoſphere, while it retains its natural quantity of electricity, remains inviſible, but becomes a cloud when electrified either *plus* or *minus*. A difficulty, however, ſtill occurs; viz. in what manner a ſmall quantity of vapour ſurrounded by an immenſe ocean of the ſame kind of matter, can acquire either more or leſs electricity than that which ſurrounds it; and this indeed we ſeem not as yet to have any data to ſolve in a ſatisfactory manner.

11 Their ſhapes.

The ſhapes of the clouds are likewiſe undoubtedly owing to their electricity; for in thoſe ſeaſons in which a great commotion has been excited in the atmoſpherical electricity, we ſhall perceive the clouds aſſuming ſtrange and whimſical ſhapes, which vary almoſt every moment. This, as well as the meeting of ſmall clouds in the air, and vaniſhing upon contact, is an almoſt infallible ſign of thunder.

12 Connection of the clouds with wind.

Beſides the phenomena of thunder, rain, &c. the clouds are intimately connected with thoſe of wind, and always aſſume a particular ſhape, when a ſtrong continued wind is about to enſue; though it is remarkable, that in the ſtrongeſt winds we ſhall often obſerve them ſtationary. Sometimes alſo, on the approach of a cloud, we ſhall find a ſudden and violent guſt of wind ariſe; and at others, the wind, though violent before, ſhall ceaſe on the approach of a cloud, and recover its ſtrength as ſoon as the cloud is paſt. This connection of the clouds with wind is moſt remarkable in mountainous countries, when the peaks are ſufficiently high to have their tops involved in clouds. A very remarkable mountain of this kind is met with at the Cape of Good Hope, from the clouds on whoſe top, according to the relations of travellers, the winds iſſue forth as if they had been confined in a bag; and ſomething ſimilar has been obſerved of mountains in other parts of the world.

13 Their uſes.

The uſes of the clouds are evident; as from them proceeds the rain which refreſhes the earth; and without which, according to the preſent ſyſtem of nature, the whole ſurface of the earth muſt be a mere deſert. They are likewiſe of great uſe as a ſcreen interpoſed between the earth and the ſcorching rays of the ſun which are often ſo powerful as to deſtroy the graſs and other tender vegetables. In the more ſecret operations of nature alſo, where the electrical fluid is concerned, the clouds bear a principal ſhare; and ſerve eſpecially as a medium for conveying that fluid from the atmoſphere into the earth, and from the earth into the atmoſphere; in doing which, when electrified to a great degree, they ſometimes produce very terrible effects; of which inſtances have been already given.

CLOVE-TREE. See CARYOPHYLLUS, BOTANY *Index*.

CLOVE, a term uſed in weights of wool. Seven pounds make a clove. In Eſſex, eight pounds of cheeſe and butter go to the clove.

CLOVE July-flower. See DIANTHUS, BOTANY *Index*.

CLOVER-GRASS. See TRIFOLIUM, BOTANY *Index*, and AGRICULTURE *Index*.

CLOUGH, or DRAUGHT, in commerce, an allowance of two pounds in every hundred weight for the turn of the ſcale, that the commodity may hold out weight when ſold out by retail.

CLOVIO, GIORGIO GIULIO, hiſtory and portrait painter, was born in Sclavonia, in 1498. Having in the early part of his youth applied himſelf to literature, his genius prompted him to purſue the art of painting for a profeſſion; and at 18 years of age he went to Rome, where he ſpent three years to perfect his hand in drawing, and devoted himſelf entirely to painting in miniature. His knowledge of colouring was eſtabliſhed by the inſtructions of Julio Romano, and his taſte of compoſition and deſign was founded on the obſervations he made on the works of Michael Angelo Buonaroti. By thoſe aſſiſtances he arrived at ſuch a degree of excellence in portrait as well as in hiſtory, that in the former he was accounted equal to Titian, and in the latter not inferior to Buonaroti. He died in 1578. His works are exceedingly valuable, and are at this day numbered among the curioſities of Rome. Vaſari, who had ſeen the wonderful performances of Clovio, with inexpreſſible aſtoniſhment, enumerates many of his portraits and hiſtorical compoſitions, and ſeems to be almoſt at a loſs for language ſufficiently expreſſive of their merit. He mentions two or three pictures on which the artiſt had beſtowed the labour of nine years; but the principal picture repreſented Nimrod, building the Tower of Babel; which was ſo exquiſitely finiſhed, and ſo perfect in all its parts, that it ſeemed quite inconceivable how the eye or the pencil could execute it. He ſays it is impoſſible to imagine any thing ſo admirably curious; whether one conſiders the elegance of the attitudes, the richneſs of the compoſition, the delicacy of the naked figures, the perſpective proportion of the objects, the tender diſtances, the ſcenery, the buildings, or other ornaments; for every part is beautiful and inimitable. He alſo takes notice of a ſingle ant introduced in one of the pictures of this maſter; which, though exceedingly and incredibly ſmall, is yet ſo perfect, that even the moſt minute member was as diſtinct as if it had been painted of the natural ſize.

CLOVIS I. was the real founder of the French monarchy; for he was the firſt conqueror of the ſeveral provinces of Gaul, poſſeſſed before his time by the Romans, Germans, and Goths. Theſe he united to the then ſcanty dominions of France, removed the ſeat of government from Soiſſons to Paris, and made this the capital of his new kingdom. He died in 511, in the 46th year of his age and 31ſt of his reign. See (*Hiſt. of*) FRANCE.

CLOUTS, in *Gunnery*, are thin plates of iron nail-

ed

ed on that part of the axle-tree of a gun-carriage which comes through the nave, and through which the linfpin goes.

CLOYNE, a town of Ireland, in the county of Cork and province of Munfter. W. Long. 8. 0. N. Lat. 51. 40. It is but a fmall place, though an epifcopal refidence. A church was built, and a bifhopric erected here, by St Colman, who died on the 4th of November 604; and in 707 an abbey was alfo founded here. In 1430, the bifhopric was united to that of Cork; and the union continued till the 11th of November 1638, when Dr George Synge was confecrated bifhop of Cloyne; fince which time this fee has been governed by its own prelates, one of whom was the celebrated Berkeley. This fee is not taxed in the king's books; but is now reputed to be worth 2500l. a-year. The chapter of Cloyne is compofed of a dean, chapter, chancellor, treafurer, an archdeacon, and fourteen prebendaries. The diocefe is divided into four rural deaneries, and the collegiate church of St Mary of Youghal is united to the bifhopric. The cathedral is a decent Gothic building. The nave is about 120 feet long; having lateral aifles, befides the crofs aifles, divided by Gothic arches, five on each fide. In the choir there is an excellent organ. The bifhop's palace, which was rebuilt at the beginning of the prefent century, is large and convenient. To the north-weft of Cloyne is a reputed holy well, dedicated to St Colman, which is much frequented on the 24th of November, being the patron day.

CLUE OF A SAIL, the lower corner; and hence

CLUE-Garnets are a fort of tackles faftened to the clues, or lower corners of the mainfail or forefail to trufs them up to the yard as occafion requires, which is ufually termed *clueing up the fails.*

CLUE-Lines are for the fame purpofe as clue-garnets; only that the latter are confined to the courfes, whereas the former are common to all the fquare fails. See thefe ropes as reprefented in the article SHIP.

CLUNIA, in *Ancient Geography*, a principal town of the Hither Spain, a Roman colony, with a conventus juridicus, on the Durius, to the weft of Numantia, Now *Corunna del Conde.*

CLUNIUM, in *Ancient Geography*, a town of Corfica, near Baftia. Now *St Catharine.*

CLUNY, or CLUGNY, a celebrated abbey of Benedictine monks, in a city of that name; being the head or chief of a congregation denominated from them.

It is fituated in the Mafonnois, a little province of France, on the river Grône; and was founded by William duke of Berry and Aquitain; or, as others fay, by the abbot Bernon, fupported by that duke, in the year 910.

This abbey was anciently fo very fpacious and magnificent, that in 1245, after the holding of the firft council of Lyons, Pope Innocent IV. went to Cluny, accompanied with the two patriarchs of Antioch and Conftantinople, 12 cardinals, 3 archbifhops, 15 bifhops, and a great number of abbots; who were all entertained, without one of the monks being put out of their place; though S. Louis Q. Blanche his mother, the duke of Artois his brother, and his fifter, the emperor of Conftantinople, the fons of the kings of Arragon and Caftile, the duke of Burgundy, fix counts, and a great number of lords, with all their retinues, were there at the fame time.

Cluny, at its firft erection, was put under the immediate protection of the apoftolic fee, with exprefs prohibition to all fecular and ecclefiaftic powers, to difturb the monks in the poffeffion of their effects, or the election of their abbot. By this they pretended to be exempted from the jurifdiction of bifhops; which at length gave the hint to other abbeys to infift on the fame.

Cluny is the head of a very numerous and extenfive congregation: in effect, it was the firft congregation of divers monafteries united under one chief, fo as only to conftitute one body, or, as they call it, one order, that ever arofe.

This order of monks was brought into England by William, earl of Warren, fon-in-law to William the Conqueror, who built a houfe for them at Lewes in Suffex about the year 1077. There were 27 priories and fells of this order in England, which were governed by foreigners, afterwards made denizens.

CLUPEA, or HERRING, in *Ichthyology*, a genus belonging to the order of abdominales. The upper jaw is furnifhed with a ferrated myftache; the branchioftege membrane has eight rays; a fcaly ferrated line runs along the belly from the head to the tail; and the belly-fins have frequently nine rays. There are 11 fpecies, viz.

1. The *harengus*, or common herring, has no fpots, and the under jaw is longer than the upper one. A herring dies immediately after it is taken out of the water; whence the proverb arifes, *As dead as a herring.* The meat is everywhere in great efteem, being fat, foft, and delicate; efpecially if it is dreffed as foon as caught, for then it is incomparably better than on the next day.

The herring was unknown to the ancients. Notwithftanding the words χαλκις and μαινις are by tranflators rendered *halec*, the characters given to thofe fifh are common to fuch numbers of different fpecies as render it impoffible to fay which they intended.

1 Herrings, where found.

Herrings are found from the higheft northern latitudes yet known, as low as the northern coafts of France; and except one inftance, brought by Dod, of a few being once taken in the bay of Tangier, none are ever found more foutherly. They are met with in vaft fhoals on the coaft of America, as low as Carolina. In Chefapeak-bay is an annual inundation of thofe fifh, which cover the fhore in fuch quantities as to become a nuifance. We find them again in the feas of Kamtfchatka, and probably they reach Japan; for Kempfer mentions, in his account of the fifh of that country, fome that are congenerous. The great winter rendezvous of the herring is within the arctic circle: there they continue for many months in order to recruit themfelves after the fatigue of fpawning; the feas within that fpace fwarming with infect food in a far greater degree than thofe of our warmer latitudes.

2 Immenfe fhoals of them.

This mighty army begins to put itfelf in motion in the fpring; we diftinguifh this vaft body by that name; for the word *herring* comes from the German *heer*, "an army," to exprefs their numbers. They begin to appear off the Shetland ifles in April and May; thefe are only the forerunners of the grand fhoal which comes

Clupea.

comes in June; and their appearance is marked by certain ſigns, by the number of birds, ſuch as gannets and others, which follow to prey on them; but when the main body approaches, its breadth and depth is ſuch as to alter the appearance of the very ocean. It is divided into diſtinct columns of five or ſix miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling: ſometimes they ſink for the ſpace of ten or fifteen minutes, and then riſe again to the ſurface; and in fine weather reflect a variety of ſplendid colours like a field of the moſt precious gems; in which, or rather in a much more valuable, light ſhould this ſtupendous gift of Providence be conſidered by the inhabitants of the Britiſh iſles.

The firſt check this army meets in its march ſouthward is from the Shetland iſles, which divide it into two parts; one wing takes to the eaſt, the other to the weſtern ſhores of Great Britain, and fill every bay and creek with their numbers; others paſs on towards Yarmouth, the great and ancient mart of herrings: they then paſs through the Britiſh Channel, and after that, in a manner diſappear. Thoſe which take towards the weſt, after offering themſelves to the Hebrides, where the great ſtationary fiſhery is, proceed to the north of Ireland, where they meet with a ſecond interruption, and are obliged to make a ſecond diviſion: the one takes to the weſtern ſide, and is ſcarce perceived, being ſoon loſt in the immenſity of the Atlantic; but the other, that paſſes into the Iriſh ſea, rejoices and feeds the inhabitants of moſt of the coaſts that border on it. Theſe brigades, as we may call them, which are thus ſeparated from the greater columns, are often capricious in their motions, and do not ſhow an invariable attachment to their haunts.

3
Wonderful inſtinct of theſe creatures.

Were we inclined to conſider this partial migration in a moral light, we might reflect with veneration and awe on the mighty power which originally impreſſed on this moſt uſeful body of his creatures the inſtinct that directs and points out the courſe, that bleſſes and enriches theſe iſlands, which cauſes them at certain and invariable times to quit the vaſt polar deeps, and offer themſelves to our expecting fleets. That benevolent Being has never been known, from the earlieſt account of time, once to withdraw this bleſſing from the whole; though he often thinks proper to deny it to particulars, yet this partial failure (for which we ſee no natural reaſon) ſhould fill us with the moſt exalted and grateful ſenſe of his providence for impreſſing ſuch an invariable and general inſtinct on theſe fiſh towards a ſouthward migration when the whole is to be benefited, and to withdraw it when only a minute part is to ſuffer.

This inſtinct was given them, that they might remove for the ſake of depoſiting their ſpawn in warmer ſeas, that would mature and vivify it more aſſuredly than thoſe of the frozen zone. It is not from defect of food that they ſet themſelves in motion; for they come to us full of fat, and on their return are almoſt univerſally obſerved to be lean and miſerable. What their food is near the pole we are not yet informed; but in our ſeas they feed much on the *oniſcus marinus*, a cruſtaceous inſect, and ſometimes on their own fry.

They are full of roe in the end of June, and continue in perfection till the beginning of winter, when they depoſit their ſpawn. The young herrings begin to approach the ſhores in July and Auguſt, and are then from half an inch to two inches long; thoſe in Yorkſhire are called *herring ſile*. Though we have no particular authority for it, yet as very few young herrings are found in our ſeas during winter, it ſeems moſt certain that they muſt return to their parental haunts beneath the ice, to repair the vaſt deſtruction of their race during ſummer by men, fowl, and fiſh. Some of the old herrings continue on our coaſt the whole year: the Scarborough fiſhermen never put down their nets but they catch a few; but the numbers that remain are not worth compariſon with thoſe that return. See *Herring-FISHERY*.

Clupea.

4
Young ones probably retire with their parents.

The Dutch are moſt extravagantly fond of this fiſh when it is pickled. A premium is given to the firſt buſs that arrives in Holland with a lading of this their ambroſia, and a vaſt price given for each keg. There is as much joy among the inhabitants on its arrival, as the Egyptians ſhow on the firſt overflowing of the Nile. Flanders had the honour of inventing the art of pickling herrings. One William Beauklen of Biverlet, near Sluys, hit on this uſeful expedient; from him was derived the name *pickle*, which we borrow from the Dutch and German. Beauklen died in 1397. The emperor Charles V. held his memory in ſuch veneration for the ſervice he did to mankind, as to do his tomb the honour of a viſit. It is very ſingular that moſt nations give the name of their favourite diſh to the facetious attendant on every mountebank. Thus the Dutch call him *pickle herring*; the Italians *macaroni*; the French, *jean pottage*; the Germans *hans wurſt*, that is, *jack ſauſage*; and the Engliſh dignify him with the name of *jack pudding*.

5
Pickling of herrings when invented.

2. The *ſprattus* has 13 rays in the back fin. It is a native of the European ſeas, and has a great reſemblance to the herring, only it is of a leſs ſize. They come into the river Thames below bridge in the beginning of November, and leave it in March; and are, during that ſeaſon, a great relief to the poor of the capital. At Graveſend and at Yarmouth they are cured like red-herrings; they are ſometimes pickled, and are little inferior in flavour to the anchovy, but the bones will not diſſolve like thoſe of the latter.

6
Sprattus, where found.

3. The *aloſa*, or *ſhad*, has a forked ſnout, and black ſpots on the ſides. According to Belonius and Haſſelquiſt, this is a fiſh of paſſage in the Nile. The laſt ſays, it is found in the Mediterranean near Smyrna, and on the coaſt of Egypt near Roſetta; and that in the months of December and January it aſcends the Nile as high as Cairo, where the people ſtuff it with pot marjoram; and when dreſſed in that manner, it will very nearly intoxicate the eater. In Great Britain the Severn affords this fiſh in higher perfection than any other river. It makes its firſt appearance there in May, but in very warm ſeaſons in April; for its arrival ſooner or later depends much on the temper of the air. It continues in the river about two months, and then is ſucceeded by a variety which we ſhall have occaſion to mention hereafter.

7
Aloſa, or ſhad, where found.

8
The fineſt inhabit the Severn.

The Severn ſhad is eſteemed a very delicate fiſh about the time of its firſt appearance, eſpecially in that part of the river that flows by Glouceſter, where they are taken in nets, and uſually ſell dearer than ſalmon: ſome are ſent to London, where the fiſhmongers diſtinguiſh

ſtinguiſh them from thoſe of the Thames by the French name *aloſe*. Whether they ſpawn in this river and the Wye is not determined, for their fry has not yet been diſcovered. The old fiſh come from the ſea into the river in full roe. In the months of July and Auguſt, multitudes of bleak frequent the river near Glouceſter; ſome of them are as big as a ſmall herring, and theſe the fiſhermen erroneouſly ſuppoſe to be the fry of the ſhad. Numbers of theſe are taken near Glouceſter, in thoſe months only, but none of the emaciated ſhad are ever caught in their return.

The Thames ſhad does not frequent that river till the latter end of May or beginning of June, and is eſteemed a very coarſe and inſipid ſort of fiſh. The Severn ſhad is ſometimes caught in the Thames, though rarely, and called *allis* (no doubt *aloſe*, the French name) by the fiſhermen in that river. About the ſame time, and rather earlier, the variety called, near Glouceſter, the *twaite*, makes its appearance, is taken in great numbers in the Severn, and is held in as great diſrepute as the ſhad of the Thames. The differences between each variety are as follow: the true ſhad weighs ſometimes eight pounds; but their general ſize is from four to five. The *twaite*, on the contrary, weighs from half a pound to two pounds, which it never exceeds. The *twaite* differs from a ſhad only in having one or more round black ſpots on the ſides; if only one, it is always near the gill; but commonly there are three or four, placed one under the other.

9 Twaite deſcribed.

10 Anchovy deſcribed.

4. The *encraſicolus*, or *anchovy*, has its upper jaw longer than the under one, and is about three inches long. They are taken in vaſt quantities in the Mediterranean, and are brought over here pickled. The great fiſhery is at Georgia, a ſmall iſle weſt of Leghorn. See *Anchovy-FISHERY*.

The other ſpecies are, 5. The atherinoides has a ſhining line on each ſide, and ſmall belly-fins. It is a native of Surinam. 6. The thriſſa has 28 rays in the fin at the anus. It is found in the Indian ocean. 7. The ſima has yellow fins, thoſe of the belly being very ſmall. The mouth is flat; the upper jaw is very ſhort; the body is of a ſhining ſilver colour, and the fins are yellow. It is a native of Aſia. 8. The ſternicla has no belly-fins, and the body is broad. It is a native of Surinam. 9. The myſtus is ſhaped like a ſword, and the fins at the anus are united. It is found in the Indian ocean. 10. The tropica has a wedge-like tail, and a white, broad, compreſſed body. It is found at Aſcenſion iſland. 11. The ſinenſis is very like the common herring, but broader. It has no teeth, and is a native of China.

CLUSIA, the BALSAM-TREE. See BOTANY *Index*.

CLUSINA PALUS, in *Ancient Geography*, a lake of Tuſcany, extending north-weſt between Cluſium and Arretium, and communicating with the Arnus and Clanis. Now *Chiana Palude*.

CLUSINI FONTES, (Horace), baths in Tuſcany, in the territory of Cluſium, between this laſt to the north, and Acula to the ſouth, at the diſtance of eight miles from each. Now *Bagni di S. Caſciana*.

CLUSIUM, anciently called *Camars*, (Virgil, Livy); a town of Tuſcany, at the ſouth end of the Palus Cluſina, where it forms the Clanis; the royal reſidence of Porſenna, three days journey from Rome to the north, (Polybius). *Cluſinus* the epithet. *Cluſini Veteres* the people. Now *Chiuſi*. E. Long. 13°, Lat. 43°.—*Cluſium Novum*, was a town of Tuſcany, near the ſprings of the Tiber, in the territory of Arretium; where lies the Ager Cluſinus: now called *Caſentino*. *Cluſini Novi*, the people, (Pliny).

CLUTIA. See BOTANY *Index*.

CLUVIER, PHILIP, in Latin *Cluverius*, a celebrated geographer, born at Dantzic in 1580. He travelled into Poland, Germany, and the Netherlands, in order to ſtudy law; but, being at Leyden. Joſeph Scaliger perſuaded him to give way to his genius for geography. Cluvier followed his advice, and for this purpoſe viſited the greateſt part of the European ſtates. He was well verſed in many languages; and wherever he went, obtained illuſtrious friends and protectors. At his return to Leyden, he taught there with great applauſe; and died in 1623, aged 43. He wrote, 1. *De tribus Rheni alveis*. 2. *Germania antiqua*. 3. *Sicilia antiqua*. 4. *Italia antiqua*. 5. *Introductio in univerſum Geographiam*. All juſtly eſteemed.

CLYDE, a large river of Scotland, which, with the rivers Tweed and Annan, has its ſource at the head of Annandale, and joins the ſea at Greenock, where it forms the Frith of Clyde. It is navigable for ſmall veſſels up to Glaſgow. The canal, which joins the Forth, falls into it ten miles below that city. The cataract called the *Falls of the Clyde*, oppoſite to Lanark, is a great natural curioſity, and the firſt ſcene of the kind in Great Britain. This tremendous ſheet of water for about a mile falls from rock to rock. At Stone-byres, the firſt fall is about 60 feet; the next at Cora-Lynn, is over ſolid rock, and is ſtill higher. At both theſe places this great body of water exhibits a grander and more intereſting ſpectacle than imagination can poſſibly conceive.

At Cora-Lynn, the falls are ſeen to moſt advantage from a pavilion placed in a lofty ſituation, and which is furniſhed with mirrors which produce a fine effect. The cataract is full in view, ſeen over the tops of trees and buſhes, precipitating itſelf, for an amazing way, from rock to rock, with ſhort interruptions, forming a rude ſlope of furious foam. The ſides are bounded by vaſt rocks, clothed on their tops with trees: on the ſummit and very verge of one is a ruined tower, and in front a wood overtopt by a verdant hill. A path conducts the traveller down to the beginning of the fall, into which projects a high rock, in floods inſulated by the water; and from the top is a tremendous view of the furious ſtream. In the cliffs of this ſavage retreat the brave Wallace is ſaid to have concealed himſelf, meditating revenge for his injured country.

On regaining the top, the walk is formed near the verge of the rocks, which on both ſides are perfectly mural and equidiſtant, except where they overhang: the river is pent up between them at a diſtance far beneath; not running, but rather ſliding along a ſtony bottom ſloping, the whole way. The ſummits of the rock are wooded; the ſides ſmooth and naked; the ſtrata narrow and regular, forming a ſtupendous natural maſonry. After a walk of above half a mile on the edge of this great chaſm, on a ſudden appears the great and bold fall of Boniton, in a foaming ſheet, far projecting into a hollow, in which the water ſhows a violent

violent agitation, and a wide extending mift arifes from the furface. Above that is another fall; two leffer fucceed; beyond them the river winds, grows more tranquil, and is feen for a confiderable way, bounded on one fide by wooded banks, on the other by rich and fwelling fields.

The great fall of Stone-byres, firft mentioned, has more of the fublime in it than any of the others, and is feen with more difficulty: it confifts of two precipitous cataracts falling one above the other into a vaft chafm, bounded by lofty rocks, forming an amazing theatre to the view of thofe who take the pains to defcend to the bottom. Between this and Cora-Lynn there is another fall called *Dundofflin*.

CLYMENE, in fabulous hiftory, the daughter of Oceanus, who, being beloved by Apollo, he had by her Phaëton, Lampatia, Egle, and Phebe. See PHAETON.

CLYPEOLA, TREACLE-MUSTARD. See BOTANY *Index*.

CLYSSUS, an extract prepared, not from one, but feveral bodies mixed together; and, among the moderns, the term is applied to feveral extracts prepared from the fame body, and then mixed together.

CLYSTER, is a liquid remedy, to be injected chiefly at the anus into the larger inteftines. It is ufually adminiftered by the bladder of a hog, fheep, or ox, perforated at each end, and having at one of the apertures an ivory pipe faftened with packthread. But the French, and fometimes the Dutch, ufe a pewter fyringe, by which the liquor may be drawn in with more eafe and expedition than in the bladder, and likewife more forcibly expelled into the large inteftines. This remedy fhould never be adminiftered either too hot or too cold, but tepid; for either of the former will be injurious to the bowels.

Clyfters are fometimes ufed to nourifh and fupport a patient who can fwallow little or no aliment, by reafon of fome impediment in the organs of deglutition; in which cafe they may be made of broth, milk, ale, and decoctions of barley and oats with wine. The Englifh introduced a new kind of clyfter, made of the fmoke of tobacco, which has been ufed by feveral other nations, and appears to be of confiderable efficacy when other clyfters prove ineffectual, and particularly in the iliac paffion, in the *hernia incarcerata*, and for the recovery of drowned perfons.

CLYTEMNESTRA, in fabulous hiftory, the daughter of Jupiter and Leda. She married Agamemnon; but while that prince was at the fiege of Troy, fhe had an amorous intrigue with Ægifthus, whom fhe engaged to murder Agamemnon at his return to his dominions. Her fon Oreftes, however, revenged the death of his father by killing Ægifthus, with his mother Clytemneftra; but was afterwards haunted by the Furies as long as he lived.

CLYTIA, or CLYTIE, daughter of Oceanus and Tethys, beloved by Apollo. She was deferted by her lover, who paid his addreffes to Leucothoe; and this fo irritated her, that fhe difcovered the whole intrigue to her rival's father. Apollo defpifed her the more for this; and fhe pined away, and was changed into a flower, commonly called a *fun-flower*, which ftill turns its head towards the fun in his courfe in token of her love.

CNEORUM, WIDOW-WAIL. See BOTANY *Index*.

CNICUS, BLESSED-THISTLE. See BOTANY *Index*.

CNIDUS, in *Ancient Geography*, a Greek town of Caria; fituated on a horn or promontory of a peninfula. It had in front a double port, and an ifland lying before it in form of a theatre, which being joined to the continent by moles or caufeways, made *Cnidus* a Dipolis or double town (Strabo), becaufe a great number of Cnidians inhabited the ifland. Paufanias mentions a bridge which joined the ifland to the continent.—*Cnidii*, the people. *Cnidius*, the epithet.—*Cnidia Venus*, a principal divinity of the Cnidians, (Horace). Her ftatue was executed by Praxiteles; and fo exquifitely done, and fo much admired, that people came from all parts to view it (Pliny). Of this place was Eudoxus, the famous aftronomer and geometrician, who had there an obfervatory (Strabo).

CNOSSUS, or CNOSUS, anciently called *Cæratos*, from a cognominal river running by it; a city of Crete, 23 miles to the eaft of Gortina (Peutinger). Here ftood the fepulchre of Jupiter, the famous labyrinth, and the palace of Minos, a very ancient king; here happened the adventure of Ariadne his daughter with Thefeus. Called *Gnofis* (Ovid). Its port-town was Heracleum, on the eaft fide of the ifland.

COACH, a vehicle for commodious travelling, fufpended on leathers, and moved on wheels. In Britain, and throughout Europe, the coaches are drawn by horfes, except in Spain, where they ufe mules. In a part of the eaft, efpecially the dominions of the great Mogul, their coaches are drawn by oxen. In Denmark they fometimes yoke rein-deer in their coaches; though rather for curiofity than ufe. The coachman is ordinarily placed on a feat raifed before the body of the coach. But the Spanifh policy has difplaced him in that country by a royal ordinance; on occafion of the duke d'Olivares, who found that a very important fecret, whereon he had conferred in his coach, had been overheard and revealed by his coachman: fince that time the place of the Spanifh coachman is the fame with that of the French ftage coachman and our poftilion, viz. on the firft horfe on the left.

According to Profeffor Beckmann, coaches of fome kind were known about the beginning of the 16th century; but the ufe of them was limited to women of the higheft rank. It was accounted difgraceful in men to ride in them. It appears from the hiftory of that period, that the electors and princes of the empire, when they did not choofe to attend the meetings of the ftates, excufed themfelves to the emperor, by informing him, that their health would not permit them to travel on horfeback; and it was confidered unbecoming to ride in carriages like women. But it feems alfo pretty certain, that about the end of the 15th century, the emperor, kings, and fome princes, travelled in covered carriages, and alfo employed them on public folemnities.

The nuptial carriage of the firft wife of Leopold, a Spanifh princefs, coft, including the harnefs, 38,000 florins. The coaches ufed by that emperor are thus defcribed. In the imperial coaches no great magnificence was to be feen, being covered over with red cloth and black nails. The harnefs was black, and no gold was to be feen in the whole work. They had glafs pannels, for which reafon they were called *impe-*

Coach.

rial coaches. The harneſs was ornamented with fringes of red ſilk on days of feſtivity. The imperial coaches were only diſtinguiſhed by having leather traces, while the ladies in the emperor's ſuite were contented with traces made of ropes. Fifty gilt coaches having ſix horſes each, were to be ſeen in 1681 at the court of Erneſt Auguſtus of Hanover. The firſt time that plenipotentiaries appeared in coaches, was at the imperial commiſſion in 1613, held at Erfurth.

We meet with ample proof in the hiſtory of France, that the monarchs rode on horſes, the ſervants on mules, and ladies of diſtinction ſometimes on aſſes, at Paris, in the 14th, 15th, and even 16th centuries. Yet carriages of ſome kind ſeem to have been uſed in France at an early period, ſince there is ſtill preſerved a ſtatute of Philip the Fair, iſſued in 1294, for the ſuppreſſion of luxury, and in which the wives of citizens were prohibited the uſe of carriages.

The oldeſt coaches uſed by the ladies of England were denominated *whirlicotes*, a name now ſunk in oblivion. About the end of the 14th century, when Richard II. was forced to fly before his rebellious ſubjects, he and all his attendants travelled on horſeback, his mother alone riding in a coach, as ſhe was indiſpoſed. This became afterwards unfaſhionable, the daughter of Charles IV. having ſhowed the ladies of England how conveniently ſhe could ride on a ſide-ſaddle.

According to Stow, coaches firſt came to be uſed in England about the middle of the 16th century, having been introduced from Germany by the earl of Arundel. The Engliſh plenipotentiary came to Scotland in a coach in the year 1598, and they were generally uſed about the year 1605.

Authors obſerve, as a thing very ſingular, that there were at firſt no more than three coaches in Paris; the firſt that of the queen; the ſecond that of Diana miſtreſs of Henry II.; and the third belonging to Jean de Lava de Bois Dauphin; whoſe enormous bulk diſabled him from travelling on horſeback. One may hence judge how much vanity, luxury, and idleneſs, have grown upon our hands in latter days; there being now computed in that ſame city no leſs than 15,000 coaches.

Coaches have had the fate of all other inventions, to be brought by degrees to their perfection; at preſent they ſeem to want nothing, either with regard to eaſe or magnificence. Louis XIV. of France made ſeveral ſumptuary laws for reſtraining the exceſſive richneſs of coaches, prohibiting the uſe of gold, ſilver, &c. therein; but they have had the fate to be neglected.

The following are the duties payable on carriages of this deſcription in Britain (1804).

	L.	s.	d.
For one carriage, with four wheels, the annual ſum of - - -	L.10	0	0
For two - - -	11	0	0
three - - -	12	0	0
four - - -	12	10	0
five - - - -	13	0	0
ſix - - - -	13	10	0
ſeven - - -	14	0	0
eight - - - -	14	10	0
nine and upwards, -	15	0	0
And for every additional body ſucceſſively uſed on the ſame carriage or number of wheels, the further ſum of -	L.5	0	0
For carriages with leſs than four wheels, drawn by one horſe - -	5	5	0
For carriages drawn by two or more horſes - - -	7	7	0
For every additional body -	2	10	0
For carriages with four wheels let out to hire - - - -	8	8	0

Every maker of coaches, chaiſes, chariots, &c. muſt, from and after the 5th day of July 1785, take out at the exciſe office in London, or of their agents in the country, a licence, to be renewed annually at leaſt ten days before the expiration of the former, for which they muſt pay 20s. They muſt alſo pay 20s. duty for every four-wheeled carriage newly built for ſale, and 10s. for every two-wheeled carriage. Theſe duties are alſo payable to the commiſſioners of the exciſe in town, or their agents in the country.

Coach-makers in Scotland are to take out their licenſes and pay the duties to the commiſſioners of exciſe in Edinburgh, or their agents in the country of that part of Great Britain.

Every coach-maker neglecting to take out a licence, and renewing the ſame annually, forfeits 10l.; and neglecting or refuſing to ſettle every ſix weeks, in the manner particularly directed by the act, is a forfeiture of 20l.

Hackney-COACHES, thoſe expoſed to hire, in the ſtreets of London, and ſome other great cities, at rates fixed by authority.

One thouſand hackney-coaches are allowed in London and Weſtminſter: which are to be licenſed by commiſſioners, and to pay a duty to the crown. They are all numbered, having their numbers engraved on tin plates fixed on the coach-doors. Their fares or rates are fixed by act of parliament; and by a late act have been increaſed in conſequence of a new weekly tax.

Stage-COACHES are thoſe appointed for the conveyance of travellers from one city or town to another. The maſters of ſtage coaches are not liable to an action for things loſt by their coachmen, who have money given them to carry the goods, unleſs where ſuch maſter takes a price for the ſame.

Perſons keeping any coach, berlin, landau, or other carriage with four wheels, or any calaſh, chaiſe, chair, or other carriage with two wheels, to be employed as public ſtage-coaches or carriages, for the purpoſe of conveying paſſengers for hire to and from different places, ſhall pay annually 5s. for a licence; and no perſon ſo licenſed ſhall by virtue of one licence keep more than one carriage, under the penalty of 10l.

Mail-COACHES are ſtage-coaches of a particular conſtruction to prevent overturns; and for a certain conſideration carry his majeſty's mails, which are protected by a guard, and ſubject to the regulations of the poſt-office. They are punctual as to their time of arrival and departure, are reſtricted to four inſide paſſengers, and from experience have proved very beneficial to the commerce and correſpondence of this country. The late John Palmer, Eſq. who had the merit of the invention, and was indefatigable in bringing the eſtabliſhment to a permanent footing, was greatly patronized

tronized by government; and got, as the reward of his ſervice, a handſome appointment in the general poſt-office, London. See *WHEEL-Carriages*.

COACH, or COUCH, is alſo a ſort of chamber or apartment in a large ſhip of war near the ſtern. The floor of it is formed by the aftmoſt part of the quarter-deck, and the roof of it by the poop: it is generally the habitation of the captain.

COADUNATE, in *Botany*, an order of plants in the *fragmenta methodi naturalis* of Linnæus, in which he has theſe genera, viz. annona, liriodendrum, magnolia, uvaria, michelia, thea.

COAGULATION, in *Chemiſtry*, is performed by ſix different agents; and by each of theſe in ſeveral different manners. 1. It is performed with water, by congealing, cryſtallizing, and precipitating, as in the mercurius vitæ and ſome other preparations. 2. With oil, which, by the force of fire, unites with ſulphur, ſalts, and metals. 3. With alcohol, upon the ſpirit of ſal ammoniac, the white of eggs, the ſerum of the blood, &c. 4. With acid and alkali growing ſolid together, as in the tartarum vitriolatum. 5. With fixed alkali, as in milk. And, 6. With acid ſalts; as in milk, ſerum, and the whites of eggs.

COAGULUM, is the ſame with what in Engliſh we call *runnet*, or rather the curd formed thereby.

COAKS. For the exciting of intenſe heats, as for the ſmelting of iron ore, and for operations where the acid and oily particles would be detrimental, as the drying of malt, foſſil-coals are previouſly charred, or reduced to *coaks*; that is, they are made to undergo an operation ſimilar to that by which charcoal is made. By this operation coals are deprived of their phlegm, their acid liquor, and part of their fluid oil. Coaks, therefore, conſiſt of the two moſt fixed conſtituent parts, the heavy oil and the earth, together with the acid concrete ſalt, which, though volatile, is diſſolved by the oil and the earth.

COAL, among chemiſts, ſignifies any ſubſtance containing oil, which has been expoſed to the fire in cloſe veſſels, ſo that all its volatile principles are expelled, and that it can ſuſtain a red heat without further decompoſition. Coal is commonly ſolid, black, very dry, and conſiderably hard. The ſpecific character of perfect coal is its capacity of burning with acceſs of air, while it becomes red hot and ſparkles, ſometimes with a ſenſible flame which gives little light, with no ſmoke or ſoot capable of blackening white bodies.

Coal, or carbonaceous matter, is capable of decompoſing ſulphuric acid, and ſeparates the ſulphur: added to nitrous acid, it inflames it; or to metallic earths, it reduces them to metals. But in theſe proceſſes, or new combinations, the aſſiſtance of red heat is required. Coal ſeems to be an unalterable compound in every inſtance but thoſe mentioned, of burning in the open air, and of ſeparating oxygen from other bodies: for it may be expoſed in cloſe veſſels to the moſt violent and long-continued fire without ſuffering the leaſt decompoſition. No diſpoſition to fuſe, or any diminution of weight, can be perceived. It is a ſubſtance exceedingly fixed, and perhaps the moſt refractory in nature. It reſiſts the action of the moſt powerful menſtrua, liver of ſulphur alone excepted.

Coal is evidently a reſult of the decompoſition of the compound bodies from which it is obtained. It conſiſts of the greateſt part of the earthy principle of theſe compound bodies, with which a part of the ſaline principles, and ſome of the phlogiſton of the decompoſed oil, are fixed and combined very intimately. Coal can never be formed but by the phlogiſton of a body which has been in an oily ſtate; hence it cannot be formed by ſulphur, phoſphorus, metals, nor by any other ſubſtance the phlogiſton of which is not in an oily ſtate. Alſo every oily matter treated with fire in cloſe veſſels, furniſhes true coal; ſo that whenever a charry reſiduum is left, we may be certain that the ſubſtance employed in the operation contained oil. Laſtly, the inflammable principle of coal, although it proceeds from oil, certainly is not oil, but pure phlogiſton, ſince coal added to ſulphuric acid can form ſulphur, to phoſphoric acid can form phoſphorus, &c. and ſince oil can produce none of theſe effects till it has been decompoſed and reduced to the ſtate of coal. Beſides, the phenomena accompanying the burning of coal are different from thoſe which happen when oily ſubſtances are burnt. The flame of charcoal is not ſo bright as that of oil, and produces no flame or ſoot.

This is the old chemical doctrine and language.

All the phlogiſton of coal is not burnt in the open air, particularly when the combuſtion is ſlow. One part of it exhales without decompoſition, and forms a vapour, or an inviſible and inſenſible gas. This vapour (which is, or at leaſt contains a great deal of fixed air) is found to be very pernicious, and to affect the animal ſyſtem in ſuch a manner as to occaſion death in a very ſhort time. For this reaſon it is dangerous to remain in a cloſe place, where charcoal or any other ſort of coal is burnt. Perſons ſtruck by this vapour are ſtunned, faint, ſuffer a violent headach, and fall down ſenſeleſs and motionleſs. The beſt method of recovering them is by expoſure to the open air, and by making them ſwallow vinegar, and breathe its ſteam.

Amongſt coals, ſome differences are obſervable, which proceed from the difference of the bodies from which they are made; ſome coals, particularly, are more combuſtible than others. This combuſtibility ſeems to depend on the greater or leſs quantity of ſaline principle they contain; that is, the more of the ſaline principle it contains, the more eaſily it decompoſes and burns. For example, coals made of plants and wood containing much ſaline matter capable of fixing it, the aſhes of which contain much alkaline ſalt, burn vigorouſly and produce much heat; whereas the coals of animal matters, the ſaline principles of which are volatile, and cannot be fixed but in ſmall quantity, and the aſhes of which contain little or no ſalt, are ſcarcely at all combuſtible. For they not only do not kindle ſo eaſily as charcoal does, nor even burn alone, but they cannot be reduced to aſhes, without very great trouble, even when the moſt effectual methods are uſed to facilitate the combuſtion. The coal of bullocks blood has been kept for ſix hours very red in a ſhallow crucible, ſurrounded by burning charcoal, and conſtantly ſtirred all the time, that it might be totally expoſed to the air; yet could it not be reduced to white, or even gray, aſhes: It ſtill remained very black, and full of phlogiſton. The coals of pure oils, or of concrete oily

oily ſubſtances and ſoot, which is a kind of coal raiſed during inflammation, are as difficultly reduced to aſhes as animal coals. Theſe coals contain very little ſaline matter, and their aſhes yield no alkali. The coals which are ſo difficultly burnt, are alſo leſs capable of inflaming with nitre than others more combuſtible; and ſome of them even in a great meaſure reſiſt the action of nitre.

Coal, in *Mineralogy*, a kind of ſolid inflammable ſubſtance, ſuppoſed to be of a bituminous nature, and commonly uſed for fuel. Of this ſubſtance there are various ſpecies.

1. *Pit-coal (Lithanthrax)*, is a black, ſolid, compact, brittle maſs, of moderate hardneſs, lamellated ſtructure, more or leſs ſhining, but ſeldom capable of a good poliſh; and does not melt when heated. According to Kirwan, it conſiſts of petrol or aſphaltum, intimately mixed with a ſmall portion of earth chiefly argillaceous; ſeldom calcareous; and frequently mixed with pyrites. A red tincture is extracted from it by ſpirit of wine, but cauſtic alkali attacks the bituminous part. From ſome ſorts of it a varniſh may be made by means of fat oils. Fixed alkali has never been found in any kind of it, nor ſulphur, unleſs when it happens to be mixed with pyrites.—None of the various kinds are found to be electrics *per ſe* (A).

The varieties of lithanthrax, enumerated by Cronſtedt, are, 1. With a ſmall quantity of argillaceous earth and ſulphuric acid. It is of a black colour, and ſhining texture; it burns, and is moſtly conſumed in the fire, but leaves, however, a ſmall quantity of aſhes. 2. Slaty coal.

2. *Culm coal*, called *kolm*, by the Swedes, has a greater portion of argillaceous earth and ſulphuric acid, with a moderate proportion of petrol. It has the ſame appearance with the foregoing, though its texture is more dull: it burns with a flame without being conſumed, but leaves behind it a ſlag of the ſame bulk with the original volume of the coal. The following is Mr Kirwan's deſcription of it, from the memoirs of the Stockholm academy. "Its fracture has a rougher ſection than the cannel coal; its ſpecific gravity from 1.300 to 1.370. The beſt kind affords, by diſtillation, at firſt fixed air, then an acid liquor, afterwards inflammable air, and a light oil of the nature of petrol; then a volatile alkali; and laſtly pitch-oil. The reſiduum is nearly three quarters of the whole; and being ſlowly burnt, affords 13 per cent. of aſhes, which conſiſt moſtly of argillaceous earth; and about three hundredth parts of them are magnetic. It is found in England, and among ſome aluminous ores in Sweden."

3. *Slate-coal* contains ſuch a quantity of argillaceous earth, that it looks like common ſlate; however, it burns by itſelf like a flame. M. Magellan is of opinion that this is the bituminous ſubſtance already deſcribed. This ſchiſtus is of a dark bluiſh ruſty colour; when thrown on the fire it burns with a lively flame, and almoſt as readily as the oily wood of dry olive-tree, or lignum vitæ; emitting the very diſagreeable ſmell of petrol. Such large quarries of it are found near Purbeck in Dorſetſhire, that the poorer part of the inhabitants are thence ſupplied with fuel. From the appearance of this ſlaty coal, Cronſtedt has been induced to ſuppoſe that the earth of all kinds of coal is argillaceous, though it is not ſo eaſy to diſtinguiſh it after being burnt. The pit-coals, he ſays, contain more or leſs of the ſulphuric acid; for which reaſon the ſmoke ariſing from them attacks ſilver in the ſame manner as ſulphur does, let the coals be ever ſo free from marcaſite, which, however, is often imbibed or mixed with them.

4. *Cannel coal (Ampelites)*, is of a dull black colour; breaks eaſily in all directions; and, if broken tranſverſely, preſents a ſmooth conchoidal ſurface. It burns with a light lively flame, but is very apt to fly in pieces in the fire; however, it is ſaid to be entirely deprived of this property by immerſion in water for ſome hours previous to its being uſed. It contains a conſiderable quantity of petrol in a leſs condenſed ſtate than other coal. Its ſpecific gravity is about 1.270. This kind of coal being of an uniform hard texture, is eaſily turned on a lathe, and takes a good poliſh. Hence it is uſed for making various toys, which appear almoſt as well as if made of the fineſt jet.

5. *Kilkenny coal* has a ſpecific gravity equal to 1.400. It contains the largeſt quantity of aſphaltum; burns with leſs ſmoke and flame, and more intenſely, though more ſlowly, than the cannel coal. The quantity of earth it contains does not exceed one twentieth part of its weight; but this kind of coal is frequently mixed with pyrites. It is found in the county of Kilkenny,

(A) "The varieties of this coal (ſays M. Magellan) are very numerous according to the different ſubſtances with which it is mixed; but in regard to their economical uſes, only two kinds are taken notice of by the Britiſh legiſlature, viz. culm and caking coals. The caking coals, in burning, ſhow an incipient fuſion, ſo that their ſmalleſt pieces unite in the fire into one maſs; by which means the ſmalleſt pieces, and even the mere duſt of this kind, are almoſt equally valuable with the largeſt pieces. The other ſort called *culm*, does not fuſe or unite in the fierceſt fire; ſo that the ſmall coal, being unfit for domeſtic purpoſes, can only be uſed in burning limeſtone.

"It ſhould be an eaſy matter for any perſon to diſtinguiſh culm from ſmall caking coal, either by trying to make fire with it in a common grate, without interpoſing any other fuel between it; when if it kindles, it is a caking coal; if not it is culm: Or by putting ſome of theſe ſmall fragments of coal on an ignited iron ſhovel; if they melt and run together, they belong to the caking kinds; if not they are culm. But it ſeems that coal merchants are now in the cuſtom of calling *culm* the powdery parts of pit-coal, of whatſoever kind they may happen to be. The reaſon of this is, that there is a difference in the duty payable by culm and by caking coals. There never was any difficulty, however, on the ſubject; nor would there be any difficulty in collecting the tax, were it not for the inſufferable ignorance and love of deſpotic oppreſſion which generally pervades the underling officers of the revenue."

kenny, belonging to the province of Leinſter in Ireland. The quality of it as burning without ſmoke, is proverbially uſed as an encomium on the county.

6. *Sulphureous coal* conſiſts of the former kinds mixed with a very conſiderable portion of pyrites; whence it is apt to moulder and break when expoſed to the air, after which water will act upon it. It contains yellow ſpots that look like metal; burns with a ſulphureous ſmell, leaving behind it either ſlag or ſulphureous aſhes, or both. Its ſpecific gravity is 1.500 or more.

7. *Bovey coal (Xylanthrax)* is of a brown or browniſh-black colour, and of a yellow laminar texture. Its laminæ are frequently flexible when firſt dug, though they generally harden when expoſed to the air. It conſiſts of wood penetrated with petrol or bitumen, and frequently contains pyrites, alum, and vitriol. According to the German chemiſts, its aſhes contain a little fixed alkali; but Mr Mills differs from them on this ſubject. By diſtillation it yields a fetid liquor mixed with a volatile alkali and oil; part of which is ſoluble in alcohol, and part of a mineral nature, and inſoluble. It is found in almoſt all the countries of Europe.

Theſe are the moſt conſiderable varieties of coals commonly known; but we muſt not imagine, that each of them is to be met homogeneous in thoſe places where they are found. On the contrary, the different qualities and proportions of their ingredients make a vaſt number of other varieties, fit for different purpoſes, according to the quality and quantity of thoſe they contain. Thus, various kinds of coals are often found mixed with one another under ground, and ſome of the finer ſorts ſometimes run like veins between thoſe of a coarſe kind. Thus, M. Magellan obſerved in the fine coals employed in a curious manufactory at Birmingham, that they produced a much clearer flame than he had ever obſerved from common coal; yet, on inquiry, he found that theſe were picked out from the common coals of the country, through which they ran in veins and were eaſily diſtinguiſhed by the manufacturers, though they did not afford ſufficient indications of a ſpecific difference. The purpoſe to which they were applied was the moulding rods of tranſparent and coloured glaſs into the ſhapes proper for common buttons, which they performed with aſtoniſhing expedition.

Fourcroy remarks, that this foſſil bitumen, when heated in contact with a body in combuſtion, and having a free acceſs of air, kindles the more ſlowly and with the greater difficulty in proportion as it is more weighty and compact. When once kindled, it emits a ſtrong and durable heat, and burns for a long time before it is conſumed. The matter that is burned, and produces the flame, appears very denſe, and ſeems united to ſome other ſubſtance which retards its deſtruction. On burning, it emits a particular ſtrong ſmell, which is not at all ſulphureous when the coal contains no pyrites. When the combuſtible, oily, and other volatile parts of the coal are diſſipated, if the combuſtion be then ſtopped, the remainder is found to be reduced to a true charred ſtate, and is called *coak*. This ſubſtance is capable of exciting the moſt intenſe heat, for which purpoſe it is uſed in metallurgic works all over Britain.

"It is well known (ſays M. Magellan), that the Engliſh method of burning pit coal into *coak* has been a moſt profitable and happy acquiſition for the ſmelting our ores, and for many other metallurgical and chemical proceſſes in this iſland. But the ingenious and advantageous undertaking of Lord Dundonald, by which he turns to a very conſiderable profit the mines of coals in his and other eſtates, building ovens of a proper conſtruction for burning pit coal into coak, and at the ſame time for collecting, in ſeparate receptacles, the volatile alkali, oil, tar, and pitch, which were generally loſt by the uſual method, deſerves to be noticed, as it affords a very remarkable inſtance of the great loſſes to mankind, for want of carefully attending to every reſult from great proceſſes of art when made on a large ſcale. Theſe ovens are ſo contrived, as to admit an under ſupply of air; and the coals, after being kindled, decompoſe themſelves by a ſlow but incomplete combuſtion, which does not deſtroy the ingredients. The reſiduum left in the oven proves to be moſt excellent cinders or coaks; whilſt the volatile parts, which otherwiſe would be diſſipated in the air, are ſeparated and condenſed in reſervoirs, or receptacles of capacious ſize, placed at proper diſtances beyond the reach of fire. Monſ. Faujas de St Fond, who viſited theſe works in a journey he made to Scotland, undertook to erect a ſimilar kind of an oven in France; and it is rather ſingular, that he endeavours to eſtabliſh a claim of having diſcovered the ſame proceſſes before he ſaw them in Scotland, as if it did not reflect a greater honour on his induſtry, to carry back to his country ſome uſeful knowledge, than to return as ignorant as our Engliſh travellers," &c.

On ſubjecting pit-coal of any kind to diſtillation in cloſe veſſels, it firſt yields a phlegm or watery liquor, then an ethereal or volatile oil, afterwards a volatile alkali, and laſtly a thick and greaſy oil; but it is remarkable, that, by rectifying this laſt oil, a tranſparent thin and light oil of a ſtraw colour is produced, which being expoſed to the air becomes black like animal oils. From this and other obſervations, the general opinion is, that coals, bitumens, and other oily ſubſtances found in the mineral kingdom, derive their origin from vegetables buried in the earth, ſince it is well known that only organized bodies have the power of producing oily and fat ſubſtances. "The amazing irregularities, gaps, and breaks (ſays M. Magellan) of the ſtrata of coals, and of other foſſil ſubſtances, evince that this globe has undergone the moſt violent convulſions, by which its parts have been broken, detached and overturned in different ways, burying large tracts of their upper ſurfaces, with all the animal and vegetable productions there exiſting, at the time of thoſe horrible cataſtrophes, whoſe epoch far precedes all human records. And it is eaſy to be conceived, that the various heaps and congeries of theſe vegetable and animal ſubſtances, remaining for ages and ages in the bowels of the earth, have obtained various conſiſtencies, and ſtill produce thoſe oily and bituminous juices, which find way to guſh out, leaving behind their thickeſt parts on the ſame places where they are found, and in many others where the induſtry of mankind never will be able to penetrate."

COAL-Mine. See COALERY. Malicioully ſetting fire to coal-mines is felony, by ſtat. 10 Geo. II. c. 32. § 6.

Coal, Coalery.

Small COAL, a ſort of charcoal prepared from the ſpray and bruſhwood, ſtripped off from the branches of coppice wood, ſometimes bound in bairns for that purpoſe, and ſometimes charred without binding, in which caſe it is called "coming together."

1 Hiſtory of coals.

COALERY, Coaliery, or Colliery; a coal-work, or place where Coals are dug.

It is generally agreed, that our cannel coal * is the lapis ampelites of the Romans, though it ſeems to have been uſed by them only for making toys, bracelets, &c. But of that common fuel which we denominate *coals*, the native Romans were entirely ignorant. It is certain that they are not, as ſome have imagined, the lapis obſidianus of Pliny, about which there have been great diſputes †: nor the Gagates or Jet, which others, again, have taken for the *lapis obſidianus:* though the lightneſs and texture ſhow plainly that it is not either ſtone or coal. In fact, there are no beds of it in the compaſs of Italy. The great line of that fuel ſeems to ſweep away round the globe, from north-eaſt to ſouth-weſt; not ranging at a diſtance even from the ſouth-eaſterly parts of our iſland, as is generally imagined, but actually viſiting Brabant and France, and yet avoiding Italy.

* See *Ampelites.*

† L. xxxvi. cap. 26. Auguſtus placed the ſtatues of four elephants made of it in the temple of Concord.

But the primæval Britons appear to have uſed it. And in the precincts of Mancheſter particularly, which are furniſhed with an inexhauſtible abundance of it, they could not have remained unappriſed of the agreeable combuſtible around them. The currents there frequently bring down fragments of coal from the mountains: and in the long and winding courſe of them through the pariſh, the Britons would ſoon mark the ſhining ſtones in the channels; and by the aid of accident, or the force of reflection, find out the utility of them. But we can advance ſtill nearer to a certainty. Several pieces of coal were diſcovered ſome years ago in the ſand under the Roman way to Ribcheſter, when both were dug up at the conſtruction of a houſe in Quay-ſtreet. The number of pieces, ſeveral of them as large as eggs, was not leſs than 40; and a quantity of ſlack was dug up with them. Theſe circumſtances ſhow the coals to have been lodged upon the ſpot before the road of the Romans covered it. That ground being in the neighbourhood of *Mancenion* ‡, the Britons had there repoſited a quantity of coals, probably for the uſe of the garriſon; and many of the ſmaller fragments, and ſome of the ſlack were buried in the ſand upon which they were laid. And that the Britons in general were acquainted with this fuel, is evident from its appellation amongſt us at preſent, which is not Saxon, but Britiſh; and ſubſiſts among the Iriſh in their *O gual*, and among the Corniſh in their *kolan*, to this day.

Whitaker's Hiſtory of Mancheſter.

‡ *i. e.* "the place of tents" An ancient Britiſh town, the ſite of which was the preſent Caſtlefield at Mancheſter.

The extenſive beds of fuel, therefore, with which the kingdom of England, and the precincts of Mancheſter, are ſo happily ſtored, were firſt noticed by the ſkill, and firſt opened by the labour of the Britons; and ſome time before the arrival of the Romans among us. And the nearer quarries in the confines of Bradford, Newton, and Mancheſter, would naturally attract the notice, and invite the inquiries of the Britons, before any others. The current of the Medlock, which waſhes the ſides of them, would bring down ſpecimens of the riches within, lodge many of them about the Caſtlefield, and allure the Britons ſucceſſively to a collection of the one, and a ſearch after the other.

Coalery.

But, even for ages after the diſcovery, wood continued to compoſe the general fuel of the nation. In 852, a grant was made of ſome lands by the abbey of Peterborough, under the reſervation of certain boons and payments in kind to the monaſtery; as, one night's entertainment; 10 veſſels of Welſh, and two of common ale; 60 cart-loads of wood, and 12 of pit-coal; where we ſee the quantity of coal was only one cart-load to five of wood. The latter naturally continued the principal article of our fuel as long as the foreſts and thickets preſented themſelves ſo ready to the hand; and ſuch it continued to a very late period. The firſt public notice of the former is mentioned by Mr Hume to have been in the time of Henry III. who, in the year 1272, granted a charter to the town of Newcaſtle, giving the inhabitants a licenſe to dig coals; and the firſt ſtatute relating to this article was the 9th Henry V. c. 10. ordaining all keels in the port of Newcaſtle to be meaſured by commiſſioners, before carriage of coals, on pain of forfeiture. They were not brought into common uſe till the reign of Charles I.; and were then ſold for about 17s. a chaldron. In ſome years after the reſtoration, there were about 200,000 chaldrons burnt in London; in 1670, about 270,000 chaldrons; at the revolution upwards of 300,000 chaldrons; and at preſent, full 600,000 are annually conſumed there. There is, beſides, an immenſe conſumption in other parts of Britain, and in Ireland. In Scotland, they ſupply their own conſumption, and alſo export. In Ireland, though they have coal, yet they take annually to the value of 30,000l. from England, and 12,000l. from Scotland.

Campbell's Political Survey.

The moſt remarkable coalery, or coal-work, that we have ever had in this iſland, was that wrought at Borrowſtounneſs, under the ſea. The veins of coal were found to continue under the bed of the ſea in this place, and the colliers had the courage to work the vein near half way over; there being a mote half a mile from the ſhore, where there was an entry that went down into the coal-pit, under the ſea. This was made into a kind of round quay or mote, as they call it, built ſo as to keep out the ſea, which flowed there twelve feet. Here the coals were laid, and a ſhip of that draught of water could lay her ſide to the mote, and take in the coal.—This famous coalery belonged to the earl of Kincardine's family. The freſh water which ſprung from the bottom and ſides of the coal-pit was always drawn out upon the ſhore by an engine moved by water, that drew it forty fathoms. This coal-pit continued to be wrought many years to the great profit of the owners, and the wonder of all that ſaw it; but, at laſt, an unexpected high tide drowned the whole at once: the labourers had not time to eſcape, but periſhed in it.

There are ſeveral other countries in Europe which poſſeſs conſiderable coal-mines; as France, Liege, Germany, and Sweden. Alſo on the other ſide of the Atlantic ocean, there has been coal diſcovered, and wrought: in Newfoundland, Cape-Breton, Canada, and ſome of the New England provinces. But in all theſe countries, the coal is of a quality much inferior to the Britiſh, and entirely unfit to be uſed in many manufactures;

2 Excellence of the Britiſh.

Coalery.

manufactures; so that they import coal from Britain for various manufactures. For a fuller account of the coal in different countries of the world, see *Williams's Mineral Kingdom*, 2d edition, by James Millar, M. D. Edinburgh, 1810.

3
Importance of the coal-trade.

Our inland coal-trade, that is, carrying coals from Newcastle, Sunderland, Blith, and other adjacent places in the north of England, as also from the frith of Edinburgh in Scotland, and other places adjacent, to the city of London, and to the port towns on the coast all the way, as well on this side of Newcastle, north, as up the channel as high as Portsmouth west, is a prodigious article, and employs abundance of shipping and seamen; insomuch that, in a time of urgent necessity, the coalery navigation alone has been able to supply the government with a body of seamen for the royal navy, able to man a considerable fleet at a very short warning, and that without difficulty, when no other branch of trade could do the like. Likewise the Whitehaven coaleries in Cumberland, belonging to Lord Lonsdale, furnish several counties in Ireland with coals, and constantly employ upwards of 2000 seamen; which also is a noble nursery for the navy of this kingdom. And not only do the pit-coal sufficiently supply all the ports, but, by means of those ports and the navigable rivers, all the adjacent counties very far inland.

In short, coals, though not an exclusive, yet may, with propriety, be styled a peculiar blessing to Britain, from their greaty plenty, their acknowledged excellence, and their being found in such places as are conveniently situated for exportation. Nor is there any danger of the export trade being lessened even by the several duties that have been laid upon them; for the foreign consumpt being founded in necessity with regard to manufactures, and in economy where they are used for convenience (wood and turf being dearer than coals with the duty), we need be in no fear of the markets declining. There is as little room to be alarmed from an apprehension of their being exhausted; as the present works are capable of supplying us for a long series of years, and there are many other mines ready to be opened when these shall fail. Besides, there are known to be coals in many parts of the three kingdoms, which hitherto they have had no encouragement to work.

Besides the value of this commodity as a conveniency of life, as an article of commerce, and as giving rise to a nursery of seamen for the increase of the marine; other important advantages deserve to be noticed. Coals are in many respects, and in a very high degree useful to the landed interest; not only by raising exceedingly the real value, and of course the purchase, of those lands in which they are found, and those through which it is necessary to pass * from the works to the places where they are embarked, but from the general improvements they have occasioned; so that very few counties are now better cultivated than Northumberland, and the same effects they have had in a greater or less degree in other places. Thousands of laborious people are employed in and about the mines; thousands more in conveying them to the ports, and on board the ships; to say nothing of those that draw their subsistence from the carriage of them by land to supply families, &c. There are also great numbers that live in a superior station; as stewards, directors, factors, agents, book-keepers, &c. To these we may add the extraordinary encouragement given to ingenious artists who have invented, and the numerous workmen continually employed about those several curious and costly machines which, for a variety of purposes in this business, are in continual use, and of course in continual wear; we may join to these the multitudes that obtain their living from the many manufactures in which they are employed, and which could not be carried on but by the help and cheapness of coals. Lastly, the produce of coals exported, which amounts to a very considerable sum, besides being profitable to the owners, merchants, and mariners, is so much clear gain to the nation.

* These are emphatically styled *way-leaves*, and are let at as high rents as any landed property in Britain.

It might be expected, that a trade so beneficial to individuals, and to the nation in general, and which has been gradually increasing for several centuries past, would have been advanced by this time to very great perfection, and reduced to a regular system. But, in one very essential respect, it is found to be quite otherwise. The art of working coal-mines in the most profitable manner is indeed highly improved; but the fundamental of the art, that of searching for and discovering coal in any district of country where it has not yet been found, has never, that we know of, been treated in a systematic manner. The reader, therefore, will not be displeased to find this defect supplied in the course of the present article, together with a detail of all the other operations in the business of coaleries.

4
Situation of the strata.

The terrestrial matters which compose the solid parts of the earth are disposed in strata, beds, or layers, the under surface of one bearing against or lying upon the upper surface of that below it, which last bears or lies on the next below in the same manner.

These strata consist of very different kinds of matter, such as free-stone, lime-stone, metal-stone or whinstone, coal, &c. as will be particularly specified in the sequel.

Some of these strata are of considerable thickness, being often found from 100 to 200 feet or upwards, nearly of the same kind of matter from the superior to the inferior surface; and others are found of the least thickness imaginable, one inch or less.

All these strata are divided or parted from each other laterally, either by their even, smooth, polished surfaces, with very thin lamina of soft or dusty matter betwixt them, called *the parting*, which renders them easy to separate; or else only by the surfaces closely conjoined to each other, without any visible matter interposed betwixt them: yet the different substance of each stratum is not in the least intermixed, though sometimes they adhere so strongly together, that it is very difficult to part or disjoin them: in this last case they are said to have a *bad parting*.

Besides this principal division or parting laterally, there are, in some strata, secondary divisions or partings also laterally, separating or approaching towards a separation, of the same stratum, into parts of different thicknesses, nearly parallel to each other, in the same manner as the principal partings divide the different strata from each other: but these secondary ones are not so strong or visible, nor make so effectual a parting, as the principal ones do; and are only met with

with in ſuch ſtrata, as are not of an uniform hardneſs, texture, or colour, from the upper to the under ſurface.

There are other diviſions or partings, called *backs*, in almoſt every ſtratum, which croſs the former lateral ones longitudinally, and cut the whole ſtratum through its two ſurfaces into long rhomboidal figures. Theſe again are croſſed by others called *cutters*, running either in an oblique or perpendicular direction to the laſt-mentioned backs, and alſo cut the ſtratum through its two ſurfaces. Both theſe backs and cutters generally extend from the upper or ſuperior ſtratum down through ſeveral of the lower ones; ſo that theſe backs and cutters, together with the lateral partings before mentioned, divide every ſtratum into innumerable cubic, priſmatic, and rhomboidal figures, according to the thickneſs of the ſtratum, and the poſition and number of the backs and cutters. They ſometimes have a kind of thin partition of duſty or ſoft matter in them, and ſometimes none, like the firſt-mentioned partings; but the ſofter kind of ſtrata generally have more backs and cutters than the harder kind, and they do not extend or penetrate through the others.

Plate CXLIX. fig. 1.

To explain this a little farther, let A, B, C, D, E, F, G, (fig. 1.) repreſent the principal partings before mentioned, or the upper and under ſurfaces of any ſtratum; then *a*, *b*, *c*, *d*, *e*, *f*, will repreſent the ſecondary lateral partings nearly parallel to the principal ones; *g*, *h*, *i*, *k*, *l*, *m*, the longitudinal partings called *backs*; *n*, *o*, *p*, *q*, *r*, *s*, the croſs partings called *cutters*, croſſing the laſt-mentioned ones either obliquely or perpendicular.

In all places where the ſtrata lie regular, they are divided and ſubdivided in the manner above mentioned; and ſometimes in this manner extend through a pretty large diſtrict of country; though it is often otherwiſe; for their regularity is frequently interrupted, and the ſtrata broken and diſordered, by ſundry chaſms, breaches, or fiſſures, which are differently denominated according to their various dimenſions, and the matters with which they are filled, viz. dikes, hitches, and troubles, which ſhall be explained in order.

5 Dikes.

Dikes are the largeſt kind of fiſſures. They ſeem to be nothing but a crack or breach of the ſolid ſtrata, occaſioned by one part of them being broken away and fallen from the other. They generally run in a ſtraight line for a conſiderable length, and penetrate from the ſurface to the greateſt depth ever yet tried, in a direction ſometimes perpendicular to the horizon, and ſometimes obliquely. The ſame kind of ſtrata are found lying upon each other in the ſame order, but the whole of them greatly elevated or depreſſed, on the one ſide of the dike as on the other. Theſe fiſſures are ſometimes two or three feet wide, and ſometimes many fathoms. If the fiſſure or dike be of any conſiderable width, it is generally filled with heterogeneous matter, different from that of the ſolid ſtrata on each ſide of it. It is ſometimes found filled with clay, gravel, or ſand; ſometimes with a confuſed maſs of different kinds of ſtone lying edgeways; and at other times with a ſolid body of free-ſtone, or even whin-ſtone. When the fiſſure is of no great width, as ſuppoſe two or three feet only, it is then uſually found filled with a confuſed mixture of the different matters which compoſe the adjoining ſtrata, conſolidated into one maſs. If the dike runs or ſtretches north and ſouth, and the ſame kind of ſtrata are found on the eaſt ſide of the dike, in a ſituation with reſpect to the horizon 10 or 20 fathoms lower than on the other ſide, it is then ſaid to be a *dip-dike*, or *downcaſt dike* of 10 or 20 fathoms to the eaſtward; or counting from the eaſt ſide, it is then ſaid to be a *riſe-dike*, or *upcaſt* of ſo many fathoms weſtward. If the ſtrata on one ſide are not much higher or lower with reſpect to the horizontal line, than thoſe on the other, but only broken off and removed to a certain diſtance, it is then ſaid to be a dike of ſo many fathoms thick, and from the matter contained between the two ſides of the fiſſure or dike, it is denominated a *clay-dike*, *ſtone-dike*, &c.

6 Hitches.

A *hitch* is only a dike or fiſſure of a ſmaller degree, by which the ſtrata on one ſide are not elevated or ſeparated from thoſe on the other ſide above one fathom. Theſe hitches are denominated in the ſame manner as dikes, according to the number of feet they elevate or depreſs the ſtrata.

There are dikes (though they are not often met with in the coal-countries) whoſe cavities are filled with ſparr, the ores of iron, lead, vitriol, or other metallic or mineral matters; and it is pretty well known, that all metallic veins are nothing elſe than what in the coal countries are called *dikes*.

The ſtrata are generally found lying upon each other in the ſame order on one ſide of the dike as on the other, as mentioned above, and nearly of the ſame thickneſſes, appearing to have been originally a continuation of the ſame regular ſtrata, and the dike only a breach by ſome later accident, perpendicularly or obliquely down through them, by which one part is removed to a ſmall diſtance, and depreſſed to a lower ſituation than the other. But this is not the only alteration made in the ſtrata by dikes; for generally, to a conſiderable diſtance on each ſide of the dike, all the ſtrata are in a kind of ſhattered condition, very tender, eaſily pervious to water, and debaſed greatly in their quality, and their inclination to the horizon often altered.

7 Troubles.

Troubles may be denominated dikes of the ſmalleſt degree; for they are not a real breach, but only a tendency towards it, which has not taken a full effect. The ſtrata are generally altered by a trouble from their regular ſite to a different poſition. When the regular courſe of the ſtrata is nearly level, a trouble will cauſe a ſudden and conſiderable aſcent or deſcent; where they have, in their regular ſituation, a certain degree of aſcent or deſcent, a trouble either increaſes or alters it to a contrary poſition: and a trouble has theſe effects upon the ſtrata in common with dikes, that it greatly debaſes them from their original quality; the partings are ſeparated; the backs and cutters disjoined, and their regularity diſordered; the original cubic and priſmatic figures, of which the ſtrata were compoſed, are broken, the diſlocation filled with heterogeneous matter, and the whole ſtrata are reduced to a ſofter and more friable ſtate.

The ſtrata are ſeldom or never found to lie in a true horizontal ſituation; but generally have an inclination or deſcent, called the *dip*, to ſome particular part of the horizon. If this inclination be to the eaſtward,

Coalery.

8
Dip and rise of the strata.

ward, it is called an *eaſt dip*, and a *weſt riſe*; and according to the point of the compaſs to which the dip inclines, it is denominated, and the aſcent or riſe is to the contrary point. This inclination or dip of the ſtrata is found to hold everywhere. In ſome places, it varies very little from the level; in others, very conſiderably; and in ſome ſo much, as to be nearly in a perpendicular direction: but whatever degree of inclination the ſtrata have to the horizon, if not interrupted by dikes, hitches, or troubles, they are always found to lie in the firſt regular manner mentioned. They generally continue upon one uniform dip until they are broken or diſordered by a dike, hitch, or trouble, by which the dip is often altered, ſometimes to a different part of the horizon, and often to an oppoſite point; ſo that on one ſide of a dike, hitch, or trouble, if the ſtrata have an eaſt dip, on the other ſide they may have an eaſt riſe, which is a weſt dip; and in general, any conſiderable alteration in the dip is never met with, but what is occaſioned by the circumſtances laſt mentioned.

Plate CXLIX. fig. 2.

To illuſtrate what has been ſaid, ſee fig. 2. where *a*, *b*, *c*, *d*, &c. repreſent a courſe of ſtrata lying upon each other, having a certain inclination to the horizon. AB, is a downcaſt-dike, which depreſſes the ſtrata obliquely to *e*, *f*, *g*, *h*, &c. lying upon each other in the ſame order, but altered in their inclination to the horizon. CD repreſents a clay or freeſtone dike, where the ſtrata are neither elevated nor depreſſed, but only broken off and removed to a certain diſtance. EF repreſents a hitch, which breaks off and depreſſes the ſtrata only a little, but alters their inclination to the horizon. GH repreſents a trouble, where the ſtrata on one ſide are not entirely broken off from thoſe on the other, but only in a cruſhed and irregular ſituation.

As ſome particular ſtrata are found at ſome times to increaſe, and at other times to diminiſh, in their thickneſſes, whilſt others remain the ſame, conſequently they cannot be all parallel; yet this increaſe and diminution in their thickneſſes come on very gradually.

The ſtrata are not found diſpoſed in the earth according to their ſpecific gravities; for we often find ſtrata of very denſe matter near the ſurface, and perhaps at 50 or even 100 fathoms beneath, we meet with ſtrata of not half the ſpecific gravity of the firſt. A ſtratum of iron ore is very often found above one of coal, though the former has twice the gravity of the latter; and, in ſhort, there is ſuch an abſolute uncertainty in forming any judgment of the diſpoſition of the ſtrata from their ſpecific gravities, that it cannot in the leaſt be relied upon.

It has been imagined by many, that hills and valleys are occaſioned by thoſe breaches in the ſtrata before mentioned called *dikes;* but this is contradicted by experience. If it was ſo, we ſhould meet with dikes at the ſkirts of the hills, and by the ſides of valleys, and the ſea-ſhore; but inſtead of that we generally find the ſtrata lying as uniformly regular under hills and valleys, and beneath the bottom of the ſea (as far as has been yet tried), as in the moſt champaign countries. It may happen, indeed, that a dike is met with in ſome of theſe places; but that being only a caſual circumſtance, can never be admitted as a general cauſe. Whatever irregularities are occaſioned in the ſolid ſtrata by dikes, or other branches, are commonly covered over and evened by thoſe beds of gravel, clay, ſand, or ſoil, which lie uppermoſt, and form the outward ſurface of the earth. Wherever theſe ſofter matters have been carried off, or removed by accident, as on the tops of hills and the ſides of valleys, there the ſolid ſtrata are expoſed, and the dip, riſe, and other circumſtances of them may be examined; but no certain concluſions can be drawn, merely from the unevenneſs and inequalities of the outward ſurface.

The preceding obſervations, upon the general diſpoſition of the ſolid ſtrata, are equally applicable to the ſtrata of coal as to thoſe of ſtone or other matter.

9
Deſcription of the ſtrata connected with coal.

We ſhall next give an account of the ſeveral ſtrata of coal, and of ſtone, and other matters, which are uſually connected with coal, and are found to have a particular affinity with it; and, for the ſake of diſtinction, ſhall arrange them into ſix principal claſſes, which will include all the varieties of ſtrata that have been found to occur in all thoſe diſtricts of country, both in Scotland and England, where coal abounds.

1. *Of Whin-ſtone.*] The ſtrata of what is denominated whin-ſtone are the hardeſt of all others; the angular pieces of it will cut glaſs; it is of a very coarſe texture, and when broken acroſs the grain, exhibits the appearance of large grains of ſand half vitrified; it can ſcarcely be wrought, or broken in pieces, by common tools, without the aſſiſtance of gunpowder; each ſtratum is commonly homogeneous in ſubſtance and colour, and cracked in the rock to a great depth. The moſt common colours of theſe ſtrata are black or dark blue, yet there are others of it aſh-coloured and light brown. Their thickneſs in all the coal countries is but inconſiderable, from ſix or five feet down to a few inches; and it is only in a few places they are met with of theſe thickneſſes. In the air it decays a little, leaving a brown powder; and in the fire it cracks, and turns reddiſh brown. Limeſtone, and what is called *baſtard limeſtone*, is ſometimes, though rarely, met with in coaleries. It is a well known ſtone; but from its reſemblance in hardneſs and colour is often miſtaken for a kind of whin. Sometimes, particularly in hilly countries, the ſolid matter next the ſurface is found to be a kind of ſoft or rotten whin;—but it may be noted, that this is only a maſs of heterogeneous matter diſpoſed upon the regular ſtrata; and that beneath this, all the ſtrata are generally found in as regular an order as where this heterogeneous matter does not occur.

2. *Of Poſt-ſtone.*] This is a freeſtone of the hardeſt kind, and next to the limeſtone with reſpect to hardneſs and ſolidity. It is of a very fine texture; and when broken appears as if compoſed of the fineſt ſand. It is commonly found in a homogeneous maſs, though variegated in colour; and, from its hardneſs, is not liable to injury from being expoſed to the weather. Of this kind of ſtone there are four varieties, which may be diſtinguiſhed by their colour. The moſt common is white poſt, which in appearance is like Portland ſtone, but conſiderably harder; it is ſometimes variegated with ſtreaks or ſpots of brown, red, or black.

Gray poſt is alſo very common; it appears like a mixture of fine black and white ſand: it is often variegated with brown and black ſtreaks; the laſt mentioned

tioned appear like ſmall clouds compoſed of particles of coal.

Brown or yellow poſt is often met with of different degrees of colour; moſt commonly of the colour of light ochre or yellow ſand. It is as hard as the reſt, and ſometimes variegated with white and black ſtreaks.

Red poſt is generally of a dull red colour: this is but rarely met with; it is often ſtreaked with white or black.

All theſe lie in ſtrata of different thickneſſes; but commonly thicker than any other ſtrata whatever: they are ſeparated from each other, and from other kinds of ſtrata, by partings of coal, ſand, or ſoft matter of different colours which are very diſtinguiſhable.

3. *Of Sand-ſtone.*] This is a freeſtone of a coarſer texture than poſt, and not ſo hard; is ſo lax as to be eaſily pervious to water; when broken, is apparently of a coarſe ſandy ſubſtance; is friable and moulders to ſand when expoſed to the wind and rain; has frequently white ſhining ſpangles in it, and pebbles or other ſmall ſtones incloſed in its maſs. Of this, there are two kinds commonly met with, diſtinguiſhed by their colours, gray and brown, which are of different ſhades, lighter or darker in proportion to the mixture of white in them. It is moſt generally found in ſtrata of conſiderable thickneſs, without many ſecondary partings; and ſometimes, though rarely, it is ſubdivided into layers as thin as the common gray ſlate. It has generally ſandy or ſoft partings.

4. *Of Metal-ſtone.*] This is a tolerably hard ſtratum, being in point of hardneſs next to ſand-ſtone; generally ſolid, compact, of conſiderable weight and of an argillaceous ſubſtance, containing many nodules or balls of iron ore, and yellow or white pyrites; its partings, or the ſurfaces of its ſtrata, are hard, poliſhed, and ſmooth as glaſs. When broken, it has a dull duſky appearance (though of a fine texture), like hard dried clay mixed with particles of coal. Though hard in the mine or quarry, when expoſed to the freſh air it falls into very ſmall pieces. The moſt uſual colour of this ſtone is black; but there are ſeveral other lighter colours, down to a light brown or gray. It is eaſily diſtinguiſhed from freeſtone by its texture and colour, as well as by its other characteriſtics. It lies in ſtrata of various thickneſſes, though ſeldom ſo thick as the two laſt-mentioned kinds of ſtone.

5. *Of Shiver.*] This ſtratum is more frequently met with in coaleries than any other. There are many varieties of it, both in hardneſs and colour; but they all agree in one general characteriſtic. The black colour is moſt common; it is called by the miners *black ſhiver*, *black metal*, or *bleas*. It is ſofter than metal-ſtone, and in the mine is rather a tough than a hard ſubſtance, is not of a ſolid or compact matter, being eaſily ſeparable by the multitude of its partings, &c. into very ſmall parts, and readily abſorbing water. The ſubſtance of this ſtratum is an indurated bole, commonly divided into thin laminæ of unequal thickneſſes, which break into long ſmall pieces when ſtruck with force; and, on examination, they appear to be ſmall irregular rhomboids: each of theſe ſmall pieces has a poliſhed glaſſy ſurface; and, when broken croſs the grain, appears of a dry, leafy, or laminated texture, like exceeding fine clay: it is very friable; feels to the touch like an unctuous ſubſtance; and diſſolves in air or water to a fine pinguid black clay. There are almoſt conſtantly found incloſed in its ſtrata lumps or nodules of iron ore, often real beds of the ſame.

There are other colours of this ſtratum beſides black. The brown or dun ſhiver is very frequently met with; it agrees with the above deſcription in every thing but colour. Gray ſhiver is alſo very common: it ſeems to be only a mixture of the black and dun; and by the different degrees of mixture of theſe colours others are produced. It lies in ſtrata ſometimes of conſiderable thickneſs, at other times not exceeding a few feet: they are commonly parted from each other by laminæ of ſpar, coal, or ſoft matter.

6. *Of Coal.*] Referring the reader, for the ſcientific diviſion of coals, to MINERALOGY, and the preceding articles, we ſhall here conſider them as diſtinguiſhable into three kinds, according to their degrees of inflammability. For a full view of the natural hiſtory of coal, ſee *Williams's Mineral Kingdom* by Dr Millar.

1. The leaſt inflammable kinds are thoſe known by the name of *Welſh coal*, which is found in Wales; Kilkenny coal, which is found near Kilkenny in Ireland; and *blind* or *deaf coal*, which is found in many parts of Scotland and England. This coal takes a conſiderable degree of heat to kindle it, but when once thoroughly ignited will burn a long time; it remains in the fire in ſeparate pieces without ſticking together or caking; it produces neither flame nor ſmoke, and makes no cinders, but burns to a white ſtony ſlag: it makes a hot glowing fire like charcoal or cinders, and emits effluvia of a ſuffocating nature, which renders it unfit for burning in dwelling-houſes, its chief uſe being among maltſters, dyers, &c. for drying their commodities. 2. *Open burning coal*, ſoon kindles, making a hot pleaſant fire, but is ſoon conſumed: it produces both ſmoke and flame in abundance; but lies open in the fire, and does not cake together ſo as to form cinders, its ſurface being burnt to aſhes before it is thoroughly calcined in the midſt; from this it has its name of an *open burning coal;* it burns to white or brown aſhes very light. Of this kind are cannel-coal, jett, parrot, ſplint, and moſt of the coals in Scotland. 3. *Cloſe burning coal*, kindles very quickly, makes a very hot fire, melts and runs together like bitumen, the very ſmalleſt culm making the fineſt cinders, which being thoroughly burnt, are porous and light as a pumice ſtone, and when broken are of a ſhining lead colour; it makes a more durable fire than any other coal, and finally burns to brown or reddiſh coloured heavy aſhes. Of this kind are the Newcaſtle and ſeveral other of the Engliſh coals, and the ſmithy coals of Scotland. The open and the cloſe burning coal mixed together, make a more profitable fire for domeſtic uſes than either of them ſeparate.

In all thoſe diſtricts of country where coal is found, there are generally ſeveral ſtrata of it; perhaps all the different kinds above mentioned will be found in ſome, and only one of the kinds in others; yet this one kind may be divided into many different ſeams or ſtrata, by beds of ſhiver or other kinds of matter interpoſing, ſo as to give it the appearance of ſo many ſeparate ſtrata.

All

Coalery.

10
The order in which they lie.

All theſe ſtrata above deſcribed, with their ſeveral varieties, do not lie or bear upon each other in the order in which they are deſcribed, nor in any certain or invariable order. Though there be found the ſame kinds of ſtrata in one coalery or diſtrict as in another, yet they may be of very different thickneſſes. In ſome places there are moſt of the hard kinds, in others moſt of the ſofter; and in any one diſtrict it rarely happens that all the various kinds are found; for ſome kinds, perhaps, occur only once or twice, whilſt others occur 10 or 20 times before we reach the principal ſtratum of coal.

Plate CXLIX. fig. 3.

In order to explain this, ſuppoſe the ſtrata in the pit at A (fig. 3.) lie in the order *a*, *b*, *c*, *d*, &c. they may be ſo much altered in their thickneſſes, by reaſon of ſome of them increaſing and others diminiſhing, at the diſtance of B, that they may be found there of very different thickneſſes; or if they are examined in a pit at D, by reaſon of its lower ſituation, and the ſtrata there not being a continuation of thoſe in the other places, they may be very different both in their order and thickneſſes, and yet of the ſame kinds.

Though they be thus found very different in one coalery or diſtrict from what they are found to be in another, with reſpect to their thickneſſes, and the order in which they lie upon each other, yet we never meet with a ſtratum of any kind of matter but what belongs to ſome of thoſe above deſcribed.

To illuſtrate how the various ſtrata lie in ſome places, and how often the ſame ſtratum may occur betwixt the ſurface and the coal, we ſhall give the following example. The numbers in the left-hand column refer to the claſſes of ſtrata before deſcribed, to which each belongs. The ſecond column contains the names of the ſtrata; and the four numeral columns, to the right hand, expreſs the thickneſs of each ſtratum, in fathoms, yards, feet, and inches.

Example.

N°		Fas	Yds	Ft.	Ins.
	Soil and gravel - -	0	1	1	0
	Clay mixed with looſe ſtones	1	1	0	0
3	Coarſe brown ſand-ſtone, with ſoft partings - - - -	3	0	2	6
2	White poſt, with ſhivery partings	1	1	0	5
5	Black ſhiver or bleas, with iron-ſtone balls	2	0	2	0
6	Coarſe ſplinty coal - -	0	0	2	6
5	Soft gray ſhiver - - -	0	1	0	7
2	Brown and gray poſt, ſtreaked with black	1	0	2	0
5	Black ſhiver, with beds and balls of iron-ſtone - - -	0	1	2	6
4	Gray and black metal-ſtone -	0	1	1	9
2	White and brown poſt - -	1	1	0	0
5	Black and gray ſhiver, ſtreaked with white	0	1	0	6
3	Soft gray ſand-ſtone, with ſhivery partings	0	1	1	0
2	Yellow and white poſt, with ſandy partings	1	0	2	0
5	Black and dun ſhiver, with iron-ſtone balls	0	1	2	6
2	White poſt ſtreaked with black, and black partings - - -	1	0	0	6
5	Gray ſhiver, with iron-ſtone balls	0	1	0	9
4	Brown and black metal-ſtone -	1	1	2	6
5	Hard ſlaty black ſhiver - -	1	1	0	0
6	Coal, hard and fine ſplint -	0	0	3	6
5	Soft black ſhiver - -	0	0	0	3
6	Coal, fine and clear - -	0	0	3	3
5	Hard black ſhiver - -	0	0	1	0
	Total Fathoms	25	0	0	0

In this inſtance the ſpecies of ſand-ſtone only occurs twice, poſt five times, whilſt the ſhiver occurs no leſs than nine times.

To apply the forgoing obſervations to practice.

Suppoſe it was required to examine whether there was coal in a piece of ground adjoining to, or in the neighbourhood of, other coaleries.

11
Methods of ſearching for coal.

In the firſt place, it is proper to be informed, at ſome of the adjacent coaleries, of the number and kinds of ſtrata, the order in which they lie upon each other; to what point of the horizon, and in what quantity, they dip; if any dikes, hitches, or troubles, and the courſe they ſtretch. Having learnt theſe circumſtances, ſearch in the ground under examination where the ſtrata are expoſed to view, and compare theſe with the other. If they be of the ſame kinds, and nearly correſpond in order and thickneſs, and be lying in a regular manner, and agree by computation with the dip and riſe, it may ſafely be concluded the coal is there; and the depth of it may be judged from the depth of the coal in the other coalery, below any particular ſtratum which is viſible in this.

Rule 1ſt.

If the ſolid ſtrata are not expoſed to view, neither in the hills nor valleys of the ground under examination, then ſearch in the adjoining grounds, and if the ſame kind of ſtrata are found there as in the adjacent coalery, and there is reaſon, from the dip and other circumſtances, to believe that they ſtretched through the ground to be examined; it may then be concluded the coal is there, as well as theſe other ſtrata.

Rule 2d.

Plate CXLIX. fig. 3.

Suppoſe a coalery is on the ſide of a hill at A, fig. 3. and you would ſearch for a coal at B, on the other ſide of the hill, but in a much lower ſituation; by obſerving the ſeveral ſtrata lying above the coal at A, and the point to which they dip, which is directly towards B (if clear of dikes), you may expect to find the ſame kind of ſtrata on the other ſide of the hill, but much lower down. Accordingly, if ſome of the ſtrata are viſible in the face of the precipice C, they may be compared with ſome of thoſe in the pit at A. Or, if they are not to be ſeen there, by ſearching in the oppoſite hill, they may perhaps be diſcovered at the place F; where, if they be found in the manner before mentioned, and there be reaſon to believe they extend regularly from the firſt place to this, it is more than probable the coal, as well as theſe ſtrata, will be found in the intermediate ground.

Rule 3d.

If the ground to be examined lie more to the riſe of the coal, as at E, which being ſuppoſed to be on a flat, perhaps the ſolid ſtrata there may be wholly covered by the gravel, clay, &c. of the outward ſurface lying upon them. In this caſe, by meaſuring the horizontal diſtance and the deſcent of ground from A to E, and computing the quantity of aſcent or riſe of the coal in that diſtance; by comparing theſe together, it may be judged at what depth the coal will be found there, allowing that it lie regular. Thus, ſuppoſe the coal at A 80 yards deep, the diſtance from A to E 500 yards, and that the coal riſes one yard in 10 of horizontal diſtance:

Then, from the depth of the pit	80
Deduct the deſcent of ground from A to E, ſuppoſe - - -	24

This

Coalery.

This remainder would be the depth, if the coal was level - - - - - 56
But as the coal rifes 1 in 10 yards, then deduct what it rifes in 500 yards, which is - - - - - - - - 50

And the remainder is the depth of that coal at E - - - - - - - - 6 yards.

Rule 4th.

Or fuppofe that the place at B is 500 yards the contrary way, or to the full dip of the coal at A; if a view of the folid ftrata cannot be obtained, then by proceeding in the fame manner as before, the depth of the coal at that place may be computed. Thus,

To the depth of the coal at the pit A 80
Add the defcent or inclination of the coal in 500 yards, which, as before, is - - - - - - - - - - - 50

This fum would be the depth, if the ground was level - - - - - 130
But as the ground defcends towards B, deduct the quantity of that, which fuppofe - - - - - - - - - 80

Remains the depth of the coal at B - 50 yards.

If the place to be examined be neither to the full dip nor full rife, but in fome proportion towards either, the fame method may be purfued, computing how much the coal rifes or dips in a certain diftance in that direction.

If there is known to be a dike in the workings of the pit at A, which elevates or depreffes the ftrata towards the place under examination, then the quantity of the elevation or depreffion muft be accordingly added to or deducted from the computed depth of the coal at that place. Suppofe there is an upcaft dike of 10 fathoms or 20 yards towards B, then deduct 20 from 50, the depth before computed, there will remain 30 yards or 15 fathoms for the depth of the coal at B.

But it often happens that coal is to be fearched for in a part of the country, at fuch a confiderable diftance from all other coaleries, that by reafon of the intervention of hills, valleys, unknown dikes, &c. the connexion or relation of the ftrata with thofe of any other coalery cannot be traced by the methods laft mentioned; in which cafe a more extenfive view muft be taken of all circumftances than was neceffary in the former; and a few general rules founded on the foregoing obfervations, and on conclufions drawn from them, will greatly affift in determining, fometimes with a great degree of probability, and fometimes with abfolute certainty, whether coal be in any particular diftrict of country or not.

Rule 5th.

The firft proper ftep to be taken in fuch a cafe, is to take a general view of that diftrict of country intended to be fearched, in order to judge, from the outward appearance or face of the country, which particular part out of the whole is the moft likely to contain thofe kind of ftrata favourable to the production of coal; and confequently fuch particular part being found, is the moft adviseable to be begun with in the examination.

Coalery.

Though the appearance of the outward furface gives no certain or infallible rule to judge of the kinds of ftrata lying beneath, yet it gives a probable one; for it is generally found, that a chain of mountains or hills rifing to a great height, and very fteep on the fides, are commonly compofed of ftrata much harder and of different kinds from thofe before defcribed wherein coal is found to lie, and therefore unfavourable to the production of coal; and thefe mountainous fituations are alfo more fubject to dikes and troubles than the lower grounds; fo that if the folid ftrata compofing them gave even favourable fymptoms of coal, yet the laft circumftance would render the quality bad, and the quantity precarious. And, on the whole, it may be obferved, that mountainous fituations are found more favourable to the production of metals than of coal.

12
Mountainous fituations.

It is likewife generally found that thofe diftricts abounding with valleys, moderately rifing hills, and interfperfed with plains, fometimes of confiderable extent, do more commonly contain coal, and thofe kinds of ftrata favourable to its production, than either the mountainous or champaign countries; and a country fo fituated as this laft defcribed, efpecially if at fome confiderable diftance from the mountains, ought to be the firft part appointed for particular examination.

13
Hills and valleys.

Plains, or level grounds of great extent, generally fituated by the fides of rivers, or betwixt fuch moderate rifing grounds as laft defcribed, are alfo very favourable to the production of coal, if the folid ftrata, and other circumftances in the higher grounds adjoining, be conformable; for it will fcarcely be found, in fuch a fituation, that the ftrata are favourable in the rifing grounds, on both fides of the plain, and not fo in the fpace betwixt them. Though plains be fo favourable, in fuch circumftances, to the production of coal, yet it is often more difficult to be difcovered in fuch a fituation, than in that before defcribed; becaufe the clay, foil, and other lax matter, brought off the higher grounds by rains and other accidents, have generally covered the furfaces of fuch plains to a confiderable depth, which prevents the exploration of the folid ftrata there, unlefs they be expofed to view by digging, quarrying, or fome fuch operation.

14
Plains.

That part of the diftrict being fixed upon which abounds with moderate hills and valleys as propereft to begin the examination at, the firft ftep to be taken is to examine all places where the folid ftrata are expofed to view (which are called the *crops* of the ftrata), as in precipices, hollows, &c. tracing them as accurately and gradually as the circumftances will allow, from the uppermoft ftratum or higheft part of the ground to the very undermoft: and if they appear to be of the kinds before defcribed, it will be proper to note in a memorandum book their different thickneffes; the order in which they lie upon each other; the point of the horizon to which they dip or incline, the quantity of that inclination, and whether they lie in a regular ftate. This fhould be done in every part of the ground where they can be feen, obferving at the fame time, that if a ftratum can be found in one place, which has a connexion with fome other in a fecond place, and if this other has a connexion with another in a third place, &c.; then, from thefe feparate connexions, the joint correfpondence of the whole may be

be traced, and the ftrata, which in fome places are covered, may be known by their correfpondence with thofe which are expofed to view.

If by this means the crops of all the ftrata cannot be feen (which is often the cafe), and if no coal be difcovered by its crop appearing at the furface: yet if the ftrata that have been viewed confift of thofe kinds before defcribed, and are found lying in a regular order, it is fufficiently probable that coal may be in that part of the diftrict, although it be concealed from fight by the furface of the earth or other matter.

Rule 6th. Therefore, at the fame time that the crops of the ftrata are under examination, it will be proper to take notice of all fuch fprings of water as feem to be of a mineral nature, particularly thofe known by the name of iron water, which bear a mud or fediment of the colour of ruft or iron, having a ftrong aftringent tafte. Springs of this kind proceed originally from thofe ftrata which contain beds or balls of iron-ore; but by reafon of the tenacity of the matter of thofe ftrata, the water only difengages itfelf flowly from them, defcending into fome more porous or open ftratum below, where, gathering in a body, it runs out to the furface in fmall ftreams or rills. The ftratum of coal is the moft general refervoir of this water; for the iron-ftone being lodged in different kinds of fhiver, and the coal commonly connected with fome of them, it therefore defcends into the coal, where it finds a ready paffage through the open backs and cutters. Sometimes, indeed, it finds fome other ftratum than coal to collect and tranfmit it to the furface; but the difference is eafily diftinguifhable; for the ochrey matter in the water, when it comes from a ftratum of coal, is of a darker rufty colour than when it proceeds from any other, and often brings with it particles and fmall pieces of coal; therefore, wherever thefe two circumftances concur in a number of thefe kind of fprings, fituated in a direction from each other anfwerable to the ftretch or to the inclination of the ftrata, it may be certain the water comes off coal, and that the coal lies in a fomewhat higher fituation than the apertures of the fprings.

There are other fprings alfo which come off coal, and are not diftinguifhable from common water, otherwife than by their aftringency, and their having a blue fcum of an oily or glutinous nature fwimming upon the furface of the water. Thefe, in common with the others, bring out particles of coal, more efpecially in rainy feafons when the fprings flow with rapidity. When a number of thefe kinds are fituated from each other in the direction of the ftrata, as above defcribed; or if the water does not run forth as in fprings, but only forms a fwamp, or an extenfion of ftagnant water beneath the turf; in either cafe, it may be depended upon that this water proceeds from a ftratum of coal.

Rule 7th. If the ftratum of coal is not expofed to view, or cannot be difcovered by the firft method of fearching for the crop, although the appearance of the other ftrata be very favourable, and afford a ftrong probability of coal being there; and if the laft-mentioned method of judging of the particular place where the crop of the coal may lie, by the fprings of water iffuing from it, fhould, from the deficiency of thofe fprings or other circumftances, be thought equivocal, and not give a fatisfactory indication of the coal; then a further fearch may be made in all places where the outward furface, or the ftratum of clay or earth, is turned up by ploughing, ditching, or digging, particularly in the lower grounds, in hollows, and by the fides of ftreams. Thefe places fhould be ftrictly examined, to fee if any pieces of coal be intermixed with the fubftance of the fuperior laft ftrata; if any fuch be found, and if they be pretty numerous and in detached pieces, of a firm fubftance, the angles perfect or not much worn, and the texture of the coal diftinguifhable, it may be concluded, that the ftratum of coal to which they originally did belong, is at no great diftance, but in a fituation higher with refpect to the horizon; and if there be alfo found along with the pieces of coal other mineral matter, fuch as pieces of fhiver or freeftone, this is a concurrent proof that it has come only from a fmall diftance. Though the two fore-mentioned methods fhould only have produced a ftrong probability, yet if this laft-mentioned place, where the pieces of coal, &c. are found in the clay, be in a fituation lower than the fprings; when this circumftance is joined to the other two, it amounts to little lefs than a moral certainty of the ftratum of coal being a very little above the level of the fprings. But if, on the contrary, thefe pieces of coal are found more fparingly interfperfed in the fuperior ftratum, and if the angles are much fretted or worn off, and very little of other kinds of mineral matter connected with them; it may then be concluded, that they have come from a ftratum of coal fituated at a greater diftance than in the former cafe; and by a ftrict fearch and an accurate comparifon of other circumftances, that particular place may be difcovered with as much certainty as the other.

After the place is thus difcovered, where the ftratum of coal is expected to lie concealed, the next proper ftep to be taken, is to begin digging a pit or hole there perpendicularly down to find the coal. If the coal has no folid ftrata above and beneath it, but be found only embodied in the clay or other lax matter, it will not be there of its full thicknefs, nor fo hard and pure as in its perfect ftate when enclofed betwixt two folid ftrata, the uppermoft called the *roof*, and the undermoft called the *pavement*, of the coal: in fuch fituation therefore it becomes neceffary, either to dig a new pit, or to work a mine forward until the ftratum of coal be found included betwixt a folid roof and pavement, after which it need not be expected to increafe much in its thicknefs: yet as it goes deeper or farther to the dip, it moft likely will improve in its quality; for that part of the ftratum of coal which lies near the furface, or only at a fmall depth, is often debafed by a mixture of earth and fundry other impurities wafhed down from the furface, through the backs and cutters, by the rains; whilft the other part of the ftratum which lies at a greater depth is preferved pure, by the other folid ftrata above it intercepting all the mud wafhed from the furface.

The above methods of inveftigation admit of many different cafes, according to the greater or lefs number of favourable circumftances attending each of the modes of inquiry; and the refult accordingly admits every degree of probability, from the moft diftant, even up to abfolute certainty. In fome fituations, the coal will

will be difcovered by one method alone, in others, by a comparifon of certain circumftances attending each method; whilft in fome others, all the circumftances that can be collected only lead to a certain degree of probability.

In the laft cafe, where the evidence is only probable, it will be more advifeable to proceed in the fearch by boring a hole through the folid ftrata (in the manner hereafter defcribed), than by digging or finking a pit, it being both cheaper and more expeditious; and in every cafe, which does not amount to an abfolute certainty, this operation is neceffary to afcertain the real exiftence of the coal in that place.

We fhall now fuppofe that, having examined a certain diftrict, fituated within a few miles of the fea or fome navigable river, that all the circumftances which offer only amount to a probability of the coal being there, and that boring is neceffary to afcertain it. We fhall therefore defcribe the operation of boring to the coal; then the method of clearing it from water, commonly called *winning* it; and all the fubfequent operations of working the coal and raifing it to the furface, leading it to the river or harbour, and finally putting it on board the fhips.

15 Of boring for the coal. Plate CXLIX. fig. 4.

Suppofe that the ground, A, B, C, D, fig. 4. has been examined, and from the appearance of the ftrata where they are vifible (as at the precipice D, and feveral other places), they are found to be of thofe kinds ufually connected with coal, and that the point to which they rife is directly weft towards A, but the ground being flat and covered to a confiderable depth with earth, &c. the ftrata cannot be viewed in the low grounds; therefore, in this and all fimilar fituations, the firft hole that is bored for a trial for coal fhould be on the weft fide of the ground, or to the full rife of the ftrata as at A, where boring down through the ftrata 1, 2, 3, fuppofe 10 fathoms, and not finding coal, it will be better to bore a new hole than to proceed to a great depth in that; therefore, proceeding fo far to the eaftward as B, where the ftratum 1, of the firft hole is computed to be 10 or 12 fathoms deep, a fecond hole may be bored, where boring down through the ftrata 4, 5, 6, 7, 8, the ftratum 1 is met with, but no coal; it would be of no ufe to bore farther in this hole, as the fame ftrata would be found which were in the hole A: therefore, proceeding again fo far to the eaftward, as it may be computed the ftratum 4 of the fecond hole will be met with at the depth of 10 or 12 fathoms, a new hole may be bored C, where, boring through the ftrata 9, 10, 11, 12, the coal is met with at 13, before the hole proceed fo deep as the ftratum 4 of the former. It is evident, that, by this method of procedure, neither the coal nor any other of the ftrata can be paffed over, as the laft hole is always bored down to that ftratum which was neareft the furface in the former hole.

The purpofes for which boring is ufed are numerous, and fome of them of the utmoft importance in coaleries, In coaleries of great extent, although the coal be known to extend through the whole grounds, yet accidental turns, and other alterations in the dip, to which the coal is liable, render the boring of three or more holes neceffary, to determine exactly to what point of the horizon it dips or inclines, before any capital operation for the winning of it can be undertaken; becaufe a very fmall error in this may occafion the lofs of a great part of the coal, or at leaft incur a double expence in recovering it.

3

Fig. 5.

Suppofe A, B, C, D, (fig. 5.) to be part of an extenfive field of coal, intended to be won or laid dry by a fire-engine; according to the courfe of the dip in adjoining coaleries, the point C is the place at which the engine fhould be erected, becaufe the coal dips in the direction of the line AC, confequently the level line would be in the direction CD; but this ought not to be trufted to. Admit two holes, 1, 2, be bored to the coal in the direction of the fuppofed dip, at 200 yards diftance from each other, and a third hole 3 at 200 yards diftance from each of them: fuppofe the coal is found, at the hole 1, to be 20 fathoms deep; at the hole 2, 10 fathoms deeper; but at the hole 3, only 8 fathoms deeper than at 1. Then to find the true level line and dip of the coal, fay, As 10 fathoms, the dip from 1 to 2, are to 200 yards the diftance, fo are 8 fathoms, the dip from 1 to 3, to 160 yards the diftance from 1 on the line 1, 2, to *a*, the point upon a level with the hole 3. Again fay, As 8 fathoms, the dip from 1 to 3, are to 200 yards the diftance; fo are 10 fathoms, the dip from 1 to 2, to 250 yards, the diftance from 1, in direction of the line 1, 3, to *b*, the point upon a level with the hole 2. Then let fall the perpendicular 1 *c*, which will be the true direction of the dip of the coal, inftead of the fuppofed line AC; and by drawing ED, and DF, parallel to the other lines, the angle D, and no other place, is the deepeft part of the coal, and the place where the engine fhould be erected. If it had been erected at the angle C, the level line would have gone in the direction *c b*, by which means about one-third part of the field of coal would have been below the level of the engine, and perhaps loft, without another engine was erected at D.

Boring not only fhows the depth at which the coal lies, but its exact thicknefs; its hardnefs; its quality, whether clofe burning or open burning, and whether any foul mixture is in it or not; alfo the thicknefs, hardnefs and other circumftances of all the ftrata bored through; and from the quantity of water met with in the boring, fome judgment may be formed of the fize of an engine capable of drawing it, where an engine is neceffary. When holes are to be bored for thefe purpofes, they may be fixed (as near as can be gueffed) in fuch a fituation from each other, as to fuit the places where pits are afterwards to be funk: by which means moft of the expence may be faved, as thefe pits would otherwife require to be bored, when finking, to difcharge their water into the mire below. There are many other ufes to which boring is applied, as will be explained hereafter.

For thefe reafons boring is greatly practifed in England, and is brought to great perfection; and as the operation is generally entrufted to a man of integrity, who makes it his profeffion, the accounts given by him of the thicknefs and other circumftances of the ftrata, are the moft accurate imaginable, and are trufted to with the greateft confidence; for as very few gentlemen choofe to take a leafe of a new coalery which has not been fufficiently explored by boring, it is neceffary the account fhould be faithful, being the only rule to guide the landlord in letting his coal, and the tenant

Coalery.

tenant in taking it. In Scotland it is not ſo generally practiſed; nor are there any men of character who are profeſſed borers, that operation being commonly left to any common workman; whence it happens, that it never has been in any eſteem, the accounts given by them being ſo imperfect and equivocal, as not to merit any confidence.

The tools or inſtruments uſed in boring are very ſimple. The boring rods are made of iron, from 3 to 4 feet long, and about an inch and a half ſquare, with a ſcrew at each end, by which they are ſcrewed together, and other rods added, as the hole increaſes in depth. The chiſel is about 18 inches long, and two and a half broad at the end, which being ſcrewed on at the lower end of the rods, and a piece of timber put through an eye at the upper end, they are prepared for work. The operation is performed by lifting them up a little, and letting them fall again, at the ſame time turning them a little round; by a continuance of which motions, a round hole is fretted or worn through the hardeſt ſtrata. When the chiſel is blunt, it is taken out, and a ſcooped inſtrument called a *wimble*, put on in its ſtead; by which the duſt or pulverized matter which was worn off the ſtratum in the laſt operation is brought up. By this ſubſtance, the borers know exactly the nature of the ſtratum they are boring in: and by any alteration in the working of the rods (which they are ſenſible of by handling them), they perceive the leaſt variation of the ſtrata. The principal part of the art depends upon keeping the hole clean, and obſerving every variation of the ſtrata with care and attention.

The eſtabliſhed price of boring in England was ſome time ago 5s. per fathom for the firſt five fathoms, 10s. per fathom for the next five fathoms, and 15s. per fathom for the next five fathoms; and ſo continually increaſing 5s. per fathom at the end of every five fathoms; the borer finding all kinds of boring inſtruments; but if more than one foot in thickneſs of whin occur, he is paid per day. See a new method of boring for coal deſcribed in Dr Millar's edition of *Williams's Min. Kingdom.*

16
Of winning the coal.

It is exceedingly uncommon to meet with a ſtratum of coal which is naturally dry, or whoſe ſubterranean ſprings or feeders of water are ſo very ſmall as to require no other means than the labour of men to draw off or conduct them away; for it moſt commonly happens that the ſtratum of coal, and the other ſtrata adjacent, abound ſo much in feeders of water, that, before acceſs can be had to the coal, ſome other methods muſt be purſued to drain or conduct away theſe feeders; therefore, after the deepeſt part of the coal is diſcovered, the next conſideration is of the beſt method of draining it, or, in the miners language, *of winning the coal.*

If the coal lies in ſuch an elevated ſituation, that a part of it can be drained by a level brought up from the lower grounds, then that will be the moſt *natural* method; but whether it be the moſt *proper* or not, depends upon certain circumſtances. If the ſituation of the ground be ſuch, that the level would be of a great length, or have to come through very hard ſtrata, and the quantity of coal it would drain, or the profits expected to be produced by that coal, ſhould be inadequate to the expence of carrying it up; in ſuch caſe ſome other method of winning might be more proper. Or ſuppoſe, in another caſe, it be found, that a level can be had to a coalery, which will coſt 2000l. and require five years to bring it up to the coal, and that it will drain 30 acres of coal when completed; yet if it be found that a fire engine, or ſome other machine, can be erected on that coalery, for the ſame ſum of money, in one year, which will drain 50 acres of the ſame coal, then this laſt would be a more proper method than the level; becauſe four years profit would be received by this method before any could come in by the other; and after the 30 acres drained by the level is all wrought, a machine of ſome kind would nevertheleſs be neceſſary to drain the remaining 20 acres; ſo that erecting a machine at firſt would be on all accounts the moſt adviſable.

Where a level can be driven, in a reaſonable time, and at an adequate expence, to drain a ſufficient tract of coal, it is then the moſt eligible method of winning; becauſe the charge of upholding it is generally leſs than that of upholding fire-engines or other machines.

If a level is judged propereſt after conſideration of every neceſſary circumſtance, it may be begun at the place appointed in the manner of an open ditch, about three feet wide, and carried forward until it be about ſix or ſeven feet deep from the ſurface, taking care to ſecure the bottom and ſides by timber work or building, after which it may be continued in the manner of a mine about three feet wide, and three feet and a half high, through the ſolid ſtrata, taking care all along to keep the bottom upon a level, and to ſecure the roof, ſides, and bottom, by timber or building, in all places where the ſtrata are not ſtrong enough to ſupport the incumbent weight, or where they are liable to decay by their expoſure to the freſh air. If the mine has to go a very long way before it reaches the coal, it may be neceſſary to ſink a ſmall pit, for the convenience of taking out the ſtones and rubbiſh produced in working the mine, as well as to ſupply freſh air to the workmen; and if the air ſhould afterwards turn damp, then ſquare wooden pipes made of deals cloſely jointed (commonly called *air-boxes*), may be fixed in the upper part of the mine, from the pit-bottom all the way to the end of the mine, which will cauſe a ſufficient circulation of freſh air for the workmen. Perhaps in a great length it will be found proper to ſink another or more pits upon the mine, and by proceeding in this manner it may be carried forward until it arrive at the coal; and after driving a mine in the coal a few yards to one ſide, the firſt coal-pit may be ſunk.

If a level is found impracticable, or for particular reaſons unadviſable, then a fire engine*, or ſome other machine, will be neceſſary, which ſhould be fixed upon the deepeſt part of the coal, or at leaſt ſo far towards the dip as will drain a ſufficient extent of coal, to continue for the time intended to work the coalery; and whether a fire engine, or any other machine is uſed, it will be of great advantage to have a partial level brought up to the engine-pit, if the ſituation of the ground will admit it at a ſmall charge, in order to receive and convey away the water without drawing it ſo high as to the ſurface; for if the pit was 30 fathoms deep to the coal, and if there was a partial level which received the water five fathoms only,

* See article *Steam-Engine.*

only below the ſurface, the engine by this means would be enabled to draw one-ſixth part more water than without it; and if there were any feeders of water in the pit above this level, they might be conveyed into it, where they would be diſcharged without being drawn by the engine.

The engine-pit may be from ſeven to nine feet wide, and whether it be circular, oval, or of any other form, is not very material, provided it be ſufficiently ſtrong, though a circular form is moſt generally approved. If any feeders of water are met with a few fathoms from the ſurface, it will be proper to make a circular or ſpiral cutting about one foot deep, and a little hollowed in the bottom, round the circumference of the pit, in order to receive and conduct the water down, without flying over the pit and incommoding the workmen. If the ſtrata are of ſo tender or friable a nature as not to bear this operation, or if the water leaks through them, then it will be neceſſary to inſert in the fore-mentiond cutting a circular piece of timber called a *crib*, hollowed in the ſame manner to collect the water; and a ſecond may be inſerted two or three yards below the firſt, with a ſloping niche down the wall or ſide of the pit, to convey the water from the former into it; proceeding by ſome of theſe methods until the pit is ſunk 15 or 20 fathoms, at which place it would be proper to fix a ciſtern or reſervoir, for the firſt or upper ſet of pumps to ſtand in; for if the pit be 30 fathoms as ſuppoſed, it would be too great a length for the pumps to be all in one ſet from bottom to top; therefore, if any extraordinary feeders are met with, betwixt 15 and 20 fathoms deep, it would be beſt to fix the ciſtern where it may receive them, and prevent their deſcending to the bottom; obſerving that the upper ſet of pumps be ſo much larger than the lower one, as the additional feeders may require; or if there are no additional feeders, it ought then to be a little ſmaller.

After the upper ciſtern is fixed, the operation may be purſued by the other ſet of pumps in much the ſame manner as has been deſcribed, until the pit is ſunk to the coal; which being done, it would be proper to ſink it ſix or eight feet deeper, and to work ſome coal out from the dip ſide of the pit, to make room for a large quantity of water to collect, without incommoding the coal-pits when the engine is not working.

It would exceed the proper bounds of this article to enumerate all the accidents to which engine-pits are liable in ſinking; we ſhall therefore only recite a few which ſeem important.

If a quickſand happens to lie above the ſolid ſtrata, next the ſurface, it may be got through by digging the pit of ſuch a wideneſs at the top (allowing for the natural ſlope or running of the ſand) as to have the proper ſize of the pit on the uppermoſt ſolid ſtratum, where fixing a wooden frame or tub as the timber-work of the pit, and covering it round on the outſide with wrought clay up to the top, the ſand may again be thrown into the excavation round the tub, and levelled with the ſurface.

If the quickſand ſhould happen to lie at a conſiderable depth betwixt the clay and ſolid ſtrata, then a ſtrong tub of timber cloſely jointed and ſhod with iron, of ſuch a diameter as the pit will admit, may be let down into it; and by fixing a great weight upon the top, and by working out the ſand, it may be made to ſink gradually, until it comes to the rock or other ſolid ſtratum below; and when all the ſand is got out, if it be lightly calked and ſecured, it will be ſufficient.

It ſometimes happens, that a ſtratum of ſoft matter lying betwixt two hard ſolid ones, produces ſo large a quantity of water as greatly to incommode the operations. In ſuch a caſe, a frame-work of plank, ſtrengthened with cribs and cloſely calked, will keep back the whole or the greateſt part of it, provided the two ſtrata which include it are of a cloſe texture; or let an excavation of about two feet be made in the ſoft ſtratum quite round the circumference of the pit, and let that be filled cloſe up betwixt the hard ſtrata with pieces of dry fir-timber about ten inches ſquare inſerted endwiſe, and afterwards as many wooden wedges driven into them as they can be made to receive; if this be well finiſhed, little or no water will find a paſſage through it.

It rarely happens that any ſuffocating damp or foul air is met with in an engine-pit; the falling of water, and the working of the pumps, generally cauſing a ſufficient circulation of freſh air. But that kind of combuſtible vapour, or inflammable air, which will catch fire at a candle, is often met with. It proceeds from the partings, backs, and cutters, of the ſolid ſtrata, exhaling from ſome in an inſenſible manner, whilſt from others it blows with as great impetuoſity as a pair of bellows. When this inflammable air is permitted to accumulate, it becomes dangerous by taking fire, and burning or deſtroying the workmen, and ſometimes by its exploſion will blow the timber out of the pit and do conſiderable damage. If a conſiderable ſupply of freſh air is forced down the pit by air-boxes and a ventilator, or by dividing the pit into two by a cloſe partition of deals from top to bottom, or by any other means it will be driven out, or ſo weakened that it will be of no dangerous conſequence; or when the inflammable air is very ſtrong, it may be ſafely carried off by making a cloſe ſheathing or lining of thin deals quite round the circumference of the pit, from the top of the ſolid ſtrata to the bottom, and lengthening it as the pit is ſunk, leaving a ſmall vacancy behind the ſheathing; when the combuſtible matter which exhales from the ſtrata, being confined behind theſe deals, may be vented by one or two ſmall leaden pipes carried from the ſheathing to the ſurface, ſo that very little of it can tranſpire into the area of the pit. If a candle be applied to the orifice of the pipe at the ſurface, the inflammable air will inſtantly take fire, and continue burning like an oil-lamp, until it be extinguiſhed by ſome internal cauſe. Upon the whole, every method ſhould be uſed to make the pit as ſtrong in every part, and to keep it as dry as poſſible; and whenever any accident happens, it ſhould be as expeditiouſly and thoroughly repaired as poſſible, before any other operation be proceeded in, leſt an additional one follow, which would more than double the difficulty of repairing it.

17
Of working the coal.

The firſt operations, after ſinking the engine-pit, are the working or driving a mine in the coal, and ſinking the firſt coal-pit. The ſituation of the firſt coal-pit ſhould be a little to the riſe of the engine-pit, that the water which collects there may not obſtruct the working

working

working of the coals every time the engine ſtops; and it ſhould not exceed the diſtance of 20, 30, or 40 yards, becauſe when the firſt mine has to be driven a long way, it becomes both difficult and expenſive. If there be not a ſufficient circulation of freſh air in the mine, it may be ſupplied by the before-deſcribed air-boxes and a ventilator, until it arrives below the intended coal-pit, when the pit may be bored and ſunk to the coal, in the manner before mentioned.

After the pit is thus got down to the coal, the next conſideration ſhould be, the beſt method of working it. The moſt general practice in Scotland is to excavate and take away a part only of the ſtratum of coal in the firſt working of the pit, leaving the other part as pillars for ſupporting the roof; and after the coal is wrought in this manner to ſuch a diſtance from the pit as intended, then theſe pillars, or ſo many of them as can be got, are taken out by a ſecond working, and the roof and other ſolid ſtrata above permitted to fall down and fill up the excavation. The quantity of coal wrought away, and the ſize of the pillars left in the firſt working, is proportioned to the hardneſs and ſtrength of the coal and other ſtrata adjacent, compared with the incumbent weight of the ſuperior ſtrata.

The ſame mode of working is purſued in moſt parts of England, differing only as the circumſtances of the coalery may require; for the Engliſh coal, particularly in the northern counties, being of a fine tender texture, and of the cloſe-burning kind, and alſo the roof and pavement of the coal in general not ſo ſtrong as in Scotland, they are obliged to leave a larger proportion of coal in the pillars for ſupporting the roof, during the firſt time of working; and, in the ſecond working, as many of theſe pillars are wrought away as can be got with ſafety.

The Scots coal in general being very hard, and of the open-burning kind, it is neceſſary to work it in ſuch a manner as to produce as many *great coals* as poſſible, which is beſt effected by taking away as high a proportion of the coal as circumſtances will allow in the firſt working; on the contrary, the Engliſh coal being very tender, cannot poſſibly be wrought large, nor is it of much importance how ſmall they are, being of ſo rich a quality; ſo that a larger proportion may be left in pillars in this coal than could with propriety be done in the other; and, when all circumſtances are conſidered, each method ſeems well adapted to the different purpoſes intended.

The ancient method of working was, to work away as much of the coal as could be got with ſafety at one working only, by which means the pillars were left ſo ſmall as to be cruſhed by the weight of the ſuperior ſtrata, and entirely loſt. As great quantities of coals were loſt by this method, it is now generally exploded, and the former adopted in its place, by which a much larger quantity of coal is obtained from the ſame extent of ground, and at a much leſs expence in the end.

The exact proportion of coal proper to be wrought away, and to be left in pillars at the firſt working, may be judged of by a compariſon of the circumſtances before mentioned. If the roof and pavement are both ſtrong, as well as the coal, and the pit about 30 fathoms deep, then two-thirds, or probably three-fourths, may be taken away at the firſt working, and one-third or one-fourth left in pillars. If both roof and pavement be ſoft or tender, then a larger proportion muſt be left in pillars, probably one-third or near one-half; and in all caſes the hardneſs or ſtrength of the coal muſt be conſidered. If tender, it will require a larger pillar than hard coal; becauſe, by being expoſed to the air after the firſt working, a part of it will moulder and fall off, by which it will loſe much of its ſolidity and reſiſtance.

The proportion to be wrought away and left in pillars being determined, the next proper ſtep is to fix upon ſuch dimenſions of the pillars to be left, and of the excavations from which the coal is to be taken away, as may produce that proportion. In order to form a juſt idea of which, ſee a plan of part of a pit's workings (fig. 6.) ſuppoſed to be at the depth of 30 fathoms, and the coal having a moderate riſe. A, repreſents the engine-pit; B, the coal-pit; A *a* B, the mine from the former to the latter; BC, the firſt working or excavation made from the coal-pit, commonly called the *winning mine* or *winning headway*, nine feet wide; *bbbb*, &c. the workings called *rooms*, turned off at right angles from the others, of the width of 12 feet: *cccc*, &c. the workings called *throughers* or *thirlings*, 9 feet wide, wrought through at right angles from one room to another; *ddd*, &c. the pillars of coal left at the firſt working for ſupporting the roof, 18 feet long and 12 feet broad; DD, two large pillars of coal near the pit bottom, 15 or 20 yards long, and 10 or 15 broad, to ſupport the pit, and prevent its being damaged by the roof falling in; *e e*, the level mine wrought in the coal from the engine-pit bottom four or five feet wide; *f f*, &c. large pillars of coal left next the level, to ſecure it from any damage by the roof falling in; *g g*, a dike which depreſſes the coal, 1 fathom; *h h*, &c. large pillars and barriers of coal, left unwrought, adjoining to the dike where the roof is tender, to prevent its falling down. The coal taken out by the firſt working in this pit is ſuppoſed to be one third of the whole; and allowing the rooms 12 feet wide, and the thirlings 9 feet wide, then the pillars will require to be 12 feet wide and 18 feet long; for if one pillar be in a certain proportion to its adjoining room and thirling, the whole number of pillars will be in the ſame proportion to the whole number of rooms and thirlings in the pit. Suppoſe ABCD (fig. 7.) to be a pillar of coal 18 feet long and 12 feet broad, its area will be 216 ſquare feet; ACHE, the adjoining thirling, 12 feet by 9 feet, and its area 108 ſquare feet; BAEFG, the adjoining room, 27 feet long and 12 feet broad, and its area 324 ſquare feet; which added to 108 gives 432 ſquare feet, or two-thirds wrought, and 216 ſquare feet left, or one-third of the whole area FGHD.

Plate CXLIX. fig. 6.

Fig. 7.

It is proper to obſerve, that in the proſecution of the workings, the rooms to the right of the winning headway ſhould be oppoſite to the pillars on the left, and the firſt, third, and fifth pillar, or the ſecond, fourth, and ſixth, adjoining to the ſaid headway, ſhould be of ſuch a length as to overlay the adjoining thirlings, as, in the plan, the pillar 2 overlays the thirlings 1 and 3; and the pillar 4 overlays the thirlings 3 and 5; this will effectually ſupport the roof of the main road BC, and will bring the other pillars into

into their regular order, by which means each pillar will be oppofite to two thirlings. Alfo a larger proportion of coal than common fhould be left in all places which are intended to be kept open after the fecond working, fuch as the pit-bottoms, air-courfes, roads, and water-courfes, or where the roof is tender, as it generally is near dikes, hitches, and troubles; and if the roof fhould continue tender for a confiderable fpace, it will perhaps be found proper to leave a few inches of coal adhering to the roof, which, together with a few props of timber fixed under it, may fupport it effectually for a long time. The level mine *e e*, and the winning headway BC, fhould be wrought forward a confiderable length before the other rooms, in order to be driven through any dikes that might interpofe, otherwife the progrefs of the workings might probably be ftopt a confiderable time, waiting until a courfe of new rooms were procured on the other fide of the dike. Suppofe the dike *g g*, fig. 6. to deprefs the coal fix feet or one fathom, and that it rifes in the fame manner on the under fide of the dike as it does on the upper fide; in fuch a cafe, the only remedy would be to work or drive a level mine through the ftrata of ftone from the engine-level at *e*, over the dike, until it interfect the coal at *i*; and from thence to drive a new level mine in the coal at *i i*, and a new winning headway *i k*. In order to gain a new fet of rooms and to fupply frefh air to this new operation, a fmall mine might be driven from the room *h*, and a hole funk down upon the level room *i i*; therefore, if the level mine *e e* was not driven fo far forward as to have all thefe operations completed before the rooms and other workings were intercepted by the dike, the working of the pit might ceafe until thefe new places were ready.

If there be two or three ftrata or feams of coal in the fame pit (as there often are) having only a ftratum of a few feet thick lying betwixt them, it is then material to obferve, that every pillar in the fecond feam be placed immediately before one in the firft, and every pillar in the third feam below one in the fecond; and in fuch a fituation the upper ftratum of coal ought to be firft wrought, or elfe all the three together; for it would be unfafe to work the lower one firft, left the roof fhould break, and damage thofe lying above.

It fometimes becomes neceffary to work the coal lying to the dip of the engine or the level; which coal is confequently drowned with water, and muft therefore be drained by fome means before it can be wrought. If the quantity of water proceeding from it be inconfiderable, it may then be drained by fmall pumps laid upon the pavement of the coal, and wrought by men or horfes, to raife the water up to the level of the engine-pit bottom; or if the feeders of water be more confiderable, and the fituation be fuitable, the working rod of thefe pumps might be connected with thofe in the engine-pit; by which means the water would be raifed up to the level; but if the quantity of water be very great; or if, from other circumftances, thefe methods may not be applicable; then the engine pit may be funk as deep below the coal as may be neceffary, and a level ftone mine driven from its bottom to the dip of the ftrata, until it interfect the ftratum of coal, from whence a new level mine might be wrought, which would effectually drain it. Suppofe AB, fig. 8. to be a fection of the engine-pit; BC, the coal drained by the engine; BD, the coal to the dip of the engine intended to be drained; then if the engine-pit be funk deeper to E, a ftone mine may be wrought in the direction ED, until it interfect the coal at D, by which the water will have a free paffage to the engine, and the coal will be drained.

Fig. 8.

If there be another ftratum of coal lying at fuch a depth below the firft as the engine-pit is intended to be funk to, the upper feam may in fome fituations be conveniently drained, by driving a mine in the lower feam of coal from E to F, and another in the upper one from B to D; and by boring a hole from D to F, the water will defcend to F, and, filling the mine EF, rife up to the engine-pit bottom at E, which is upon a level with D.

Whenever it is judged neceffary to work the pillars, regard muft be had to the nature of the roof. If the roof is tender, a narrow room may be wrought through the pillar from one end to the other, leaving only a fhell of coal on each fide for fupporting the roof the time of working. Suppofe ABCD, fig. 7. to be a pillar of coal 18 feet long and 12 feet broad: if the roof is not ftrong, the room 1, 2, 3, 4, of eight feet wide, may be wrought up through that pillar, leaving a fhell of two feet thick on each fide; and if it can be fafely done, a part of thefe fhells may alfo be wrought away, by working two places through them as at 5 and 6. By this means very little of the coal will be loft; for two-thirds of the whole being obtained by the firft working, and above two-thirds of the pillar by the fecond working, the lofs upon the whole would not exceed one-tenth: but it may be obferved, that fome pillars will not produce fo great a proportion, and perhaps others cannot be wrought at all; fo that, upon the whole, there may be about one-fixth, one-feventh, or in fome fituations but one-eighth part of the coal loft. If the roof be hard and ftrong, then as much coal may be wrought off each fide and each end of the pillar as can be done with fafety, leaving only a fmall piece ftanding in the middle; and when the roof is very ftrong, fometimes feveral pillars may be taken entirely out, without any lofs of coal: and in general this laft method is attended with lefs lofs, and produces larger coals, than the former. In all cafes it is proper to begin working thofe pillars firft which lie fartheft from the pit bottom, and to proceed working them regularly away towards the pit; but if there be a great number of pillars to the dip of the pit, it is the fafeft method to work thefe out before thofe to the rife of the pit are begun with.

There is no great difference in the weight of different kinds of coals, the lighteft being about 74 pounds avoirdupois, and the heavieft about 79 pounds the cubic foot; but the moft ufual weight is 75 pounds the foot, which is 18 hundred weight and 9 pounds the cubic yard. The ftatute chalder is 53 hundred weight; or when meafured is as follows: 268.8 cubic inches to the Winchefter gallon; $4\frac{1}{2}$ gallons to the coal peck, about 3 pounds weight; 8 coal-pecks to the boll, about $247\frac{1}{7}$ pounds; and 24 bolls to the chalder, of 53 hundred weight. If one coal meafuring exactly a cubic yard (nearly equal to 5 bolls) be broken into pieces of a moderate fize, it will meafure feven coal bolls

Coalery.

bolls and a half. If broken very fmall it will meafure 9 bolls; which fhows, that the proportion of the weight to the meafure depends upon the fize of the coals; therefore accounting by weight is the moft rational method.

A TABLE of the weight and quantity of coal contained in one acre Scots meafure, allowing one-fixth part to be loft below ground, in feams of the following thickneffes.

Thicknefs of Coal. Feet.	Inches.	Weight in Tons.	Quantity in Chalders.
2	0	3068	1158—
2	6	3835	1447+
3	0	4602	1736+
3	6	5369	2026+
4	0	6136	2315+
4	6	6903	2604+
5	0	7670	2894+
5	6	8437	3183+
6	0	9204	3473+

We fhall next mention fome of the various methods of bringing the coals from the rooms and other workings to the pit-bottom. Where the ftratum of coal is of a fufficient thicknefs, and has a moderate rife and dip, the coals are moft advantageoufly brought out by horfes, who draw out the coals in a tub or bafket placed upon a fledge: a horfe by this means will bring out from four to eight hundred weight of coals at once, according to the quantity of the afcent or defcent. In fome coaleries they have accefs to the workings by a mine made for them, floping down from the furface of the earth to the coal; and where that convenience is wanting, they are bound into a net, and lowered down the pit. If the coal be not of fuch a height as to admit horfes, and has a moderate rife like the laft, then men are employed to bring out the coals: they ufually draw a bafket of four or five hundred weight of coals, fixed upon a fmall four-wheeled carriage. There are fome fituations in which neither horfes nor men can be properly ufed; particularly where the coal has a great degree of defcent, or where many dikes occur: in fuch a cafe the coals are beft brought out by women called *bearers*, who carry them in a kind of bafket upon their backs, ufually a hundred, or a hundred weight and a half, at once.

When the coals are brought to the pit-bottom, the bafkets are then hooked on to a chain, and drawn up the pit by a rope to the furface, which is beft effected by a machine called a *gin*, wrought by horfes. There are fome kinds of gins for drawing coals, fome wrought by water, others by the vibrating lever of a fire-engine, but either of thefe laft is only convenient in fome particular fituations, thofe wrought by horfes being in moft general ufe. After the coals are got to the furface, they are drawn a fmall diftance from the pit, and laid in feparate heaps: the larger coals in one heap, the fmaller pieces called *chews* in another, and the *culm* or *pan-coal* in a feparate place.

18 Of crufhes and fitts.

There is an accident of a very dangerous nature, to which all coaleries are liable, and which has been the ruin of feveral; it is called a *crufh*, or a *fitt*. When the pillars of coal are left fo fmall as to fail, or yield under the weight of the fuperior ftrata; or when the pavement of the coal is fo foft as to permit the pillars to fink into it, which fometimes happens by the great weight that lies upon them; in either cafe the folid ftratum above the coal breaks and fails in, crufhes the pillar to pieces, and clofes up a great extent of the workings, or probably the whole coalery. As fuch an accident feldom comes on fuddenly, if it be perceived in the beginning, it may fometimes be ftopped by building large pillars of ftone amongft the coal pillars: but if it has already made fome progrefs, then the beft method is to work away as many of the coal pillars adjoining to the crufh as may be fufficient to let the roof fall freely down; and if it makes a breach of the folid ftrata from the coal up to the furface, it will very probably prevent the crufh from proceeding any farther in that part of the coalery. If the crufh begins in the rife part of the coalery, it is more difficult to ftop it from proceeding to the dip, than it is to ftop it from going to the rife when it begins in a contrary part.

19 Foul air.

Another circumftance proper to be taken notice of is the foul or adulterated air fo often troublefome in coaleries. Of this there are two kinds; the black damp or ftyth, which is of a fuffocating nature; and the inflammable or combuftible damp. Without ftaying to inquire, in this place, into the origin and effects of thefe damps, it may be fufficient to obferve, that, in whatever part of any coalery a conftant fupply or a circulation of frefh air is wanting, there fome of thefe damps exift, accumulate in a body, and become noxious or fatal; and whenever there is a good circulation of frefh air, they cannot accumulate, being mixed with and carried away by the ftream of air as faft as they generate or exhale from the ftrata. Upon thefe principles are founded the feveral methods of ventilating a coalery. Suppofe the workings of the pits A and B (fig. 6.) to be obnoxious to the inflammable damps; if the communication was open betwixt the two pits, the air which went down the pit A would proceed immediately beyond the mine *a*, and afcend out of the pit B; for it naturally takes the neareft direction, fo that the air in all the workings would be ftagnant; and they would be utterly inacceffible from the accumulation of the combuftible damp. In order to expel this, the air muft be made to circulate through all the different rooms by means of collateral air-courfes made in this manner: The paffage or mine *a* muft be clofed up or ftopped by a partition of deals, or by a wall built with bricks or ftones, to prevent the air paffing that way. This building is called a *ftopping*. There muft alfo be ftoppings made in the thirlings 1 1 1, &c. between the pillars *f f*, &c. which will direct the air up the mine *e e*, until it arrives at the innermoft thirling 2, which is to be left open for its paffage. There muft alfo be ftoppings made at the fide of the mine *a* at *m m*, and on both fides of the main headway BC at *b b*, &c. then returning to the innermoft thirling 2, proceed to the third row of pillars, and build up the thirlings 2 2, &c. leaving open the thirling 3 for a paffage for the air; and proceeding on to the fifth row of pillars, build up in the fame manner the ftoppings 3 3, &c. leaving open 4 for an air courfe: and by proceeding in this manner to ftop up the thirlings or paffages in every other row of pillars, the current

Plate CXLIX.

rent of fresh air will circulate through and ventilate the whole workings, in the direction pointed to by the small arrows in the plan, clearing away all the damps and noxious vapours that may generate. When it is arrived at C, it is conducted across the main headway, and carried through the other part of the pit's workings in the same manner, until it returns through *n n* to the pit B, where it ascends; and as the rooms advance farther, other stoppings are regularly made.

In some of those stoppings, on the side of the main headway, there must be doors to admit a passage for the bringing out of the coals from the rooms to the pit, as at 5 5: these doors must be constantly shut, except at the time of passing through them.

There are other methods of disposing the stoppings so as to ventilate the pit; but none which will so effectually disperse the damps as that described above. If the damps are not very abundant, then the course of stopping 1 1 1, &c. in the level mine, and the others at *b b b*, &c. in the main headway, without any others, may perhaps be sufficient to keep the pit clear. If at any time the circulation of the fresh air is not brisk enough, then a large lamp of fire may be placed at the bottom of the pit B, which, by rarefying the air there, will make a quicker circulation.

20
Of leading and shipping the coals.

Most of the larger coaleries send their coals to the ships for the coasting trade or exportation; and, as the quantity is generally very large, it would take a greater number of carts than could conveniently be obtained at all times to carry them; besides the considerable expence of that manner of carriage: they therefore generally use waggons, for carrying them along waggon-ways, laid with timber, by which means one horse will draw from two to three tons at a time, when in a cart not above half a ton could be drawn.

The first thing to be done in making a waggon-way is to level the ground in such a manner as to take off all sudden ascents and descents, to effect which, it is sometimes necessary to cut through hills, and to raise an embankment to carry the road through hollows. The road should be formed about 12 feet wide, and no part should have a greater descent than of one yard perpendicular in 10 of a horizontal line, nor a greater ascent than one yard in 30. After the road is formed, pieces of timber, about six feet long, and six inches diameter, called *sleepers*, are laid across it, being 18 or 24 inches distant from each other. Upon these sleepers other pieces of timber, called *rails*, of four or five inches square, are laid in a lateral direction, four feet distant from each other, for the waggon-wheels to run upon; which being firmly pinned to the sleepers, the road may then be filled with gravel and finished.

The waggons have four wheels, either made of solid wood or of cast iron. The body of the carriage is longer and wider at the top than at the bottom; and usually has a kind of trap-door at the bottom, which, being loosed, permits the coals to run out without any trouble. The size of a waggon to carry 50 hundred weight of coals is as follows:

	Feet.	Inches.
Length of the top - -	7	9
Breadth of the top, - -	5	0
Length of the bottom, -	5	0
Breadth of the bottom, -	2	6
Perpendicular height, -	4	3

E

Where the pits are situated at some considerable distance from the harbour, it becomes necessary to have a store-house near the shipping place, where the coals may be lodged, until the lighters or ships are ready to take them in. The waggon-way should be made into the store-house, at such a height from the ground, as to permit the coals to run from the waggons down a spout into the vessels; or else to fall down into the store-house, as occasion may require.

This kind of store-house is well adapted to dispatch and saving expence; for a waggon load of coals may be delivered either into the store-house or vessels instantly with very little trouble: and if the coals were exposed to the effects of the sun and rain, they would be greatly injured in their quality; but being lodged under cover of the store-house, they are preserved.

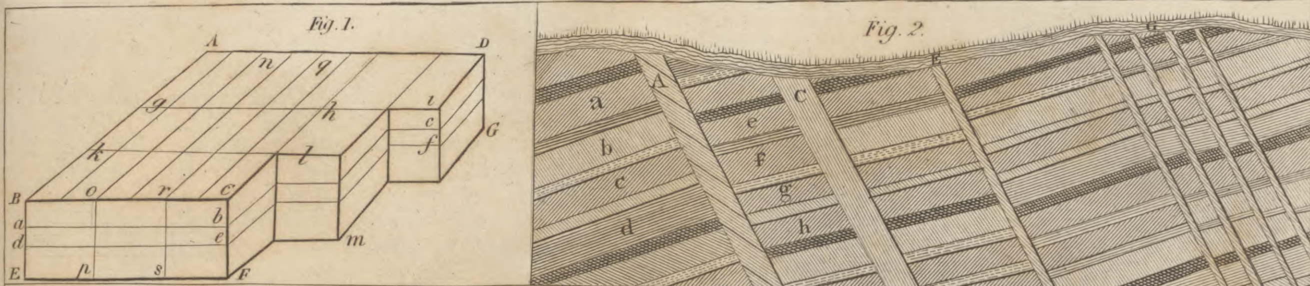
COALESCENCE, the union or growing together of two bodies before separate. It is principally applied to some bones in the body, which are separate during infancy, but afterwards grow together; or to some morbid union of parts, which should naturally be distinct from each other. Thus there is a coalescence of the sides of the vulva, anus, and nares; of the eye-lids fingers, toes, and many other parts.

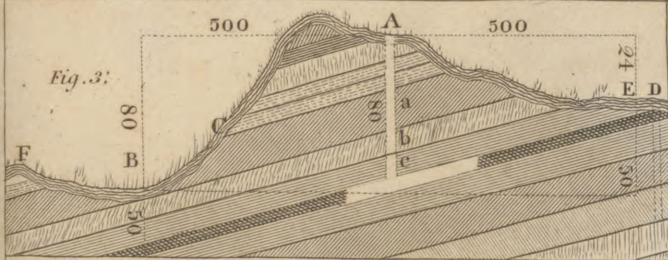
COALLIER, a vessel employed to carry coals from one port to another, chiefly from the northern parts of England to the capital, and more southerly parts, as well as to foreign markets. This trade is known to be an excellent nursery for seamen, although they are often found, from the constitution of their climate, not to be so well calculated for southern navigation.

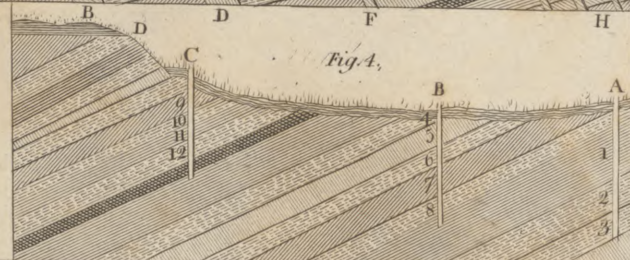
COAMINGS, in ship-buildings, are those planks, or that frame, forming a border round the hatches, which raise them up higher that the rest of the deck. Loop-holes for muskets to shoot out at are often made in the coamings, in order to clear the deck of the enemy when the ship is boarded.

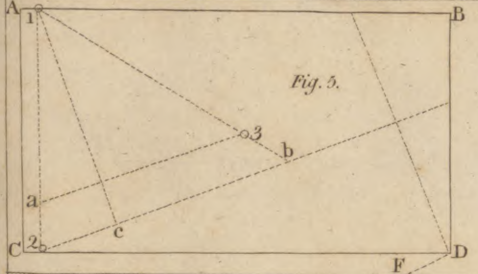
COANE, among the Greeks, a name given to a peculiar species of *tutia* or tutty, which was always found in a tubular form. It had its name from *κωνη*, a word used to express a sort of cylindric tube, into which the melted brass was received from the furnace, and in which it was suffered to cool. In cooling, it always deposited a sort of recrement on the sides of the vessel or tube, and this was the tutty called coane.

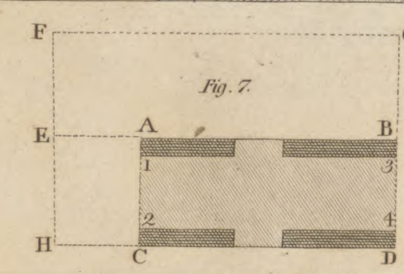
COAST, a sea-shore, or the country adjoining to the edge of the sea. Dr Campbell, in his Political Survey of Great Britain, considers an extensive sea-coast as of great advantage to any kingdom; and consequently that this island hath many conveniencies resulting from the extent of its coasts, superior to other kingdoms which are much larger. The chief advantages arising from an extensive sea-coast are, that thus there is a convenient opportunity for exportation and importation to or from all parts of the kingdom. Thus, a number of cities are formed on the coasts; by this means the internal parts are improved, &c. The extent of the sea-coasts of Arabia, he looks upon as the genuine source of wealth and splendour to the ancient inhabitants of that peninsula; the same was the instrument of the greatness of ancient Egypt, of Phœnicia, &c. In short, according to him, no country or city can for any length of time be flourishing unless











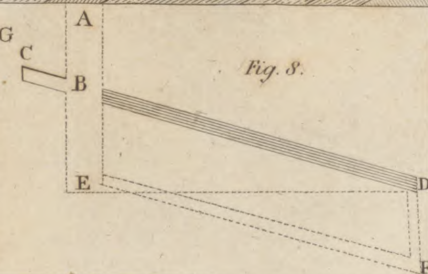


Fig. 6.

Rise
Level
Level
Dip

W. Archibald Sculp.t

unless it hath considerable connexion with the sea. "It is indeed true (says he) that the wisdom and industry of man, taking hold of some particular circumstances, may have rendered a few inland cities and countries very fair and flourishing. In ancient history we read of Palmyra and the district round it, becoming a luxuriant paradise in the midst of inhospitable deserts. But this was no more than a temporary grandeur; and it has now lain for some ages in ruins. The city and principality of Candahar was in like manner rendered rich and famous, in consequence of its being made the centre of the Indian commerce; but long ago declining, its destruction has been completed in our days, from that dreadful desolation which Thamas Kouli Khan spread through Persia and the Indies. Here, in Europe, many of the large cities in Germany, which for a time made a great figure from the freedom and industry of the inhabitants, and diffused ease, plenty, and prosperity, through the districts dependent on them, which of course rendered them populous, are now so much sunk through inevitable accidents, as to be but shadows of what they were; and though they still continue to subsist, subsist only as the melancholy monuments of their own misfortunes. We may therefore, from hence, with great certainty discern, that all the pains and labour that can be bestowed in supplying the defect of situation, in this respect, proves, upon the whole, but a tedious, difficult, and precarious expedient. But, however, we must at the same time admit, that it is not barely the possession even of an extended coast that can produce all these desirable effects. That coast must likewise be distinguished by other natural advantages, such as capes and promontories, favourably disposed to break the fury of the winds; deep bays, safe roads, and convenient harbours. For, without these, an extended coast is no more than a maritime barrier against the maritime force of other nations; as is the case in many parts of Europe, and is one of the principal reasons why Africa derives so little benefit from a situation which has so promising an appearance; there being many considerable tracts upon its coasts equally void of havens and inhabitants, and which afford not the smallest encouragement to the attempting any thing that might alter their present desolate condition. It is, however, a less inconvenience, and in some cases, no inconvenience at all, if, in the compass of a very extended coast, there should be some parts difficult or dangerous of access, provided they are not altogether inaccessible.—The sea-coast of Britain, from the figure, in some measure, of the island, but chiefly from the inlets of the sea, and the very irregular indented line which forms its shore, comprehends, allowing for those sinuosities, at least 800 marine leagues: we may, from hence, therefore, with safety affirm, that in this respect it is superior to France, though that be a much larger country; and equal to Spain and Portugal in this circumstance, though Britain is not half the size of that noble peninsula, which is also singularly happy in this very particular."

Cape-Coast, the name of the chief British settlement on the coast of Guinea, in Africa. The name is thought to be a corruption of *Cabo Corso*, the ancient Portuguese appellation. This cape is formed by an angular point, washed on the south and east by the sea, on which stands the English fort. Here the Portuguese settled in 1610, and built the citadel of Cape-Coast upon a large rock that projects into the sea. A few years afterwards they were dislodged by the Dutch, to whom this place is principally indebted for its strength. In 1664 it was demolished by Admiral Holmes, and in 1665 the famous Dutch Admiral De Ruyter was ordered by the states to revenge the insults of the English. With a squadron of 13 men of war, he attacked all the English settlements along the coast; ruined the factories; and took, burnt, and sunk all the shipping of the English Company: however, after all his efforts, he was baffled in his attempts on Cape-Coast. By the treaty of Breda it was confirmed to the English, and the king granted a new charter in 1672; on which the Company applied all their attention to the fortifying and rendering it commodious.

COASTING, in *Navigation*, the act of making a progress along the sea-coast of any country. The principal articles relating to this part of navigation are, the observing the time and direction of the tide; knowledge of the reigning winds; of the roads and havens; of the different depths of the water, and qualities of the ground.

Coasting-Pilot, a pilot who by long experience has become sufficiently acquainted with the nature of any particular coast, and of the requisites mentioned in the preceding article, to conduct a ship or fleet from one part of it to another.

COAT, or Coat of Arms, in *Heraldry*, a habit worn by the ancient knights over their arms, both in war and tournaments, and still borne by heralds at arms. It was a kind of fur-coat, reaching as low as the navel, open at the sides, with short sleeves, sometimes furred with ermine and hair, upon which were applied the armories of the knights embroidered in gold and silver, and enamelled with beaten tin coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diversified with bands and fillets of several colours, alternately placed, as we still see cloths scarleted, watered, &c. Hence they were called devices, as being divided and composed of several pieces sewed together; whence the words *fess*, *pale*, *chevron*, *bend*, *cross*, *saltier*, *lozenge*, &c. which have since become honourable pieces, or ordinaries of the shield. See Cross, Bend, Chevron, &c.

Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

Coat, in *Anatomy*. See Tunic and Eye.

Coat of Mail; a kind of armour made in form of a shirt; consisting of iron rings wove together netwise. See Mail.

COATI, in *Zoology*; a synonyme of a species of Viverra and Ursus. See Mammalia *Index*.

COATIMUNDI, a variety of the above.

Coating of Phials, *Panes of Glass*, &c. among electricians, is usually performed by covering the outside of the phial with tinfoil, brass, or gold-leaf, &c. and filling its inside with loose pieces of brass-leaf, by which means it becomes capable of being *charged*. See Electricity.

COATZONTECOXOCHITL, or *Flower with*

the viper's head, is the Mexican name of a flower of incomparable beauty. It is compofed of five petals or leaves, purple in the innermoft part, white in the middle, the reft red but elegantly ftained with yellow and white fpots. The plant which bears it has leaves refembling thofe of the iris, but longer and larger; its trunk is fmall and flim: This flower was one of the moft efteemed among the Mexicans. The Lincean academicians of Rome, who commented on and publifhed the Hiftory of Hernandez in 1651, and faw the paintings of this flower, with its colours, executed in Mexico, conceived fuch an idea of its beauty, that they adopted it as the emblem of their very learned academy, denominating it *Fior di Lince*.

COBALT, a metallic fubftance which was formerly claffed with the femimetals. See CHEMISTRY and MINERALOGY *Index*.

COBBING, a punifhment fometimes inflicted at fea. It is performed by ftriking the offender a certain number of times on the breech with a flat piece of wood called the *cobbing-board*. It is chiefly ufed as a punifhment to thofe who quit their ftation during the period of the night-watch.

COBITIS, the LOACHE, in *Ichthyology*, a genus of fifhes belonging to the order of abdominales. See ICHTHYOLOGY *Index*. It is frequent in the ftream near Amefbury in Wiltfhire, where the fportfmen, through frolic, fwallow it down alive in a glafs of white wine.

COBLE, a boat ufed in the turbot fifhery, twenty feet fix inches long, and five feet broad. It is about one ton burthen, rowed with three pair of oars, and admirably conftructed for encountering a mountainous fea.

COBLENTZ, an ancient, handfome, and ftrong town of Germany, in the electorate of Triers or Treves, feated at the confluence of the rivers Rhine and Mofelle, in a fertile country, with mountains covered with vineyards. It is the ufual refidence of the elector of Treves, to whom it belongs. Over the Rhine is a bridge of twelve arches, built for the convenience of the inhabitants of Coblentz and the adjacent places. A ferry machine is conftantly going from the city to the other fide of the Rhine, where there is a little town and very ftrong caftle built on an eminence named *the rock of honour*. This machine is erected on two boats, in the form of a large fquare gallery, encompaffed with balluftrades, and carries a tall flagftaff, on which are difplayed the arms of the electorate of Treves. It is put in motion by the ferry-man's pulling a rope, which is fixed to a ftandard on each fide the river. The caftle appears to be almoft inaccefible to an enemy, and entirely commands the city of Coblentz. The archbifhop's palace ftands at the foot of this rock, and the arfenal at a little diftance. E. Long. 7. 32. N. Lat. 50. 24.

COBOB, the name of a difh among the Moors. It is made of feveral pieces of mutton wrapt up in the cawl, and afterwards roafted in it; the poorer people, inftead of the meat, ufe the heart, liver, and other parts of the entrails, and make a good difh, though not equal to the former.

COBOOSE, in fea-language, is derived from the Dutch *kambuis*, and denotes a fort of box, refembling a fentry-box, ufed to cover the chimneys of fome merchant fhips. It generally ftands againft the barricade, on the fore-part of the quarter-deck. It is called in the Weft Indies *cobre vega*.

COBURG, a town of Germany in the circle of Franconia, and capital of a territory of the fame name, with a famous college, a fort, and a caftle. This town, with its principality, belongs to the houfe of Saxony, and the inhabitants are Proteftants. It is feated on the river Itch, in E. Long. 11. 18. N. Lat. 50. 22.

COBWEB, in *Phyfiology*, the fine net-work which fpiders fpin out of their own bowels, in order to catch their prey. See ARANEA.

COCCEIUS, JOHN, profeffor of theology at Bremen, was founder of a fect called *Cocceians*: they held, amongft other fingular opinions, that of a vifible reign of Chrift in this world, after a general converfion of the Jews and all other people to the true Chriftian faith, as laid down in the voluminous works of Cocceius. He died in 1699, aged 66.

COCCINELLA, in *Zoology*, a genus of infects of the order of coleoptera. See ENTOMOLOGY *Index*.

COCCOLOBO, in *Botany*, a genus of the trigynia order, belonging to the octandria clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. See BOTANY *Index*.

COCCOTHRAUSTES, the trivial name of a fpecies of LOXIA. See ORNITHOLOGY *Index*.

COCCULUS INDICUS, the name of a poifonous berry, too frequently mixed with malt-liquors in order to make them intoxicating; but this practice is exprefsly forbidden by act of parliament. It is the fruit of the *MENISPERMUM Cocculus*. Fifhermen have a way of mixing it with pafte, which the fifh fwallow greedily, and are thereby rendered lifelefs for a time, and float on the water. It is fometimes ufed with ftavefacre, for deftroying vermine in children's heads.

COCCUS, in *Zoology*, a genus of infects belonging to the order of hemiptera. See ENTOMOLOGY *Index*.

COCCYGÆUS MUSCULUS. See ANATOMY, *Table of the Mufcles*.

COCCYX, or COCCYGIS OS. See ANATOMY *Index*.

COCHIN, a Dutch fettlement on the coaft of Malabar, in N. Lat. 10. 0. E. Long. 75. 30. The town is not unpleafant, though it falls far fhort of their fettlement at Columbo in the ifland of Ceylon. The fortification is irregular, but ftrong enough to refift any of the Indian powers, and has 40 or 50 cannon facing the fea. The people in this town and the country adjacent are fubject to a ftrange diforder of the legs, called *Cochin* or *elephant legs*, in which the fwelled limb is fometimes of fuch an enormous bulk as to have greatly the appearance both in fhape and fize of the leg of an elephant. According to Mr Ives, this diforder feems to be merely an œdematous fwelling, occafioned by an impoverifhed ftate of the blood and juices. The perfons afflicted with this diftemper very feldom apply to European furgeons, and thus are rarely, if ever, cured. Indeed, our author obferves, that their application would probably be of little avail, as the only thing that could be prefcribed would be an alteration from the pooreft to the moft cordial and nutritious diet; and the Indians are fo invincibly wedded to their own cuftoms, that they would fooner die than break through them. Of this he fays there were

several instances in their long passage to Bengal, during which some of the Sepoys perished for want of food, rather than save themselves by partaking of the ship's provisions after their own had been expended. Most of those afflicted with the disorder we speak of, are unable to call any assistance, being the very poorest of the people, who live entirely upon a kind of fish called *sardinias*, without being able to purchase even the smallest quantity of rice to eat along with it; their drink is also mere water, unless they sometimes procure a draught of the simple unfermented juice called *toddy*. Cochin is the principal place from whence the Dutch import their pepper into Europe.

Cochin-China, a kingdom of Asia, bounded on the north by Tonquin; on the east, by the sea of China; on the south by the Indian ocean; and on the west by Cambodia, and a ridge of mountains inhabited by a savage people called *Kemois*, who live independent of any government. Little of the history of this kingdom is known. M. le Poivre, a French traveller, informs us, that about half a century before the French first arrived in these distant regions, a prince of Tonquin, as he fled from his sovereign, by whom he was pursued as a rebel, had with his soldiers and adherents crossed the river, which serves as a barrier between Tonquin and Cochin-China. The fugitives, who were warlike and civilized men, soon expelled the scattered inhabitants, who wandered about without any society or form of government, and founded a new kingdom, which soon grew rich and populous. During the reigns of the first six kings, no nation could be happier than the Cochin-Chinese. Their monarchs governed them as a father does his family, establishing no laws but those of nature, to which they themselves were the first to pay obedience. They honoured and encouraged agriculture, as the most useful employment of mankind; and required from their subjects only a small annual free-gift to defray the expence of their defensive war against the Tonquinese, who were their enemies. This imposition was regulated, by way of poll-tax, with the greatest equity. Every man, able to till the ground, paid in to the prince a small sum proportioned to the strength of his constitution, and the vigour of his arm, and nothing more.

Cochin-China continued happy under these princes for more than a century; but the discovery of gold-mines put a stop to the above mild regulations. Luxury immediately took place. The prince began to despise the simple habitation of his ancestors, and caused a superb palace to be built a league in circumference, surrounded with a wall of brick on the model of that of Pekin, and defended by 1600 pieces of cannon. Not content with this, he would needs have a winter palace, an autumn palace, and a summer palace. The old taxes were by no means sufficient to defray these expences; new ones were devised; and oppression and tyranny everywhere took place. His courtiers, to flatter their prince, gave him the title of the *king of heaven*, which he still continues to assume. When speaking of his subjects, he styles them his *children*, but by no means behaves as if he was their father; for our author informs us, that he has seen whole villages newly abandoned by their inhabitants, who were harassed with toil and insupportable exactions; the necessary consequence of which was, that their lands returned to their former uncultivated state.

M. le Poivre represents the Cochin-Chinese as gentle, hospitable, frugal, and industrious. There is not a beggar in the country, and robbery and murder are absolutely unknown. A stranger may wander over the kingdom from one end to the other (the capital excepted) without meeting with the slightest insult. He will be everywhere received with the most eager curiosity, but at the same time with the greatest benevolence. A Cochin-Chinese traveller, who has not money sufficient to defray his expences at an inn, enters the first house of the town or village he arrives at, and waiting the hour of dinner, takes part with the family, and goes away when he thinks proper, without speaking a word, or any person's putting to him a single question.

The country of Cochin-China is much of the same temperature with that of Tonquin; though rather milder, as lying near the sea. Like Tonquin, it is annually overflowed, and consequently fruitful in rice, which requires no other manure than the mud left by the inundations. They have sugar-canes, and the same kinds of fruits common to other parts of India. The country produces no grapes, and therefore they drink a liquor brewed from rice. They have vast woods of mulberry-trees, which run up as fast as our hemp. Their silk is stronger than that of China, but not so fine. They have the best timber in the world, particularly a sort which abounds in the mountains, and is called the *incorruptible tree*, because it never rots under earth or water, and is so solid that it serves for anchors. There are two kinds, black and red. The trees are very tall, straight, and so big that two men can scarce grasp them. They have also on the mountains of the Kemois a tree of the most fragrant scent, which is supposed to be the same with lignum aloes. This, being reckoned the best product of the country, is engrossed by the king, and is sold from five to 16 ducats per pound. It is highly valued both in China and Japan, where the logs of it are sold for 200 ducats a pound, to make pillows for the king and nobility; and among those Indians which continue to burn their dead, great quantities of it are used in the funeral piles. The young trees called *aquila*, or eagle-wood, are every one's property, which make the old ones called *calamba* so scarce and dear. They have oak, and large pines, for the building of ships, so that this country is of the same use to China that Norway is to Britain. In general, they have the same kind of trees and plants that are to be met with in Tonquin. They have mines of gold, as well as diamonds; but the last they do not value so high as pearl. They also esteem their coral and amber very much. In all the provinces there are great granaries filled with rice, in some of which that grain is kept upwards of 30 years. One of the greatest rarities of these parts, especially in grand entertainments, is a ragout made of the eatable birds-nests, which some say are found only in Cochin-China, and others in four islands that lie south of its coast. See Birds-Nests.

The merchants of Cambodia, Tonquin, China, Macao, Manila, Japan, and Malacca, trade to Cochin-China with plate, which they exchange for the commodities of the country. The Portuguese are the most favoured

favoured here of any Europeans. The Cochin Chinese themselves, not being inclined to travel, seldom sail out of sight of their own shore, but purchase many trifles from foreigners at great rates, particularly combs, needles, bracelets, glass pendants, &c. They are very fond of our hats, caps, girdles, shirts, and other clothes; and, above all, set a great value on coral. The country is said to have 700 miles of coast, with many large inlets of the sea, and above 60 convenient landing places; which, however, according to Captain Hamilton, are but seldom visited by strangers.

The people of this country have a great affinity with those of Tonquin, with whom they have a common origin, and from whom they differ very little in their manner of living, as well as their manners and customs, all of which they have in a great measure borrowed from the Chinese. The principal exports of the country are silk, sugar, ebony, and calamba wood; gold in dust or in bars, which is sold for only ten times its weight in silver; and copper and porcelain brought from China and Japan. From this country also are exported the birds-nests esteemed such a delicacy at the table. They are found in four islands situated near the coasts of Cochin-China, to the eastward of which are five other smaller ones, where are found prodigious numbers of turtles, the flesh of which is so delicate that the Tonquinese and people of Cochin-China frequently fight desperate battles, in order to take them from one another. The commodities which sell most readily in this country are, saltpetre, sulphur, lead, fine cloth, and barred or flowered chintz. Pearls, amber, and coral, were formerly in great request, but at present only the two last are saleable; and even these will not answer unless the beads of coral be round, well polished, and of a beautiful red colour; the amber must also be extremely clear, the beads of an equal size, and not larger than a hazel nut.

The only money current in Cochin-China is that of Japan, which is paid and received by weight. The money of the country is of copper and as large as our countries; of a round figure, and having a hole in the middle by which the pieces may be strung like beads. Three hundred of these are put on one side, and as many on the other, which in Cochin-China pass for a thousand; because in 600 are found ten times 60, which make a century among almost all the people of the east. There is, however, scarce any country in which merchants are more apt to be deceived with regard to the value of money than Cochin-China, owing to the pieces being unequal in figure and quality, and the difficulty of determining their value, which is regulated only by a few characters stamped upon them. The dealers must therefore be at pains to have honest and skilful people to ascertain the value of the pieces they receive, otherwise they run a great risk of being deceived in their value, as the Cochin-Chinese make a great merit of being able to cheat an European.

European merchants complain, according to M. Grosier, unjustly of the demands made in Cochin-China for entrance, clearance, and anchorage. The duties, indeed, are very trifling, amounting only, even those of the customhouse, to 4 per cent.; but nothing can be removed from a ship which arrives there until she has first been inspected, when the customhouse officers unload her, weigh and count the smallest pieces, and generally take what they look upon to be most valuable, in order to send it to the king. The monarch takes what he thinks proper, and returns the value; but the grandees are said to keep part of the goods also, without paying any thing for them. Thus the ordinary goods, which, had they been accompanied with the more valuable part of the cargo, would have found a ready market, can now scarcely be disposed of; though our author is of opinion, that the matter is not altogether without remedy. When the Dutch sent to this country vessels loaded with cloths, lead, and saltpetre, their cargoes were suffered to remain entire, because they had taken the precaution to pay every year a certain sum for each vessel that entered. Other nations, by endeavouring to avoid the payment of this duty, entirely destroyed their commerce: the people of Cochin-China, however, for some years past, have been much more moderate in their demands; and whatever their exactions may be, they are far less exorbitant than those of the Tonquinese.

M. Grosier observes, that a false report has gained ground in Europe, that when a trading vessel happens to run aground in Cochin-China, or to be driven into any of its harbours by stress of weather, the king seizes the cargo if the rudder be broken. He assures us, however, that, so far from this being the case, a vessel in distress is much safer on the coasts of Cochin-China than almost anywhere else. Barks are immediately sent to the relief of the crew, and people employed to drag the sea with nets in order to recover the goods that are lost; and, in short, neither labour nor expences are spared to put the ships in the best condition possible. Only two things can hurt the trade of foreigners at Cochin-China, one of which may be easily avoided. This regards the clearing out of vessels. Thus, while the master is waiting on the evening before his departure, or on the day fixed for sailing, in order to receive his dispatches, it often happens that he loses his voyage, which may prove the ruin of a trader. For this reason, care must be taken to solicit a clearance a month before; by which means one is always certain of obtaining it, and departing on the day appointed. The other difficulty is occasioned by the necessity of selling goods on credit, which are seldom paid at the stipulated time. This, however, is contrary to the inclination of the prince; for every merchant who can convey to him an account of these unjust delays, is sure to be paid, and sometimes even with interest.

COCHINEAL, or COCHINEEL, a drug used by the dyers, &c. for giving red colours, especially crimsons and scarlets, and for making carmine; and likewise in medicine as a cardiac, cordial, sudorific, alexipharmac, and febrifuge.

The cochineal, in the state in which it is brought to us, is in small bodies of an irregular figure, usually convex, ridged and furrowed on one side, and concave on the other. The colour of the best is a purplish gray, powdered over with a sort of white dust. All that the world knew of it for a long time was, that it was gathered from certain plants in Mexico; and therefore it was naturally supposed to be a seed, till in the year 1692 Father Plumier gave Pomet an account

count of its being an animal. And this, though then disregarded, has been confirmed by subsequent observations. Indeed, to determine the point, we have now the means in our own hands, even in this part of the world.—We need only moisten and soak in water, or in vinegar, a number of cochineals till they are swelled and distended, to know that every one is the more or less perfect body of an insect; the most imperfect and mutilated specimens always show the rings of the body; and from observing others, it will be easy to find the number and disposition of the legs, parts, or even whole ones, being left on several, and often complete pairs. In this way the legs, antennæ, and proboscis, may be discovered. See COCCUS above, and DYEING.

M. Macquer observes, that the cochineal of Sylvester is gathered in the woods of Old and New Mexico. The insect lives, grows, and multiplies on the uncultivated opuntias, which grow there in great abundance. It is there exposed to the inclemencies of the weather, and dies naturally. The colour is more durable than that of the common cochineal, but less bright: but there is no advantage in using it; for, though cheaper, a greater quantity is requisite.

COCHLEA, the SHELL-SNAIL. See HELIX, CONCHOLOGY *Index*.

COCHLEA, in *Anatomy*. See ANATOMY *Index*.

COCHLEARIA, SCURVY-GRASS. See BOTANY *Index*.

COCHLITES, in *Natural History*, an appellation given to the petrified shells of the cochleæ or snails.

COCINTUM, in *Ancient Geography*, a promontory of the Bruttii, reckoned the longest in Italy, and which Holstenius and Vossius have restored to Ovid, reading *Cocintia* for *Ceurania*, Metam. xv. v. 704.—*Cocintum*, also a town 22 miles to the south of Scylaceum, almost on the spot where now *Stilo* stands, from which the opposite promontory *Cocintum* is commonly called *Capo de Stilo*.

COCK, in *Zoology*, the English name of the males of gallinaceous birds, but more especially used for the common dunghill cock. See PHASIANUS, ORNITHOLOGY *Index*.

Black-COCK. } See TETRAO, ORNITHOLOGY
COCK of the Wood. } *Index*.

COCK-Chaffer. See SCARABÆUS, ENTOMOLOGY *Index*.

COCK-Paddle, *Lump-fish* or *Sea-owl*. See CYCLOPTERUS, ICHTHYOLOGY *Index*.

COCK-Pit, a sort of theatre upon which game-cocks fight.

It must appear astonishing to every reflecting mind, that a mode of diversion so cruel and inhuman as that of cock-fighting should so generally prevail; that not only the ancients, barbarians, Greeks, and Romans, should have adopted it; but that a practice so savage and heathenish should be continued by Christians of all sorts, and even pursued in these better and more enlightened times.

The ancient Greeks and Romans, as is well known, were wont to call all the nations in the world barbarians; yet certainly, if we consider the many instances of cruelty practised among them, there was very little reason for the distinction. Human sacrifices were common both to them and the barbarians; and with them

the exposing of infants, the combats of men with wild beasts, and of men with men in the gladiatorial scenes, were spectacles of delight and festivity.

The islanders of Delos, it seems, were great lovers of cock-fighting; and Tanagra a city in Bœotia, the isle of Rhodes, Chalcis in Eubœa, and the country of Media, were famous for their generous and magnanimous race of chickens. The kingdom of Persia was probably included in the last, from whence this kind of poultry was first brought into Greece; and if one may judge of the rest from the fowls of Rhodes and Media, the excellency of the broods at that time consisted in their weight and largeness (as the fowls of those countries were heavy and bulky), and of the nature of what our sportsmen call *shakebags* or *turnpokes*. The Greeks, moreover, had some method of preparing the birds for battle, by feeding; as may be collected from Columella.

It should seem, that at first cock-fighting was partly a religious and partly a political institution at Athens; and was there continued for the purpose of improving the seeds of valour in the minds of their youth; but was afterwards abused and perverted both here and in the other parts of Greece to a common pastime, without any moral, political, or religious intention, and as it is now followed and practised among us.

At Rome, as the Romans were prone to imitate the Greeks, we may expect to find them following their example in this mode of diversion, and in the worst way, viz. without any good or laudable motives, since when they took and brought it to Rome, the Greeks had forgotten every thing that was commendable in it, and had already perverted it to a low and unmeaning sport. Signior Hyam thinks the Romans borrowed the pastime from Dardanus, in Asia; but there is little reason for making them go so far from it, when it was so generally followed in Greece, whose customs the Romans were addicted to borrow and imitate. However, it is probable, they did not adopt this opinion very early. It may be gathered from Columella, that the Romans did not use the sport in his time. This author styles cock-fighting a *Grecian diversion;* and speaks of it in terms of ignominy as an expensive amusement, unbecoming the frugal householder, and often attended with the ruin of the parties that followed it. "The words are remarkable. "Nos enim censemus instituere vectigal industrii patris familias, non rixosarum avium lanistæ, cujus plerumque totum patrimonium pignus aleæ, victor gallinaceus pyctes abstulit:" When he describes, as we think, the manner not of the Romans, but of the Greeks, who had in his time converted the diversion of cock-fighting into a species of gaming, and even to the total ruin of their families, as happens but too often in England at this day. The Romans, however, at last gave into the custom, though not till the decline of the empire. The first cause of contention between the two brothers Bassianus and Geta, sons of the emperor Septimus Severus, happened, according to Herodian, in their youth, about the fighting of their cocks; and if the battling between those two princes was the first instance of it, probably they had seen and learned it in Greece, whither they had often accompanied the emperor their father.

It is observable, that cocks and quails pitted for the

purpoſe of engaging one another, *à outrance*, or to the laſt gaſp, for diverſion, are frequently compared, and with much propriety, to gladiators. Hence Pliny's expreſſion, *Gallorum——ceu gladiatorum*; and that of Columella, *rixoſarum avium laniſtæ; laniſta* being the proper term for the maſter of the gladiators. Conſequently one would expect, that when the bloody ſcenes of the amphitheatre were diſcarded, as they were ſoon after the Chriſtian religion became the eſtabliſhment of the empire, the wanton ſhedding of men's blood in ſport, being of too cruel and ſavage a nature to be patronized and encouraged in an inſtitution ſo harmleſs and innocent as the Chriſtian was, one might juſtly expect that the ορτυγομανια and the αλεκτρυομανια would have ceaſed of courſe. The fathers of the church are continually inveighing againſt the ſpectacles of the arena, and upbraiding their adverſaries with them. Theſe indeed were more unnatural and ſhocking than a main of cocks; but this, however, had a tendency towards infuſing the like ferocity and implacability in the breaſts and diſpoſitions of men.

Beſides, this mode of diverſion has been in fact the bane and deſtruction of thouſands here, as well as of thoſe *laniſtæ avium*, "cock-feeders," mentioned by Columella, whoſe patrimonial fortunes were totally diſſipated and deſtroyed by it.

The cock is not only an uſeful animal, but ſtately in his figure, and magnificent in his plumage. "*Imperitant ſuo generi*, ſays Pliny, *et regnum* in quacunque ſunt domo, *exercent*." Ariſtophanes compares him to the king of Perſia; moſt authors alſo take notice of the "ſpectatiſſimum inſigne, ſerratum, quod eorum verticem *regiæ coronæ modo* exornat." His tenderneſs towards his brood is ſuch, that, contrary to the cuſtom of many other males, he will ſcratch and provide for them with an aſſiduity almoſt equal to that of the hen; and his generoſity is ſo great, that, on finding a hoard of meat, he will chuckle the hens together, and without touching one bit himſelf will relinquiſh the whole of it to them. He was called *the bird*, κατ' ἐξοχην, by many of the ancients; he was highly eſteemed in ſome countries, and in others was even held ſacred, inſomuch that one cannot but regret that a creature ſo uſeful and noble, ſhould, by a ſtrange fatality, be ſo enormouſly abuſed by us. It is true, our αλεκτρυομανια, or the maſſacre of Shrove Tueſday, is now in a declining way; and, in a few years, it is to be hoped, will be totally diſuſed; but the cock-pit ſtill continues a reproach to the humanity of Engliſhmen, and to their religion; the pureſt, the tendereſt, and moſt compaſſionate, of all others, not excepting even the Brachmannic.

It is unknown when the pitched battle firſt entered England, but it was probably brought hither by the Romans. This bird was here before Cæſar's arrival, but no notice of his fighting occurs earlier than the time of William Fitz-Stephen, who wrote the life of Archbiſhop Becket, ſome time in the reign of Henry II. and deſcribes the cocking as a ſport of ſchool-boys on Shrove Tueſday. From this time at leaſt the diverſion, however abſurd and even impious, was continued amongſt us. It was followed, though diſapproved and prohibited, 39 Edward III.; alſo in the reign of Henry VIII. and A. D. 1569. It has by ſome been called a *royal diverſion*; and, as every one knows, the cock-pit at Whitehall was erected by a crowned head, for the more magnificent celebration of it. There was another pit in Drury-lane, and another in Javin-ſtreet. It was prohibited, however, by one of Oliver's acts, March 31. 1664. What aggravates the reproach and diſgrace upon Engliſhmen, are thoſe ſpecies of fighting which are called the *battle-royal* and the *Welſh-main*, known nowhere in the world but there; neither in China, nor in Perſia, nor in Malacca, nor among the ſavage tribes in America. Theſe are ſcenes ſo bloody as almoſt to be too ſhocking to relate; and yet, as many may not be acquainted with the horrible nature of them, it may be proper for the excitement of our averſion and deteſtation to deſcribe them in a few words. In the former, an unlimited number of fowls are pitted, and when they have ſlaughtered one another for the diverſion (*Dii boni!*) of the otherwiſe generous and humane Engliſhman, the ſingle ſurviving bird is to be eſteemed the victor, and carries away the prize. The Welſh-main conſiſts we will ſuppoſe of 16 pairs of cocks; of theſe, the 16 conquerors are pitted a ſecond time; the 8 conquerors of theſe are pitted a third time; the 4 conquerors the fourth time; and laſtly, the two conquerors of theſe are pitted the fifth time; ſo that (incredible barbarity) 31 cocks are ſure to be moſt inhumanly murdered for the ſport and pleaſure, the noiſe and nonſenſe, the profane curſing and ſwearing, of thoſe who have the effrontery to call themſelves, with all theſe bloody doings, and with all this impiety about them, *Chriſtians*; nay, what with many is a ſuperior and diſtinct character, men of benevolence and morality. But let the morality and benevolence of ſuch be appreciated from the following inſtance recorded as authentic in the obituary of the Gentleman's Magazine for April 1789. "Died April 4. at Tottenham, John Ardeſoif, Eſq. a young man of large fortune, and in the ſplendour of his carriages and horſes rivalled by few country gentlemen. His table was that of hoſpitality, where it may be ſaid he ſacrificed too much to conviviality; but if he had his foibles, he had his merits alſo that far outweighed them. Mr Ardeſoif was very fond of cock-fighting, and had a favourite cock upon which he had won many profitable matches. The laſt bet he laid upon this cock he loſt; which ſo enraged him, that he had the bird tied to a ſpit and roaſted alive before a large fire. The ſcreams of the miſerable animal were ſo affecting, that ſome gentlemen who were preſent attempted to interfere, which ſo enraged Mr Ardeſoif, that he ſeized a poker, and with the moſt furious vehemence declared, that he would kill the firſt man who interpoſed; but, in the midſt of his paſſionate aſſeverations, he fell down dead upon the ſpot. Such, we are aſſured, were the circumſtances which attended the death of this great pillar of humanity."

COCK-PIT, of a ſhip of war, the apartment of the ſurgeon and his mates, being the place where the wounded men are dreſſed in time of battle, or otherwiſe. It is ſituated under the lower deck.

COCKBURNE, MRS CATHARINE, a moſt accompliſhed lady and celebrated writer, was the daughter of Captain David Trotter, a native of Scotland, and a ſea-commander in the reign of King Charles II. She was born in London, Auguſt 16. 1679, and baptized in the

the Protestant church, according to which she was bred up. She gave early marks of her genius; and learned to write, and also made herself mistress of the French language, by her own application and diligence without any instructor; but she had some assistance in the study of the Latin grammar and logic, of which latter she drew up an abstract for her own use. The most serious and important subjects, and especially religion, soon engaged her attention.—But notwithstanding her education, her intimacy with several families of distinction of the Romish persuasion, exposed her, while very young, to impressions in favour of that church, which not being removed by her conferences with some eminent and learned members of the church of England, she embraced the Romish communion, in which she continued till the year 1707. In 1695 she produced a tragedy called *Agnes de Castro*, which was acted at the theatre-royal when she was only in her 17th year. The reputation of this performance, and the verses which she addressed to Mr Congreve upon his Mourning Bride in 1697, were probably the foundation of her acquaintance with that celebrated writer. Her second tragedy, Fatal Friendship, was acted in 1698, at the new theatre in Lincoln's-Inn Fields. This tragedy met with great applause, and is still thought the most perfect of her dramatic performances. Her dramatic talents not being confined to tragedy, she brought upon the stage, in 1707, a comedy called *Love at a Loss*, or *Most votes carry it*. In the same year she gave the public her third tragedy, entitled the *Unhappy Penitent*, acted at the theatre-royal in Drury-lane. But poetry and dramatic writing did not so far engross the thoughts of our author, but that she sometimes turned them to subjects of a very different nature, and distinguished herself in an extraordinary manner in defence of Mr Locke's writings, a female metaphysician being a remarkable phenomenon in the republic of letters.

She returned to the exercise of her dramatic genius in 1703, and fixed upon the revolution of Sweden, under Gustavus Erickson, for the subject of a tragedy. This tragedy was acted in 1706, at the queen's theatre in the Hay-Market. In 1707, her doubts concerning the Romish religion, which she had so many years professed, having led her to a thorough examination of the grounds of it, by consulting the best books on both sides of the question, and advising with men of the best judgment, the result was a conviction of the falseness of the pretensions of that church, and a return to that of England, to which she adhered during the remainder of her life. In 1708 she was married to the Rev. Mr Cockburne, then curate of St Dunstan's in Fleet-street, but he afterwards obtained the living of Long-Horsely, near Morpeth in Northumberland. He was a man of considerable abilities; and, among several other things, wrote an account of the Mosaic Deluge, which was much approved by the learned.

Mrs Cockburne's remarks upon some writers in the controversy concerning the foundation of moral duty and moral obligation, were introduced to the world in August 1712, in the Literary Journal, entitled, *The History of the Works of the Learned*. The strength, clearness, and vivacity shown in her remarks upon the most abstract and perplexed questions, immediately raised the curiosity of all good judges about the concealed writer; and their admiration was greatly increased when her sex and advanced age were known. Dr Rutherford's Essay on the Nature and Obligations of Virtue, published in May 1744, soon engaged her thoughts; and notwithstanding the asthmatic disorder which had seized her many years before, and now left her small intervals of ease, she applied herself to the confutation of that elaborate discourse, and finished it with a spirit, elegance, and perspicuity, equal, if not superior, to all her former writings.

The loss of her husband in 1748, in the 71st year of his age, was a severe shock to her; and she did not long survive him, dying on the 11th of May 1749, in her 71st year, after having long supported a painful disorder with a resignation to the Divine will, which had been the governing principle of her whole life, and her support under the various trials of it.

Her works are collected into two large volumes 8vo by Dr Birch, who has prefixed to them an account of her Life and Writings.

COCKERMOUTH, a town of Cumberland in England, situated in W. Long. 3. 12. N. Lat. 54. 35. It is a large town, irregularly built, with broad streets. It is washed by the Derwent on the western side; divided in two by the Cocker; and the parts are connected by a stone bridge of a single arch. The number of inhabitants is between three and four thousand: the manufactures are shalloons, worsted stockings, and hats; the last exported from Glasgow to the West Indies. It is a borough-town, and the right of voting is vested by burgess tenure in certain houses: this is also the town where the county elections are held.—Here is a castle seated on an artificial mount on a bank above the Derwent. It is a square building, and strengthened with several square towers: on each side of the inner gate are two deep dungeons capable of holding 50 persons in either. They are vaulted at top, and have only a small opening in order to lower through it the unhappy victims into this dire prison; and on the outside of each is a narrow slit with a slope from it, down which were put the provisions allotted for the wretched inhabitants. This castle was founded by Waldof, first lord of Allerdale, and son of Gospatrick earl of Northumberland, cotemporary with William the Conqueror. Waldof resided first at Papcastle, which he afterwards demolished; and with the materials built that at Cockermouth, where he and his family long resided; but several arms over the gateway, which Camden says are those of the *Multons*, *Humfrenvilles*, *Lucies*, and *Percies*, evince it to have belonged in later times to those families. It appears that it was first granted by Edward II. to Anthony de Lucie, son of Thomas de Multon, who had assumed that name, because his mother was daughter and co-heiress to Richard de Lucie; and afterwards, by marriages, this castle and its honours descended to the Humfranvilles, and finally to the Percies. In 1658, it was garrisoned for the king; and being besieged and taken by the rebels, was burnt, and never afterwards repaired.—Cockermouth is now in the possession of the Lowther family, who have here a great property in coal-works. The town sends two members to parliament.

COCKET, is a seal belonging to the king's custom-house,

houfe, or rather a fcroll of parchment fealed and delivered by the officers of the cuftoms to merchants, as a warrant that their merchandifes are cuftomed.

It is alfo ufed for the office where goods tranfported were firft entered, and paid their cuftom, and had a cocket or certificate of difcharge.

COCKLE. See Cardium, Conchology *Index*.

Cockle, *Schorl*, or *Shirle*, in *Mineralogy*, a fpecies of ftones, belonging to the filiceous clafs. See Mineralogy *Index*.

COCKNEY, a very ancient nickname for a citizen of London. Ray fays, an interpretation of it is, A young perfon coaxed or cockered, made a wanton, or neftle-cock, delicately bred and brought up, fo as when arrived at man's eftate to be unable to bear the leaft hardfhip. Another, A perfon ignorant of the terms of country economy, fuch as a young citizen, who having been ridiculed for calling the neighing of a horfe laughing, and told that it was called neighing, next morning, on hearing the cock crow, to fhow inftruction was not thrown away upon him, exclaimed to his former inftructor, How that cock neighs! whence the citizens of London have ever fince been called cockneighs, or cockneys. Whatever may be the origin of this term, we at leaft learn from the following verfes, attributed to Hugh Bagot earl of Norfolk, that it was in ufe in the time of King Henry II.

> Was I in my caftle at Bungay,
> Faft by the river Waveney,
> I would not care for the king of Cockney.
> (i. e. the king of London.)

The king of the cockney occurs among the regulations for the fports and fhows formerly held in the Middle Temple, on Childermas day, where he had his officers, a marfhal, conftable, butler, &c. See Dugdale's *Origines Juridicales*, p. 247.

COCKROACH. See Blatta. In Captain Cook's laft voyage, the fhips, while at Huaheine, were infefted with incredible numbers of thefe creatures, whom it was found impoffible by any means to deftroy. Every kind of food, when expofed only for a few minutes, was covered with thefe noxious infects, and pierced fo full of holes, that it refembled a honey comb. They were particularly deftructive to birds which had been ftuffed for curiofities, and were fo fond of ink, that they ate out the writing on labels. Books, however, were fecured from their ravages by the clofenefs of the binding, which prevented them from getting in between the leaves. They were of two kinds, the *Blatta Orientalis* and *Germanica*.

COCKSWAIN, or Cockson, an officer on board a man of war, who hath the care of the boat or floop, and all things belonging to it. He is to be always ready with his boat's gang or crew, and to man the boat on all occafions. He fits in the ftern of the boat, and fteers; and hath a whiftle to call and encourage his men.

COCLES, Pub. Horatius, a celebrated Roman, who alone oppofed the whole army of Porfenna at the head of a bridge, while his companions behind him were cutting off the communication with the other fhore. When the bridge was deftroyed, Cocles, though wounded by the darts of the enemy, leapt into the Tiber, and fwam acrofs it with his arms. A brazen ftatue was raifed to him in the temple of Vulcan, by the conful Publicola, for his eminent fervices.

COCOA. See Cocos, Botany *Index*.

COCONATO, a town of Piedmont in Italy, famous for being the birth-place of Columbus, who firft difcovered America. E. Long. 8. 0. N. Lat. 44. 50.

COCOS, in *Botany*, a genus belonging to the natural order of *Palmæ*. See Botany *Index*.

COCTION, a general term for all alterations made in bodies by the application of fire or heat.

COCYTUS, one of the rivers of hell, according to the theology of the poets. It has its name απο τȣ κωκυειν, from groaning and lamenting. Hence Milton,

> Cocytus nam'd of lamentation loud,
> Heard on the rueful ftream.

It was a branch of the river Styx: and flowed, according to Horace, with a dull and languid ftream.

COD, in *Ichthyology*. See Gadus and Fishery.

Cod is alfo a term ufed, in fome parts of the kingdom, for a pod. See Pod.

Cod-Cape, a promontory on the coaft of New England, near the entrance of Bofton harbour. W. Long. 69. 50. N. Lat. 42. 0.

CODDY moddy, the Englifh name of a fpecies of Larus.

CODE (*codex*), a collection of the laws and conftitutions of the Roman emperors, made by order of Juftinian. The word comes from the Latin *codex*, "a paper book;" fo called *à codicibus*, or *caudicibus arborum*, "the trunks of trees;" the bark whereof being ftripped off, ferved the ancients to write their books on.

The code is accounted the fecond volume of the civil law, and contains twelve books; the matter of which is nearly the fame with that of the digefts, efpecially the firft eight books; but the ftyle is neither fo pure, nor the method fo accurate, as that of the digefts; and it determines matters of daily ufe, whereas the digefts difcufs the more abftrufe and fubtle queftions of the law, giving the various opinions of the ancient lawyers. Although Juftinian's code is diftinguifhed by the appellation of *code*, by way of eminence, yet there were codes before his time: fuch were, 1. The Gregorian code, and Hermogenean code, collections of the Roman laws, made by two famous lawyers, Gregorius and Hermogenes, which included the conftitutions of the emperors from Adrian to Dioclefian and Maximinus. 2. The Theodofian code, comprifed in 16 books, formed out of the conftitutions of the emperors from Conftantine the Great to Theodofius the Younger: this was obferved almoft over all the weft, till it was abrogated by the Juftinian code. There are alfo feveral later codes, particularly the ancient Gothic, and thofe of the French kings; as the code of Euridic, code-Lewis, code-Henry, code-Marchande, code des Eaux, &c.; and the prefent king of Pruffia has lately publifhed a code, which comprifes the laws of his kingdom in a very fmall volume.

CODEX, in antiquity, denotes a book or tablet on which the ancients wrote. See Code.

Codex alfo denoted a kind of punifhment by means of a clog or block of wood, to which flaves who had offended

fended were tied faſt, and obliged to drag it along with them; and ſometimes they ſat on it cloſely bound.

CODIA, among botaniſts, ſignifies the head of any plant, but more particularly a poppy head; whence its ſyrup is called *diacodium.*

CODICIL, is a writing, by way of ſupplement to a will, when any thing is omitted that the teſtator would have added, or wants to be explained, altered, or recalled.

CODLIN, an apple uſeful in the kitchen, being the moſt proper for baking.

CODLING, an appellation given to the young cod-fiſh. See GADUS, ICHTHYOLOGY *Index.*

CODON (Κωδων), in antiquity, a cymbal, or rather little braſs bell, reſembling the head of a poppy. They were faſtened to the trappings and bridoles of horſes.

CODRINGTON, CHRISTOPHER, a brave Engliſh officer, and not leſs diſtinguiſhed for his learning and benevolence, was born at Barbadoes in the year 1668, and educated at Oxford; after which he betook himſelf to the army; and by his merit and courage, ſoon recommending himſelf to the favour of King William, was made a captain in the firſt regiment of foot-guards. He was at the ſiege of Namur in 1695; and, upon the concluſion of the peace of Ryſwick, was made captain-general and governor in chief of the Leeward and Caribbee iſlands. However, in 1701, ſeveral articles were exhibited againſt him to the houſe of commons in England; to which he publiſhed a diſtinct and particular anſwer, and was honourably acquitted of all imputations. In 1703, he ſhowed great bravery at the attack of Guadaloupe, but at laſt he reſigned his government, and lived a ſtudious retired life; for a few years before his death, he chiefly applied himſelf to church-hiſtory and metaphyſics. He died at Barbadoes on the 7th of April 1710, and was buried there the day following; but his body was afterwards brought over to England, and interred on the 19th of June 1716, in the chapel of All-Souls College, Oxford. By his laſt will, he bequeathed his plantations in Barbadoes, and part of the iſland of Barbuda, to the ſociety for propagating the goſpel in foreign parts; and left a noble legacy to All-Souls College, of which he had been a fellow. This legacy conſiſted of his library, which was valued at 6000l.; and 10,000l. to be laid out, 6000 in building a library, and 4000 in furniſhing it with books. He wrote ſome of the poems in the *Muſæ Anglicanæ*, printed at London in 1741.

CODRUS, the 17th and laſt king of Athens, ſon of Melanthus. When the Heraclidæ made war againſt Athens, the oracle ſaid that the victory would be granted to that nation whoſe king was killed in battle. The Heraclidæ upon this gave ſtrict orders to ſpare the life of Codrus; but the patriotic king diſguiſed himſelf and attacked one of the enemy, by whom he was killed. The Athenians obtained the victory, and Codrus was deſervedly called the father of his country. He reigned 21 years, about 2153 years before the Chriſtian era. To pay more honour to his memory, the Athenians made a reſolution that no man after Codrus ſhould reign in Athens under the name of *king*.

COECUM, or BLIND GUT. See ANATOMY *Index.* Dr Muſgrave gives us an account, in the Philoſophical Tranſactions, of the cœcum of a dog being cut out without any prejudice to the animal. Mr Giles gives us another of the cœcum of a lady being diſtended, ſo as to form a tumour that held almoſt ſix pints of a thin grayiſh, almoſt liquid ſubſtance, of which ſhe died. And Mr Knowler a third, of a boy's cœcum being vaſtly extended and ſtuffed with cherry-ſtones, which likewiſe proved mortal.

COEFFICIENTS, in *Algebra*, are ſuch numbers or known quantities as are put before letters or quantities, whether known or unknown, and into which they are ſuppoſed to be multiplied. Thus in $3x$, ax, or bx; 3, a and b, are the coefficients of x; and in $6a$, $9b$; 6 and 9 are the coefficients of a and b. See ALGEBRA.

COELESTIAL, or CELESTIAL, in general, denotes any thing belonging to the heavens: thus we ſay, *celeſtial obſervations*, the *celeſtial globe*, &c.

COELIAC ARTERY, in *Anatomy*, that artery which iſſues from the aorta, juſt below the diaphragm. See ANATOMY *Index.*

COELIAC Vein, in *Anatomy*, that running through the inteſtinum rectum, along with the cœliac artery.

COELIMONTANA PORTA (Pliny), one of the gates of Rome, ſituated at the foot of Mount Cœlius; and hence its name, thought to be the ancient *Aſinaria* by ſome; but this others doubt. By this gate Alaric with his Goths is ſaid to have entered and plundered Rome.

COELIOBRIGA, in *Ancient Geography*, a town of the Bracari in the Hither Spain, to the ſouth of Bracara Auguſta, the north of the Durius, and not far from the Atlantic; a municipium (Coin). Now thought to be *Barcelos*, a town of Entre Minho y Duero. W. Long. 9. 15. Lat. 41. 20.

COELIUS MONS, one of the ſeven hills of Rome, ſo called from *Cocles*, a Tuſcan captain, who came to the aſſiſtance of Romulus againſt the Sabines, (Dionyſius Halicarnaſſus). Called alſo *Quercu*l*anus* or *Quercetulanus*, from the oaks growing on it; and *Auguſtus*, by Tiberius (Tacitus, Suetonius). To the eaſt it had the city walls, on the ſouth the Coeliolus, to the weſt the Palatine, and on the north the Eſquiliæ.

COELIOLUS, a part of Mount Cœlius to the ſouth, called *Minor Cœlius* (Martial); having the city walls on the eaſt, the Aventine to the ſouth, and on the weſt and north the valley through which the rivulet of the Appia runs.

COELOMA, among phyſicians, a hollow ulcer, ſeated in the tunica cornea of the eye.

COELOS PORTUS, in *Ancient Geography*, a town of the Cherſoneſus of Thrace, to the ſouth of Seſtos, where the Athenians erected a trophy, after a ſea victory over the Lacedæmonians (Diodorus Siculus).

COELOSYRIA, in the larger ſenſe of the word, was the name of the whole country lying ſouthward of Seleucia, and extending as far as Egypt and Arabia; but this word is principally applied to the valley lying between Libanus and Antilibanus. This word occurs only in the apocryphal writings of the Old Teſtament.

COELUS (Heaven), in Pagan mythology, the ſon of Æther and Dies, or Air and Day. According to Heſiod, he married Terra or the Earth, on whom he begat Aurea or the Mountains, the Ocean, &c. But having at length impriſoned the Cyclops, who were

alfo his children, his wife, being offended, incited her fon Saturn to revenge the injury done to his brothers; and by her affiftance, he bound and caftrated Cœlus, when the blood that flowed from the wound produced the three furies, the giants, and the wood-nymphs; and the genital parts being thrown into the fea, impregnated the waters and formed the goddefs Venus. This deity was called by the Greeks *Uranus*.

COEMETERY. See CEMETERY.

COEMPTIONALES, among the Romans, an appellation given to old flaves, which were fold in a lot with others, becaufe they could not be fold alone.

COENOBITE, a religious who lives in a convent, or in community, under a certain rule; in oppofition to anchoret or hermit, who lives in folitude. The word comes from the Greek *κοινος*, *communis*; and *βιος*, *vita*, "life." Caffian makes this difference between a *convent* and a *monaftery*, that the latter may be applied to the refidence of a fingle religious or reclufe, whereas the *convent* implies *cœnobites*, or numbers of religious living in common. Fleury fpeaks of three kinds of monks in Egypt; *anchorets*, who live in folitude; *cœnobites*, who continue to live in community; and *farabaites*, who are a kind of monks-errant, that ftroll from place to place. He refers the inftitution of cœnobites to the times of the apoftles, and makes it a kind of imitation of the ordinary lives of the faithful at Jerufalem. Though St Pachomius is ordinarily owned the inftitutor of the cœnobite life, as being the firft who gave a rule to any community.

COENOBIUM, (*κοινοβιον*), the ftate of living in a fociety or community, where all things are common. Pythagoras is thought to be the author or firft inftitutor of this kind of life; his difciples, though fome hundreds in number, being obliged to give up all their private eftates, in order to be annexed to the joint ftock of the whole. The Effenians among the Jews, and Platonifts, are faid to have lived in the fame manner. Many of the Chriftians alfo have thought this the moft perfect kind of fociety, as being that in which Chrift and his apoftles chofe to live.

COESFELDT, a town of Germany, in Weftphalia, and in the territories of the bifhop of Munfter, where he often refides. It is near the river Burkel. E. Long. 64. 2. N. Lat. 51. 58.

COEVORDEN, one of the ftrongeft towns in the United Provinces, in Overyffel, fortified by the famous Cohorn. It was taken by the bifhop of Munfter, 1673; and the Dutch retook it the fame year. It is furrounded by a morafs. E. Long. 6. 41. N. Lat. 52. 40.

COFFEA, the COFFEE-TREE. See BOTANY *Index*. The flowers, which are produced in clufters at the root of the leaves, are of a pure white, and have a very grateful odour. The fruit, which is the only ufeful part, refembles a cherry. When it comes to be of a deep red, it is gathered for the mill, in order to be manufactured into thofe *coffee-beans* now fo generally known. The mill is compofed of two wooden rollers furnifhed with iron plates 18 inches long, and 10 or 12 in diameter. Thefe moveable rollers are made to approach a third which is fixed, and which they call the *chops*. Above the rollers is a hopper, in which they put the coffee, from whence it falls between the rollers and the chops, where it is ftripped of its firft fkin, and divided into two parts, as may be feen by the form of it after it has undergone this operation; being flat on the one fide and round on the other. From this machine it falls into a brafs fieve, where the fkin drops between the wires, while the fruit flides over them into bafkets placed ready to receive it: it is then thrown into a veffel full of water, where it foaks for one night, and is afterwards thoroughly wafhed. When the whole is finifhed, and well dried, it is put into another machine called the *peeling-mill*. This is a wooden grinder, turned vertically upon its trendle by a mule or horfe. In paffing over the coffee it takes off the parchment, which is nothing but a thin fkin that detaches itfelf from the berry in proportion as it grows dry. The parchment being removed, it is taken out of this mill to be put into another, which is called the *winnowing-mill*. This machine is provided with four pieces of tin fixed upon an axle, which is turned by a flave with confiderable force; and the wind that is made by the motion of thefe plates clears the coffee of all the pellicles that are mixed with it. It is afterwards put upon a table, where the broken berries, and any filth that may remain among them, are feparated by negroes, after which the coffee is fit for fale.

The coffee-tree is cultivated in Arabia, Perfia, the Eaft Indies, the ifle of Bourbon, and feveral parts of America. It is alfo raifed in botanic gardens in feveral parts of Europe. Prince Eugene's garden at Vienna produced more coffee than was fufficient for his own confumption. It delights particularly in hills and mountains, where its root is almoft always dry, and its head frequently watered with gentle fhowers. It prefers a weftern afpect, and ploughed ground without any appearance of grafs. The plants fhould be placed at eight feet diftance from each other, and in holes twelve or fifteen inches deep. If left to themfelves, they would rife to the height of 16 or 18 feet, as already obferved; but they are generally ftinted to five, for the conveniency of gathering their fruit with the greater eafe. Thus dwarft, they extend their branches fo, that they cover the whole fpot round about them. They begin to yield fruit the third year, but are not in full bearing till the fifth. With the fame infirmities that moft other trees are fubject to, thefe are likewife in danger of being deftroyed by a worm or by the fcorching rays of the fun. The hills where the coffee-trees are found have generally a gravelly or chalky bottom. In the laft, it languifhes for fome time and then dies; in the former, its roots, which feldom fail of ftriking between ftones, obtain nourifhment, and keep the tree alive and fruitful for 30 years. This is nearly the period for plants of the coffee-tree. The proprietor, at the end of this period, not only finds himfelf without trees, but has his land reduced that it is not fit for any kind of culture; and unlefs he is fo fituated, that he can break up a fpot of virgin land, to make himfelf amends for that which is totally exhaufted by the coffee-trees, his lofs is irreparable.

The coffee produced in Arabia is found fo greatly to excel that raifed in the American plantations or elfewhere, that the cultivation of the tree is now but feldom practifed in any of the Britifh colonies. Large plantations of this kind were formerly made in fome of

Coffea, Coffee.

of them; and it was propofed to the parliament to give a proper encouragement for cultivating this commodity there, fo as to enable the planters to underfell the importers from Arabia. Accordingly, there was an abatement of the duty payable on all coffee imported from our colonies in America, which at that time was fuppofed to be fufficient encouragement for this kind of commerce; but the inferiority of the American coffee to the Arabian hath almoft ruined the project. Mr Miller propofes fome improvements in the method of cultivation. According to him, the trees are planted in too moift a foil, and the berries are gathered too foon. They ought, he fays, to be permitted to remain on the trees till their fkins are fhrivelled, and they fall from the trees when fhaken. This will indeed greatly diminifh their weight, but the value of the commodity will thereby be increafed to more than double of that which is gathered fooner. In Arabia, they always fhake the berries off the trees, fpreading cloths to receive them, and only take fuch as readily fall at each time. Another caufe may be the method of drying the berries. They are, he obferves, very apt to imbibe moifture, or the flavour of any thing placed near them. A bottle of rum placed in a clofet, in which a canifter of coffee-berries clofely ftopped, was ftanding on a fhelf at a confiderable diftance, in a few days fo impregnated the berries as to render them very difagreeable. Some years ago, a coffee-fhip from India had a few bags of pepper put on board, the flavour of which was imbibed by the coffee, and the whole cargo fpoiled. For thefe reafons coffee-berries fhould never be brought over in fhips freighted with rum, or laid to dry in the houfes where fugars are boiled or rum diftilled. When they are fully ripe, they fhould be taken off when the trees are perfectly dry, and fpread upon cloths to dry in the fun, carrying them every evening under cover, to prevent the dews or rain from falling on them. When perfectly dry, they fhould have their outer fkins beaten off, and then be carefully packed up in cloths or bags three or four times double.

Coffee alfo denotes a kind of drink, prepared from thofe berries; very familiar in Europe for thefe 100 years, and among the Turks for 170.

Its origin is not well known. Some afcribe it to the prior of a monaftery, who being informed by a goat-herd, that his cattle fometimes browzing on the tree would wake and caper all night, became curious to prove its virtue: accordingly he firft tried it on his monks, to prevent their fleeping at matins. Others, from Schehabeddin, refer the invention of coffee to the Perfians, from whom it was learned in the 15th century by Gemaleddin, mufti of Aden, a city near the mouth of the Red fea, and who having tried its virtues himfelf, and found that it diffipated the fumes which oppreffed the head, infpired joy, opened the bowels, and prevented fleep, without being incommoded by it, recommended it firft to his dervifes, with whom he ufed to fpend the night in prayer. Their example brought coffee into vogue at Aden; the profeffors of the law for ftudy, artifans to work, travellers to walk in the night, in fine every body at Aden, drank coffee. Hence it paffed to Mecca, where firft the devotees, then the reft of the people, took it. From Arabia Felix it paffed to Cairo. In 1511, Kahie Beg prohibited it, from a perfuafion that it inebriated, and inclined to things forbidden. But Sultan Caufon immediately after took off the prohibition, and coffee advanced from Egypt to Syria, and Conftantinople. The dervifes declaimed againft it from the Alcoran, which declares, that coal is not of the number of things created by God for food. Accordingly the mufti ordered the coffee-houfes to be fhut; but his fucceffor declaring coffee not to be *coal*, they were again opened. During the war in Candia the affemblies of news mongers making too free with ftate affairs, the grand vifir Cuproli fuppreffed the coffee-houfes at Conftantinople, which fuppreffion, though ftill on foot, does not prevent the public ufe of the liquor there. Thevenot the traveller, was the firft who brought it into France; and a Greek fervant, named *Pafqua*, brought into England by Mr Dan. Edwards, a Turkey merchant, in 1652, to make his coffee, firft fet up the profeffion of *coffee-man*, and introduced the drink into this ifland.

The word *coffee* is originally Arabic: the Turks pronounce it *caheub*, and the Arabians *cahuah*; which fome authors maintain to be a general name for any thing that takes away the appetite, others for any thing that promotes appetite, and others again for any thing that gives ftrength and vigour.—The Mahometans, it is obferved, diftinguifh three kinds of *cahuah*. The firft is wine, or any liquor that inebriates; the fecond is made of the pods that contain the coffee-berry; this they call the *Sultan's coffee*, from their having firft introduced it on account of its heating lefs than the berry, as well as its keeping the bowels open; the third is that made with the berry itfelf, which alone is ufed in Europe, the pods being found improper for tranfportation. Some Europeans who imported the pods, called them the *flower of the coffee-tree*. The deep brown colour of the liquor occafioned its being called *fyrup of the Indian mulberry*, under which fpecious name it firft gained ground in Europe.

The preparation of coffee confifts in roafting, or giving it a juft degree of torrefaction on an earthen or metalline plate, till it has acquired a brownifh hue equally deep on all fides. It is then ground in a mill, as much as ferves the prefent occafion. A proper quantity of water is next boiled, and the ground coffee put into it. After it has juft boiled, it is taken from the fire, and the decoction having ftood a while to fettle and fine, they pour or decant it into difhes. The ordinary method of roafting coffee among us is in a tin cylindrical box full of holes, through the middle whereof runs a fpit. Under this is a femicircular hearth, whereon is a large charcoal-fire: by help of a jack the fpit turns fwift, and fo roafts the berry, being now and then taken up to be fhaken. When the oil rifes, and it is grown of a dark brown colour, it is emptied into two receivers made with large hoops, whofe bottoms are iron plates: there the coffee is fhaken, and left till almoft cold; and if it look bright and oily, it is a fign it is well done.

Very different accounts have been given of the medicinal qualities of this berry. To determine its real effects on the human body, Dr Percival has made feveral experiments, the refult of which he gives in the following words: "From thefe obfervations we may infer, that coffee is flightly aftringent and antifeptic; that

that it moderates alimentary fermentation, and is powerfully sedative. Its action on the nervous system probably depends on the oil it contains; which receives its flavour, and is rendered mildly empyreumatic, by the process of roasting. Neumann obtained by distillation from one pound of coffee, five ounces five drachms and a half of water, six ounces and half a drachm of thick fetid oil, and four ounces and two drachms of a caput mortuum. And it is well known, that rye, torrefied with a few almonds, which furnish the necessary proportion of oil, is now frequently employed as a substitute for these berries.

"The medicinal qualities of coffee seem to be derived from the grateful sensation which it produces in the stomach, and from the sedative powers it exerts on the *vis vitæ*. Hence it assists digestion, and relieves the headach; and is taken in large quantities, with peculiar propriety by the Turks and Arabians, because it counteracts the narcotic effects of opium, to the use of which those nations are much addicted.

"In delicate habits, it often occasions watchfulness, tremors, and many of those complaints which are denominated nervous. It has been even suspected of producing palsies; and from my own observation, I should apprehend, not entirely without foundation. Slare affirms, that he became paralytic by the too liberal use of coffee, and that this disorder was removed by abstinence from that liquor.

"The following curious and important observation is extracted from a letter with which I was honoured by Sir John Pringle, in April 1773: 'On reading your section concerning coffee, one quality occurred to me which I had observed of that liquor, confirming what you have said of its sedative virtues. It is the best abater of the paroxysms of the periodic asthma that I have seen. The coffee ought to be of the best Mocco, newly burnt, and made very strong immediately after grinding it. I have commonly ordered an ounce for one dish; which is to be repeated fresh after the interval of a quarter or half an hour; and which I direct to be taken without milk or sugar. The medicine in general is mentioned by Musgrave, in his treatise *De arthritide anomola*; but I first heard of it from a physician in this place, who having once practised in Litchfield, had been informed by the old people of that place, that Sir John Floyer, during the latter years of his life, kept free from, or at least lived easy under, his asthma, from the use of very strong coffee. This discovery, it seems, he made after the publication of his book upon that disease. Since the receipt of that letter, I have frequently directed coffee in the asthma with great success."

COFFER, in *Architecture*, a square depressure or sinking in each interval between the modillions of the Corinthian cornice; ordinarily filled up with a rose; sometimes with a pomegranate, or other enrichment.

COFFER, in *Fortification*, denotes a hollow lodgement, athwart a dry moat, from 6 to 7 feet deep, and from 16 to 18 broad; the upper part made of pieces of timber raised two feet above the level of the moat, which little elevation has hurdles laden with earth for its covering, and serves as a parapet with embrasures: the coffer is nearly the same with the caponiere, excepting that this last is sometimes made beyond the counterscarp on the glacis, and the coffer always in the moat, taking up its whole breadth, which the caponiere does not. It differs from the traverse and gallery, in that these latter are made by the besiegers, and the coffer by the besieged. The besieged generally make use of coffers to repulse the besiegers when they endeavour to pass the ditch. To save themselves from the fire of these coffers, the besiegers throw up the earth on that side towards the coffer.

COFFERER *of the* KING'S HOUSEHOLD, a principal officer in the court, next under the comptroller. He was likewise a white-staff officer, and always a member of the privy council. He had a special charge and oversight of the other officers of the household. He paid the wages of the king's servants below stairs, and for provisions as directed by the board of green cloth. This office is now suppressed, and the business of it is transacted by the lord steward, and paymaster of the household. He had 100l. a-year wages, and 400l. a-year board wages.

COFFIN, the chest in which dead bodies are put into the ground.

The sepulchral honours paid to the manes of departed friends in ancient times, demand attention, and are extremely curious. Their being *put into a coffin* has been particularly considered as a mark of the highest distinction. With us the poorest people have their coffins. If the relations cannot afford them, the parish is at the expence. On the contrary, in the east they are not at all made use of in our times; Turks and Christians, as Thevenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner: neither was the body of our Lord, it should seem, put into a coffin; nor that of Elisha, 2 Kings xiii. 21. whose bones were touched by the corpse that was let down *a little after* into his sepulchre. However, that they were anciently made use of in Egypt, all agree; and antique *coffins of stone* and *sycamore wood*, are still to be seen in that country; not to mention those said to be made of a kind of pasteboard; formed by folding or glueing cloth together a great many times, curiously plastered, and then painted with hieroglyphics. Its being an ancient Egyptian custom, and not practised in the neighbouring countries, were, doubtless, the cause that the sacred historian expressly observes of Joseph, that he was not only embalmed, but put into a coffin too *; both being managements peculiar to the Egyptians.

* Gen. l. 26.

Bishop Patrick, in his commentary on this passage, takes notice of these Egyptian coffins of sycamore wood and of pasteboard; but he doth not mention the contrary usage in the neighbouring countries, which was requisite, one might suppose, in order fully to illustrate the place; but even this perhaps would not have conveyed the whole idea of the sacred author. Maillet apprehends that all were not inclosed in coffins who were laid in the Egyptian repositories of the dead; but that it was an honour appropriated to persons of figure: for after having given an account of several riches found in those chambers of death, he adds†, "But it must not be imagined that the bodies deposited in these gloomy apartments were *all* inclosed in *chests*, and placed in niches. The greatest part were simply embalmed and swathed after that manner which every one hath some notion of;

† Let. vii. p. 181.

of; after which they laid them one by the ſide of another without any ceremony. Some were even laid in theſe tombs without any embalming at all; or ſuch a ſlight one, that there remains nothing of them in the linen in which they were wrapped, but the bones, and thoſe half rotten. It is probable, that each conſiderable family had one of theſe burial-places to themſelves; that the niches were deſigned for the bodies of the heads of the families; and that thoſe of their domeſtics or ſlaves had no other care taken of them than the laying them on the ground, after having been embalmed, or even without that; which, undoubtedly, was alſo all that was done even to the heads of families of leſs diſtinction." After this he gives an account of a way of burial, practiſed anciently in that country, which had been but lately diſcovered, and which conſiſted in placing the bodies, after they were ſwathed, upon a layer of charcoal, and covering them with a mat, under a depth of ſand of ſeven or eight feet.

That *coffins* then were not univerſally uſed in Egypt, is undoubted from theſe accounts: and probably they were only perſons of diſtinction who were buried in them. It is alſo reaſonable to believe, that in times ſo remote as that of Joſeph, they might be much leſs common than afterwards; and conſequently, that Joſeph's being put in a coffin in Egypt, might be mentioned with a deſign to expreſs the great honours which the Egyptians did him at his death, as well as in life, being interred after the moſt ſumptuous manner of the Egyptians, *embalmed* and *put into a coffin*. Agreeably to this, the Septuagint verſion, which was made for Egyptians, ſeems to repreſent coffins as a mark of grandeur. Job xxi. 32.

It is no objection to this account, that the widow of Nain's ſon is repreſented as carried forth to be buried in a σοϱος, or "on a bier:" for the preſent inhabitants of the Levant, who are well known to lay their dead bodies in the earth uninclosed, carry them frequently out to burial in a kind of coffin. So Dr Ruſſel, in particular, deſcribes the bier uſed for the Turks at Aleppo, as a kind of coffin much in the form of ours, only that the lid riſes with a ledge in the middle. Chriſtians, indeed, as he tells us, are carried to the grave on an open bier: but as the moſt common kind of bier reſembles our coffins, that uſed by the people of Nain might very poſſibly be of the ſame kind; in which caſe the word σοϱος was very proper.

COGGLE, or Cog, a ſmall fiſhing-boat upon the coaſts of Yorkſhire: and cogs (*cogones*) are a kind of little ſhips or veſſels uſed in the rivers Ouſe and Humber; (Stat. 23 Hen. VIII. c. 18.) *Præparatis cogonibus, galleis, et aliis navibus, &c.* (Mat. Paris. ann. 1066.) And hence the cogmen, boatmen, and ſeamen, who, after ſhipwreck or loſſes by ſea, travelled and wandered about to defraud the people, by begging and ſtealing, until they were reſtrained by proper laws.

COGITATION, a term uſed by ſome for the act of thinking.

COGNAC, a town of France in Angoumois, with a caſtle, where Francis I. was born. It is ſeated on the river Charante, in a very pleaſant country, abounding in wine, and remarkable for excellent brandy. W. Long. 0. 10. N. Lat. 45. 44.

COGNATE, in *Scots Law*, any male relation by the mother.

COGNATION, in the civil law, a term for that line of conſanguinity which is between males and females, both deſcended from the ſame father; as agnation is for the line of parentage between males only deſcended from the ſame ſtock.

COGNI, an ancient and ſtrong town of Caramania, in Turkey in Aſia, and the reſidence of a beglerbeg. It is ſeated in a pleaſant country, abounding in corn, fruits, pulſe, and cattle. Here are ſheep whoſe tails weigh 30 pounds. E. Long. 35. 56. N. Lat. 37. 56.

COGNITIONIS CAUSA, in *Scots Law*. When a creditor charges the heir of his debtor to enter, in order to conſtitute the debt againſt him, and the heir renounces the ſucceſſion, the creditor can obtain no decreet of conſtitution of that debt againſt the heir; but only a decreet ſubjecting the *hæreditas jacens*, or the eſtate which belonged to the debtor, to his diligence: and this is called a decreet *cognitionis cauſa*.

COGNIZANCE, or CONNUSANCE, in *Law*, has divers ſignifications. Sometimes it is an acknowledgment of a fine, or confeſſion of ſomething done; ſometimes the hearing of a matter judicially, as to take cognizance of a cauſe; and ſometimes a particular juriſdiction, as cognizance of pleas is an authority to call a cauſe or plea out of another court, which no perſon can do but the king, except he can ſhow a charter for it. This cognizance is a privilege granted to a city or a town to hold plea of all contracts, &c. within the liberty; and if any one is impleaded for ſuch matters in the courts at Weſtminſter, the mayor, &c. of ſuch franchiſe may demand cognizance of the plea, and that it may be determined before them.

COGNIZANCE is alſo uſed for a badge on a waterman's or ſerving-man's ſleeve, which is commonly the giver's creſt, whereby he is decerned to belong to this or that nobleman or gentleman.

COGGS. See COGGLE.

COHABITATION, denotes the ſtate of a man and a woman who live together without being legally married. By the common law of Scotland, cohabitation for year and day, or a complete twelvemonth, is deemed equivalent to matrimony.

CO-HEIR, one who ſucceeds to a ſhare of an inheritance, to be divided among ſeveral.

COHESION, one of the four ſpecies of attraction, denoting that force by which the parts of bodies adhere or ſtick together.

1 Conſidered by Sir Iſaac Newton as an eſſential property of matter.

This power was firſt conſidered by Sir Iſaac Newton as one of the properties eſſential to all matter, and the cauſe of all that variety we obſerve in the texture of different terreſtrial bodies. He did not, however, abſolutely determine that the power of coheſion was an immaterial one; but thought it might poſſibly ariſe, as well as that of gravitation, from the action of an ether.

2 His account of the original conſtitution of matter.

His account of the original conſtitution of matter is as follows: It ſeems probable, that God in the beginning formed *matter* in ſolid, maſſy, impenetrable, moveable particles; of ſuch ſizes, figures, and other properties, and in ſuch proportion to ſpace, as moſt conduced to the end for which he formed them; and that

Cohesion.

that these primitive particles being solid, are incomparably harder than any porous bodies composed of them; even so very hard as never to wear or break in pieces; no ordinary power being able to divide what God himself made one at the first creation. While the particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of all things depending on them would be changed. Water and earth composed of old worn particles and fragments of particles, would not now be of the same texture with water and earth composed of entire particles in the beginning. And therefore, that nature may be lasting, the changes of corporeal things are to be placed in the various separations and new associations and motions of these permanent particles; compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together, and touch in a few points." It seems farther, "That these particles have not only a *vis inertiæ*, accompanied with such passive laws of motion as naturally result from that force; but also that they are moved by certain active principles, such as that of gravity, and that which causeth fermentation and the cohesion of bodies. These principles are to be considered not as occult qualities, supposed to result from the specific forms of things, but as general laws of nature by which the things themselves are formed; their truth appearing to us by phenomena, though their cause is not yet discovered."

3 Attraction the general law of nature.

The general law of nature, by which all the different bodies in the universe are composed, according to Sir Isaac Newton, is that of attraction: i. e. "Every particle of matter has an attractive force, or a tendency to every other particle; which power is strongest in the point of contact, and suddenly decreases, insomuch that it acts no more at the least sensible distance; and at a greater distance is converted into a repellent force, whereby the parts fly from each other. On this principle of attraction may we account for the cohesion of bodies, otherwise inexplicable.

4 Formation of particles of different sizes.

"The smallest particles may cohere by the strongest attractions, and compose bigger particles of weaker virtue; and many of these may cohere, and compose bigger particles, whose virtue is still less: and so on for divers successions, until the progression end in the biggest particles, on which the operations in chemistry, and the colours of natural bodies, depend; and which, by cohering, compose bodies of a sensible magnitude.

5 Distinction of bodies into hard, soft, humid, &c.

If the body is compact, and bends or yields inward to pressure without any sliding of its parts, it is hard and elastic, returning to its figure with a force arising from the mutual attraction of its parts. If the parts slide from one another, the body is malleable or soft. If they slip easily, and are of a fit size to be agitated by heat, and the heat is great enough to keep them in agitation, the body is fluid: and if it be apt to stick to things, it is humid; and the drops of every fluid affect a round figure by the mutual attractions of their parts, as the globe of the earth and sea affects a round figure from the mutual attraction and gravity of its parts.

"Since metals dissolved in acids attract but a small quantity of the acid, their attractive force reaches but to a small distance. Now, as in algebra, where affirmative quantities cease, there negative ones begin; so in mechanics, where attraction ceases, there a repulsive virtue must succeed.

6 Existence of repulsive power proved.

That there really is such a virtue seems to follow from the reflections and inflections of the rays of light; the rays being repelled by bodies in both these cases without the immediate contact of the reflecting and inflecting body. The same thing seems also to follow from the emission of light; a ray, as soon as shaken off from a body by the vibrating motion of the parts of the body, and got beyond the reach of attraction, being driven away with exceeding great velocity; for that force which is sufficient to turn it back in reflection may be sufficient to emit it. From the same repelling power it seems to be that flies walk upon the water without wetting their feet; that the object-glasses of long telescopes lie upon one another without touching; and that dry powders are difficultly made to touch one another so as to stick together, without melting them or wetting them with water, which, by exhaling, may bring them together.

"The particles of all hard homogeneous bodies which touch one another, cohere with a great force; to account for which, some philosophers have recourse to a kind of hooked atoms, which in effect is nothing else but to beg the question. Others imagine, that the particles of bodies are connected by rest, i. e. in effect by nothing at all; and others, by conspiring motions, i. e. by a relative rest among themselves. For myself, it rather appears to me, that the particles of bodies cohere by an attractive force, whereby they tend mutually to each other."

7 No conclusion to be drawn from this account.

From this account of the formation and constitution of bodies, we can conclude nothing, except that they are composed of an infinite number of little particles, kept together by a force or power; but of what nature that power is, whether material or immaterial, we must remain ignorant till farther experiments are made. Some of the Newtonian philosophers, however, have positively determined these powers to be immaterial. In consequence of this supposition, they have so refined upon attractions and repulsions, that their systems seem not far from downright scepticism, or denying the existence of matter altogether. A system of this kind we find adopted by Dr Priestley*, from Messrs Boscovich and Michell, in order to solve some difficulties concerning the Newtonian doctrine of light.

8 Mr Michell's hypothesis adopted by Dr Priestley.

"The easiest method (says he) of solving all difficulties, is to adopt the hypothesis of Mr Boscovich, who supposes that matter is not impenetrable, as has been perhaps universally taken for granted; but that it consists of physical points only, endued with powers of attraction and repulsion in the same manner as solid matter is generally supposed to be: provided, therefore, that any body moves with a sufficient degree of velocity, or has a sufficient *momentum* to overcome any powers of repulsion that it may meet with, it will find no difficulty in making its way through any body whatever; for nothing else will penetrate one another but powers, such as we know do in fact exist in the same place, and counterbalance or overrule one another. The most obvious difficulty, and indeed almost the only one that attends this hypothesis, as it supposes the mutual penetrability of matter, arises from the idea

* *Hist. of Vision*, vol. i. p. 392.

Cohesion.

idea of the nature of matter, and the difficulty we meet with in attempting to force two bodies into the same space. But it is demonstrable that the first obstruction arises from no actual contact of matter, but from mere powers of repulsion. The difficulty we can overcome; and having got within one sphere of repulsion, we fancy that we are now impeded by the solid matter itself. But the very same is the opinion of the generality of mankind with respect to the first obstruction. Why, therefore, may not the next be only another sphere of repulsion, which may only require a greater force than we can apply to overcome it, without disordering the arrangement of the constituent particles; but which may be overcome by a body moving with the amazing velocity of light.

9 Bodies oppose each other not from actual contact.

"This scheme of the *immateriality of matter* as it may be called, or rather the *mutual penetration of matter*, first occurred to Mr Michell on reading *Baxter on the immateriality of the soul*. He found that this author's idea of matter was, that it consisted, as it were of bricks cemented together with immaterial mortar. These bricks, if he would be consistent with his own reasoning, were again composed of less bricks, cemented likewise by an immaterial mortar; and so on *ad infinitum*. This putting Mr Michell upon the consideration of the several appearances of nature, he began to perceive that the bricks were so covered with this immaterial mortar, that if they had any existence at all, it could not possibly be perceived; every effect being produced, in nine instances of ten certainly, and probably in the tenth also, by this immaterial spiritual, and penetrable mortar. Instead therefore of placing the world upon the giant, the giant upon the tortoise, and the tortoise upon, he could not tell what, he placed the world at once upon itself."

10 Mr Baxter's opinion.

Other philosophers have supposed the powers both of gravitation and cohesion to be material; and to be only different actions of the ethereal fluid, or elementary fire. In support of this it has been urged, that before we have recourse to a spiritual and immaterial power as the cause of any natural phenomenon, we ought to be well assured that there is no material substance with which we are acquainted, that is capable of producing such effects. In the present case, we are so far from having such assurance, that the contrary is manifest to our senses. One instance of this is in the experiment with the *Magdeburg hemispheres*, as they are called. These are two hollow hemispheres of brass, exactly fitted to one another, so as to form one globe when joined together, without admitting any air at the joining. In this state, if the air within them is exhausted by means of a pump, they will cohere with such force, if they are five or six inches diameter, as to require a weight of some hundreds of pounds to separate them. The pressure of the atmosphere, we see, is in this case capable of producing a very strong cohesion; and if there is in nature any fluid more penetrating, as well as more powerful in its effects, than the air we breathe, it is possible that what is called the *attraction of cohesion* may some how or other be an effect of the action of that fluid. Such a fluid as this is the element of fire. Its activity is such as to penetrate all bodies whatever; and in the state in which it is commonly called *fire*, it acts according to the quantity of solid matter contained in the body. In this state, it is capable of dissolving the strongest cohesions observed in nature; but whatever is capable of dissolving any cohesion, must necessarily be endued with greater power than that by which the cohesion is caused. Fire, therefore, being able to dissolve cohesions, must also be capable of causing them, provided its power is exerted for that purpose. Nor will it seem at all strange that this fluid should act in two such opposite ways, when we consider the different appearances which it assumes. These are three, viz. fire or heat, in which it consumes, destroys, and dissolves: light, in which it seems deprived of all destructive or dissolvent power, and to be the most mild, quiet, and placid being in nature. The third state of this element is, when it becomes what is called the *electric fluid;* and then it attracts, repels, and moves bodies, in a vast variety of ways, without either burning or rendering them visible by its light. In this state it is not less powerful than in either of the other two; for a violent shock of electricity will displace and tear in pieces the most heavy and solid bodies. The seeming capricious nature of this fluid, however, probably renders it less suspected as the cause of cohesion than it otherwise would be, were the attractions regular and permanent, which we observe it to occasion. But here we must observe, that the fluid has an existence in all bodies before the experiments are tried which make its effects visible to us, and is acting in them according to its settled and established laws. While acting in this manner it is perfectly invisible; and all we can do is, to produce some little infringement of these regular laws according to which it commonly acts. In some cases, however, the electrical attractions produced by art are found to be pretty permanent and strong. Thus, Mr Symmer, in some experiments upon silk stockings, found their attraction so strong, that it required upwards of 15 pounds weight to separate them from each other; and this attraction would continue for more than an hour. In plates of glass, too, he observed a remarkable cohesion when electrified. In the Philosophical Transactions for 1777, we find this hypothesis taken notice of, and in some measure adopted, by Mr Henley. "Some gentlemen (says he) have supposed that the electric matter is the cause of the cohesion of the particles of bodies. If the electric matter be, as I suspect, a real elementary fire inherent in all bodies, that opinion may probably be well founded; and perhaps the soldering of metals, and the cementation of iron, by fire, may be considered as strong proofs of the truth of their hypothesis."

11 Cohesion supposed owing to elementary fire.

On this last hypothesis we must observe, that if the electric, or any other fluid, is supposed to be the cause of the attraction of cohesion universally, the particles of that fluid must be destitute of all cohesion between themselves; otherwise we should be at as great a loss to account for the cohesion of these particles, as for that of terrestrial matter. Philosophers, indeed, do not suppose any cohesion between the particles of the electric fluid themselves; it is generally believed that the particles of this fluid are repulsive of one another, though attracted by all other matter. If this is a fact, we cannot suppose the electric fluid to be the cause of cohesion. The probability or improbability of the hypothesis, just mentioned, must greatly depend on its being

ing afcertained whether the particles of the electric fluid do really repel one another, and attract all other kinds of matter, or not; but for this we muft refer to the article ELECTRICITY.

COHOBATION, in *Chemiftry*, an operation by which the fame liquor is frequently diftilled from the fame body, either with an intention to diffolve this body, or to produce fome change upon it. This is one of thofe operations which the ancient chemifts practifed with great patience and zeal, but which is now neglected. To make the operation eafier, and to prevent the trouble of frequently changing the veffels, a particular kind of alembic, called a *pelican*, was invented. This veffel was made in the form of a cucurbit with an alembic-head, but had two fpouts communicating with the body. As the vapour rofe up into the head, it was gradually condenfed, and ran down the fpouts into the body of the pelican, from whence it was again diftilled; and fo on.

COHORN (N.) the greateft engineer Holland has produced. Among his other works, which are efteemed mafterpieces of fkill, he fortified Bergen-op-zoom; which, to the furprife of all Europe, was taken by the French in 1747; but that, it is believed, was the effect of treachery. He wrote a treatife on fortification, and died in 1704.

COHORT, in Roman antiquity, the name of part of the Roman legion, comprehending about 600 men. There were ten cohorts in a legion, the firft of which exceeded all the reft both in dignity and number of men. When the army was ranged in order of battle, the firft cohort took up the right of the firft line; the reft followed in their natural order; fo that the third was in the centre of the firft line of the legion, and the fifth on the left; the fecond between the firft and third; and the fourth between the third and fifth: the five remaining cohorts formed a fecond line in their natural order.

COIF, the badge of a fergeant of law, who is called fergeant of the coif, from the lawn coif they wear under their caps when they are created fergeants.

The chief ufe of the coif was to cover the clerical tonfure. See TONSURE.

COILING, on fhipboard, implies a fort of ferpentine winding of a cable or other rope, that it may occupy a fmall fpace in the fhip. Each of the windings of this fort is called a *fake;* and one range of fakes upon the fame line is called a *tier*. There are generally from five to feven fakes in a tier; and three or four tiers in the whole length of the cable. This, however, depends on the extent of the fakes. The fmaller ropes employed about the fails are coiled upon cleats at fea, to prevent their being entangled amongft one another in traverfing, contracting, or extending the fails.

COILON, in the ancient Grecian theatres, the fame with the cavea of the Romans.

COIMBRA, a handfome, large, and celebrated town of Portugal, capital of the province of Beira, with a bifhop's fee, and a famous univerfity. The cathedral and the fountains are very magnificent. It is feated in a very pleafant country abounding in vineyards, olive-trees, and fruits. It ftands on a mountain, by the fide of the river Mondego. W. Long. 8. 17. N. Lat. 40. 12.

COIN, a piece of metal converted into money by the impreffion of certain marks or figures thereon.

COIN differs from MONEY as the fpecies from the genus. Money is any matter, whether metal, wood, leather, glafs, horn, paper, fruits, fhells, or kernels, which have currency as a medium in COMMERCE. Coin is a particular fpecies, always made of metal, and ftruck according to a certain procefs called COINING.

The precife epocha of the invention of money is too ancient for our annals; and, if we might argue from the neceffity and obvioufnefs of the thing, muft be nearly coeval with the world.

Whether coins be of equal antiquity, may admit of fome doubt; efpecially as moft of the ancient writers are fo frequent and exprefs in their mention of leathern-moneys, paper-moneys, wooden-moneys, &c. Some, however, notwithftanding this, are of opinion, that the firft moneys were of metal: the reafons they give, and the firmnefs, neatnefs, cleannefs, durablenefs, and univerfality of metals; which, however, do rather conclude they ought to have been fo, than that they actually were fo.

In effect, the very commodities themfelves were the firft moneys, i. e. were current for one another by way of exchange; and it was the difficulty of cutting or dividing certain commodities, and the impoffibility of doing it without great lofs, that firft put men on the expedient of a general medium. See EXCHANGE.

Indeed, thus much may be faid in behalf of coins, that, on this view, it was natural for men to have their firft recourfe to metals, as being almoft the only things whofe goodnefs, and as it were integrity, is not diminifhed by partition; befides the advantages above expreffed, and the conveniences of melting and returning them into a mafs of any fize or weight.

It was probably, then, this property of metals which firft accuftomed people, who traded together, to account them in lieu of quantities of other merchandifes in their exchanges, and at length to fubftitute them wholly in their ftead; and thus arofe money; as it was their other property to preferve any mark or impreffion a long time, which confirmed them in the right; and thus was the firft rife of coins.

In the firft ages, each perfon cut his metal into pieces of different fizes and forms, according to the quantity to be given for any merchandife, or according to the demand of the feller, or the quantity ftipulated between them. To this end they went to market loaded with metal in proportion to the purchafe to be made, and furnifhed with inftruments for portioning it, and fcales for dealing it out, according as occafion required. By degrees, it was found more commodious to have pieces ready weighed; and as there were different weights required according to the value of the different wares, all thofe of the fame weight began to be diftinguifhed with the fame mark or figure: thus were coins carried one ftep further. At length the growing commerce of money beginning to be difturbed with frauds, both in the weights and the matter, the public authority interpofed; and hence the firft ftamps or impreffions of money; to which fucceeded

ed the names of the moniers; and at length the effigy of the prince, the date, legend, and other precautions to prevent the alterations of the ſpecies; and thus were coins completed.

Modern COINS. In England the current ſpecies of gold are the guinea, half-guinea, ſeven-ſhillings piece, Jacobus, laureat, angel, and roſe-noble; the four laſt of which are now ſeldom to be met with; having been moſt of them converted into guineas, chiefly during the reign of Charles II. and James II. The ſilver coins are the crown, half-crown, ſhilling, and ſixpence. Copper coins are the farthing, half-penny, penny and two-penny pieces.

In Scotland, by the articles of the Union, it is appointed that all the coins be reduced to the Engliſh, and the ſame accounts obſerved throughout. Till then the Scots had their pounds, ſhillings, and pence, as in England; but their pound was but 20 pence Engliſh, and the others in proportion: accordingly, their merk was 13$\frac{1}{3}$s. Scots, current in England at 13$\frac{1}{3}$d.; their noble in proportion. Beſides theſe they had their turnorer pence and half-pence; their penny $\frac{1}{12}$ of that of England: beſides baſe money of achiſons, babees, and placks. The bodle $\frac{1}{6}$ of the penny, $\frac{1}{4}$ of the achiſon, $\frac{1}{3}$ of the babee, and $\frac{1}{2}$ of the plack.

In Ireland, the coins are as in England, viz. ſhillings, pence, &c. with this difference, that their ſhilling is but equal to 11$\frac{3}{400}$d. ſterling: whence their pound is only 18s 5$\frac{1}{4}$d.

But, for a view of all the coins preſently current in the four quarters of the globe, with their values and proportions, ſee the table ſubjoined to the article MONEY.

In many places ſhells are current for coins; particularly a ſmall white kind dug out of the ground in the Maldives, and ſome parts of America, called in the Indies *cowries* or *coris*, on the coaſt of Africa *bonges*, and in America *porcelaines;* of which it takes a vaſt number to be equivalent in value to a penny. Of zimbis, another kind of ſhell current, particularly in the kingdoms of Angola and Congo, two thouſand make what the negroes call a *macoute*, which is no real money; for of this there is none in this part of Africa, but a manner of reckoning: thus, two Flemiſh knives they eſteem a macoute; a copper baſon two pounds weight, and 12 inches diameter, they reckon three macoutes; a fuſee 10, &c.

In ſome places fruits are current for coins. Of theſe there are three ſorts uſed; two in America, particularly among the Mexicans, which are the cacao and maize; the other in the Eaſt Indies, viz. almonds brought thither from Lar, and growing in the deſarts of Arabia. Of cacao 15 are eſteemed equivalent to a Spaniſh rial, or ſeven pence ſterling. Maize has ceaſed to be a common money ſince the diſcovery of America by the Europeans. Almonds are chiefly uſed where the *cowries* are not current. As the year proves more or leſs favourable to this fruit, the value of the money is higher or lower. In a common year 40 almoſt are ſet againſt a *peſcha*, or halfpenny ſterling; which brings each almond to $\frac{1}{20}$ of a farthing.

Ancient COINS are thoſe chiefly which have been current among the Jews, Greeks and Romans. Their values and proportions are as follow:

JEWISH.

					ſterl. l.	s.	d.
Gerah					0	0	$1\frac{37}{100}$
10	Becah				0	0	$1\frac{11}{16}$
20	2	Shekel			0	0	$2\frac{3}{8}$
1200	120	50	Maneh, Mina hebraica		5	14	$0\frac{3}{4}$
60000	6000	3000	60	Talent	342	3	9
Solidus aureus, or ſextula, worth					0	12	$0\frac{1}{2}$
Siculus aureus, worth					1	16	6
A talent of gold, worth					5475	0	0

GRECIAN.

											ſter. s.	d.	qrs.
Lepton											0	0	$0\frac{31}{336}$
7	Chalcus										0	0	$0\frac{31}{48}$
14	2	Dichalcus									0	0	$1\frac{7}{24}$
28	4	2	Hemiobolum								0	0	$2\frac{7}{12}$
56	8	4	2	Obolus							0	1	$1\frac{1}{6}$
112	16	8	4	2	Diobolum						0	2	$2\frac{1}{3}$
224	32	16	8	4	2	Tetrobolum					0	5	$0\frac{2}{3}$
336	48	24	12	6	3	$1\frac{1}{2}$	Drachma				0	7	3
662	96	48	24	12	6	3	2	Didrachmon			1	3	2
1324	112	96	48	24	12	6	4	2	Tetrardſtat.		2	7	0
1660	384	120	60	30	15	$7\frac{1}{2}$	5	$2\frac{1}{2}$	$1\frac{1}{4}$	Pentrad.	3	2	3

Note: Of theſe the drachma, didrachma, &c. were of ſilver, the reſt for the moſt part of braſs. The other parts, as tridrachm, tribolus, &c. were ſometimes coined.

Note alſo: The drachma is here, with the generality of authors, ſuppoſed equal to the denarius; though there is reaſon to believe that the drachma was ſomewhat the weightier. See DRACHMA and DENARIUS.

	ſter. l.	s.	d.
The Grecian gold coin was the ſtater aureus, weighing two Attic drachms, or half of the ſtater argenteus, and exchanging uſually for 25 Attic drachms of ſilver in our money.	0	16	$1\frac{1}{2}$
According to our proportion of gold to ſilver	1	0	9
There were likewiſe the ſtater Cyzicenus, exchanging for 28 Attic drachms, or	0	18	1
Stater Philippicus, and ſtater Alexandrinus, of the ſame value.			
Stater Daricus, according to Joſephus, worth 50 Attic drachms, or	1	12	$3\frac{1}{2}$
Stater Crœſius, of the ſame value.			

ROMAN.

						ſter. s.	d.	qrs.
Teruncius						0	0	$0\frac{775}{1000}$
2	Semilibella					0	0	$1\frac{55}{100}$
4	2	Libella, As				0	0	$3\frac{1}{10}$
10	5	$2\frac{1}{2}$	Seſtertius			0	1	$3\frac{3}{4}$
20	10	5	2	Quinarius, Victoriatus		0	3	$3\frac{1}{2}$
40	20	10	4	2	Denarius	0	7	3

Note.

Coin. Coinage.

Note. Of theſe the denarius, victoriatus, ſeſtertius, and ſometimes the as, were of ſilver, the reſt of braſs. See As, &c.

There were ſometimes alſo coined of braſs the triens, ſextans, uncia, ſextula, and dupondius.

	l.	*s.*	*d.*
The Roman gold coin was the aureus, which weighed generally double the denarius; the value of which, according to the firſt proportion of coinage, mentioned by Pliny, was	1	4	$3\frac{3}{4}$
According to the proportion that obtains now amongſt us, worth	1	0	9
According to the decuple proportion, mentioned by Livy and Julius Pollux, worth	0	12	11
According to the proportion mentioned by Tacitus, and which afterwards obtained, whereby the aureus exchanged for 25 denarii, its value,	0	16	$1\frac{3}{4}$

Coin, in *Architecture*, a kind of dye cut diagonally, after the manner of a flight of a ſtaircaſe, ſerving at bottom to ſupport columns in a level, and at top to correct the inclination of an entablature ſupporting a vault.

Coin is alſo uſed for a ſolid angle compoſed of two ſurfaces inclined towards each other, whether that angle be exterior, as the coin of a wall, a tree, &c. or interior, as the coin of a chamber or chimney. See Quoin.

COINAGE, or Coining, the art of making money, as performed either by the hammer or mill.

Formerly the fabric of coins was different from what it is at preſent. They cut a large plate of metal into ſeveral little ſquares, the corners of which were cut off with ſciſſars. After having ſhaped theſe pieces, ſo as to render them perfectly conformable, in point of weight, to the ſtandard piece, they took each piece in hand again, to make it exactly round by a gentle hammering. This was called a *planchet*, and was fit for immediate coining. Then engravers prepared, as they ſtill do, a couple of ſteel maſſes in form of dyes, cut and terminated by a flat ſurface, rounded off at the edges. They engraved or ſtamped on it the hollow of a head, a croſs, a ſcutcheon, or any other figure, according to the cuſtom of the times, within a ſhort legend. As one of theſe dyes was to remain dormant, and the other moveable, the former ended in a ſquare priſm, that it might be introduced into the ſquare hole of the block, which, being fixed very faſt, kept the dye as ſteady as any vice could have done. The planchet of metal was horizontally laid upon this inferior maſs, to receive the ſtamp of it on one ſide, and that of the upper dye, wherewith it was covered, on the other. This moveable dye, having its round engraved ſurface reſting upon the planchet, had at its oppoſite extremity a flat, ſquare, and larger ſurface, upon which they gave ſeveral heavy blows, with a hammer of an enormous ſize, till the double ſtamp was ſufficiently, in relievo, impreſſed on each ſide of the planchet. This being finiſhed, was immediately ſucceeded by another, and they thus became a ſtandard coin, which had the degree of fineneſs of the weight and mark determined by the judgment of the inſpectors, to make it good current money; the ſtrong tempering which was and is ſtill given to the two dyes, rendering them capable of bearing thoſe repeated blows. Coining has been conſiderably improved and rendered expeditious, by ſeveral ingenious machines, and by a wiſe application of the ſureſt phyſical experiments to the methods of fining, dyeing, and ſtamping the different metals.

Coinage.

The three fineſt inſtruments the mint-man uſes, are the laminating engine; the machine for making the impreſſions on the edges of coins; and the mill.

After they have taken the laminæ, or plates of metal, out of the mould into which they are caſt, they do not beat them on the anvil, as was formerly done, but make them paſs and repaſs between the ſeveral rollers of the laminating engine, which being gradually brought cloſer and cloſer, to each other, preſently give the lamina its uniform and exact thickneſs. Inſtead of dividing the lamina into ſmall ſquares, they at once cut clean out of it as many planchets as it can contain, by means of a ſharp ſteel trepan, of a roundiſh figure, hollow within, and of a proportionable diameter, to ſhape and cut off the piece at one and the ſame time. After thoſe planchets have been prepared and weighed with ſtandard pieces, filed or ſcraped, to get off the ſuperfluous part of the metal, and then boiled and made clean, they arrive, at laſt, at the machine (fig. 1.), which marks them upon the edge; and finally, the mill (fig. 2), which, ſqueezing each of them ſingly between the two dyes, brought near each other with one blow, forces the two ſurfaces or fields of the piece to fill exactly all the vacancies of the two figures engraved hollow. The engine which ſerves to laminate lead, gives a ſufficient notion of that which ſerves to flatten gold and ſilver laminæ between rollers of a leſſer ſize.

Plate CL.

Fig. 1.

The principal pieces of the machine (fig. 1.), to ſtamp coins on the edge, are two ſteel laminæ, about a line thick. One half of the legend, or of the ring, is engraved on the thickneſs of one of the laminæ, and the other half on the thickneſs of the other; and theſe two laminæ are ſtraight, although the planchet marked with them be circular.

When they ſtamp a planchet, they firſt put it between the laminæ in ſuch a manner, as that theſe being each of them laid flat upon a copperplate, which is faſtened upon a very thick wooden table, and the planchet being likewiſe laid flat upon the ſame plate, the edge of the planchet may touch the two laminæ on each ſide, and in their thick part.

One of theſe laminæ is immoveable, and faſtened with ſeveral ſcrews; the other ſlides by means of a dented wheel, which takes into the teeth that are on the ſurface of the lamina. This ſliding lamina makes the planchet turn in ſuch a manner, that it remains ſtamped on the edge, when it has made one turn. Only crown and half-crown pieces can bear the impreſſion of letters on the thickneſs of their edges.

Fig. 2.

The coining engine or mill is ſo fitted for diſpatch, (fig. 2.), that a ſingle man may ſtamp 20,000 planchets in one day: gold, ſilver, and copper planchets, are all of them coined with a mill, to which the coining ſquares (fig. 3.) commonly called dyes are faſtened; that of the face under, in a ſquare box furniſhed with male and female ſcrews, to fix and keep it ſteady; and the other above, in a little box garniſhed with the ſame ſcrews, to faſten the coining ſquare. The planchet

chet is laid flat on the ſquare of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which cauſes the ſcrew ſet within it to turn. This enters into the female ſcrew, which is in the body of the mill, and turns with ſo much ſtrength, that by pulling the upper ſquare upon that of the effigy, the planchet, violently preſſed between both ſquares, receives the impreſſion of both at one pull, and in the twinkling of an eye.

The planchet thus ſtamped and coined, goes through a final examination of the mint wardens, from whoſe hands it goes into the world.

In the COINING of Medals, the proceſs is the ſame in effect with that of money, the principal difference conſiſting in this, that money having but a ſmall relievo, receives its impreſſion at a ſingle ſtroke of the engine: whereas for medals, the height of their relievo makes it neceſſary that the ſtroke be repeated ſeveral times: to this end the piece is taken out from between the dyes, heated, and returned again; which proceſs, in medallions and large medals, is repeated 15 or 20 times before the full impreſſion be given: care muſt be taken, every time the planchet is removed, to take off the ſuperfluous metal ſtretched beyond the circumference with a file. Medallions, and medals of a high relievo, are uſually firſt caſt in ſand, by reaſon of the difficulty of ſtamping them in the preſs, where they are put only to perfect them; in regard the ſand does not leave them clear, ſmooth, and accurate enough. Therefore we may ſee that medals receive their form and impreſſion by degrees, whereas money receives them all at once.

Britiſh COINAGE, both by the beauty of the engraving, and by the invention of the impreſſions on the edges, that admirable expedient for preventing the alteration of the ſpecies, is carried to the utmoſt perfection.

It was only in the reign of King William III. that the hammer money ceaſed to be current in England, where till then it was ſtruck in that manner, as in other nations. Before the hammer ſpecie was called in, the Engliſh money was in a wretched condition, having been filed and clipped by natives as well as foreigners, inſomuch that it was ſcarce left of half the value: the retrieving this diſtreſſed ſtate of the Engliſh money is looked upon as one of the glories of King William's reign.

The Britiſh coinage is now wholly performed in the Tower of London, where there is a corporation for it, under the title of the *mint*. Formerly there were here, as there are ſtill in other countries, the rights of ſeinorage and braſſage; but ſince the eighteenth year of King Charles II. there is nothing taken either for the king or for the expences of coining; ſo that weight is returned for weight to any perſon who carries their gold and ſilver to the Tower.

The ſpecies coined in Great Britain are eſteemed contraband goods, and not to be exported. All foreign ſpecies are allowed to be ſent out of the realm, as well as gold and ſilver in bars, ingots, duſt, &c.

Barbary COINAGE, particularly that of Fez and Tunis, is under no proper regulations, as every goldſmith, Jew, or even private perſon, undertakes it at pleaſure; which practice renders their money exceedingly bad, and their commerce very unſafe.

Muſcovite COINAGE. In Muſcovy there is no other coin ſtruck but ſilver, and that only in the cities of Moſcow, Novogorod, Twere, and Pleſkow, to which may be added Peterſburgh. The coinage of each of theſe cities is let out to farm, and makes part of the royal revenue.

Perſian COINAGE. All the money made in Perſia is ſtruck with a hammer, as is that of the reſt of Aſia; and the ſame may be underſtood of America, and the coaſts of Africa, and even Muſcovy: the king's duty, in Perſia, is ſeven and a half per cent. for all the moneys coined, which are lately reduced to ſilver and copper, there being no gold coin there except a kind of medals, at the acceſſion of a new ſophi.

Spaniſh COINAGE is eſteemed one of the leaſt perfect in Europe. It is ſettled at Seville and Segovia, the only cities where gold and ſilver are ſtruck.

COIRE, or, as the Germans call it, CHUR, a large and handſome town of Switzerland, and capital of the country of the Griſons, with a biſhop's ſee whoſe prelate has the right of coining money. It is divided into two parts; the leaſt of which is of the Roman Catholic religion, and the greateſt of the Proteſtant. It is governed by its own laws, and ſeated in a plain, abounding in vineyards and game, on the river Pleſſure, half a mile from the Rhine. E. Long. 9. 25. N. Lat. 46. 50.

COITION, the intercourſe between male and female in the act of generation.

It is obſerved that frogs are forty days in the act of coition. Bartholine, &c. relate, that butterflies make 130 vibrations of the wings in one act of coition.

COIX, JOB'S-TEARS. See BOTANY *Index*. In Spain and Portugal the poor people grind the ſeeds of this plant in times of ſcarcity, and make a coarſe kind of bread of them. The ſeeds are incloſed in ſmall capſules about the bigneſs of an Engliſh pea, and of different colours. Theſe are ſtrung upon ſilk, and uſed inſtead of bracelets by ſome of the poorer ſort in the Weſt Indies, but eſpecially by the negroes.

COKE, or COOKE, SIR EDWARD, lord chief juſtice of the king's bench in the reign of James I. was deſcended from an ancient family in Norfolk, and born at Milcham in 1549. When he was a ſtudent in the Inner-Temple, the firſt occaſion of his diſtinguiſhing himſelf was the ſtating the caſe of a cook belonging to the Temple ſo exactly, that all the houſe, who were puzzled with it, admired him and his pleading, and the whole bench took notice of him. After his marriage with a lady of great fortune, preferments flowed in upon him. The cities of Norwich and Coventry choſe him for their recorder; the county of Norfolk, for one of their knights in parliament; and the houſe of commons, for their ſpeaker, in the 35th year of Queen Elizabeth. The queen appointed him ſolicitor-general in 1592, and attorney-general the next year. In 1603, he was knighted by King James I.; and in November the ſame year, upon the trial of Sir Walter Raleigh, &c. at Wincheſter, he treated that gentleman with a ſcurrility of language hardly to be paralleled. June 27. he was appointed lord chief juſtice of the common pleas; and in 1613, lord chief juſtice of the king's bench, and ſworn one of the privy council. In 1615, he was very vigorous in the diſcovery and proſecution of the perſons employed in poiſoning

Sir

Sir Thomas Overbury in the Tower in 1612. His conteſt not long after with the lord chancellor Egerton, with ſome other caſes, haſtened the ruin of his intereſt at court; ſo that he was ſequeſtrated from the council-table and the office of lord chief juſtice. In 1621, he vigorouſly maintained in the houſe of commons, that no proclamation is of any force againſt the parliament. The ſame year, being looked upon as one of the great incendiaries in the houſe of commons, he was removed from the council of ſtate with diſgrace; the king ſaying, "that he was the fitteſt inſtrument for a tyrant that ever was in England:" he was alſo committed to the Tower, and his papers were ſeized. Upon the calling of a new parliament in 1625, the court-party, to prevent his being elected a member, got him appointed ſheriff of Buckinghamſhire; to avoid the office, if poſſible, he drew up exceptions againſt the oath of a ſheriff, but was obliged to undertake the office. In 1628 he ſpoke vigorouſly upon grievances, and made a ſpeech, in which he affirmed, that "the duke of Buckingham was the cauſe of all our miſeries" While he lay upon his deathbed, his papers and laſt will were ſeized by an order of council. He died in 1634, and publiſhed many works: the moſt remarkable are his Inſtitutes of the Laws of England; the firſt part of which is only a tranſlation and comment of Sir Thomas Littleton, one of the chief juſtices of the common pleas in the reign of Edward IV.

COKENHAUSEN, a ſtrong town of Livonia in Ruſſia on the river Dwina. E. Long. 25. 50. N. Lat. 56. 30.

COL, one of the weſtern iſlands of Scotland, is annexed to the county of Argyle. It is 13 miles long, and 9 broad. It abounds in corn, paſture, ſalmon, eels, and cod. The inhabitants are chiefly employed in the fiſheries. W. Long. 7. 15. N. Lat. 57.

COLAPIS, Colops, in *Ancient Geography*, a river of Liburnia, which after a winding north-eaſt courſe, falls into the Savus at the Inſula Segeſtica. Now the *Culpe*, the boundary of the Alps, running through Croatia into the Save. Colapiani, the people living on it (Pliny).

COLARBASIANS, or Colorbasians, a ſet of Chriſtians in the ſecond century; ſo called from their leader Colarbaſus, a diſciple of Valentinus; who, with Marcus, another diſciple of the ſame maſter, maintained the whole plenitude and perfection of truth and religion to be contained in the Greek alphabet; and that it was upon this account that Jeſus Chriſt was called the *alpha* and *omega*. This ſect was a branch of the Valentinians. See alſo Marcosians.

COLBERG, a ſtrong, handſome ſea-port town of Germany in Pomerania, belonging to the king of Pruſſia. It is remarkable for its ſalt works; and is ſeated at the mouth of the river Perſant, on the Baltic ſea, 60 miles north-eaſt of Stetin, and 30 north-eaſt of Camin. It was taken by the Ruſſians in 1761, but reſtored at the ſubſequent peace. E. Long. 15. 39. N. Lat. 54. 22.

COLBERT, John Baptist, Marquis of Segnelai, one of the greateſt ſtateſmen that France ever had, was born at Paris in 1619; and deſcended from a family that lived at Rheims in Champagne, no way conſiderable for its ſplendour and antiquity. His grandfather is ſaid to have been a wine merchant, and his father at firſt followed the ſame occupation; but afterwards became clerk to a notary. In 1648, his relation John Baptiſt Colbert, lord of S. Pouange, preferred him to the ſervice of Michael le Tellier, ſecretary of ſtate, whoſe ſiſter he had married; and here he diſcovered ſuch diligence, and exactneſs in executing all the commiſſions that were entruſted to his care, that he quickly grew diſtinguiſhed. One day his maſter ſent him to Cardinal Mazarine, who was then at Sedan, with a letter written by the queen-mother; and ordered him to bring it back, after that miniſter had ſeen it. Colbert carried the letter, and would not return without it, though the cardinal treated him roughly, uſed ſeveral arts to deceive him, and obliged him to wait for it ſeveral days. Some time after, the cardinal returning to court, and wanting one to write his agenda, or memoranda, deſired Le Tellier to furniſh him with a fit perſon for that employment: and Colbert being preſented to him, the cardinal had ſome remembrance of him, and deſired to know where he had ſeen him. Colbert was afraid of putting him in mind of Sedan, leſt the remembrance of his importunacy, in demanding the queen's letter, ſhould renew the cardinal's anger. But his eminency was ſo far from hating him for his faithfulneſs to his late maſter, that he received him on condition that he ſhould ſerve him with the like zeal and fidelity.

Colbert applied himſelf wholly to the advancement of his maſter's intereſts, and gave him ſo many marks of his diligence and ſkill, that afterwards he made him his intendant. He accommodated himſelf ſo dexterouſly to the inclinations of that miniſter, by retrenching his ſuperfluous expences, that he was entruſted with the management of that gainful trade of ſelling benefices and governments. It was by Colbert's counſel, that the cardinal obliged the governors of frontier places to maintain their garriſons with the contributions they exacted; with which advice his eminency was extremely pleaſed. He was ſent to Rome to negociate the reconciliation of Cardinal de Retz, for which the pope had ſhowed ſome concern; and to perſuade his holineſs to conſent to the diſincamerating of Caſto, according to the treaty concluded with his predeceſſor Urban VIII. Upon the whole Mazarine had ſo high an opinion of Colbert's abilities, and withal ſuch a regard for his faithful ſervices, that at his death, which happened in 1661, he earneſtly recommended him to Louis XIV. as the propereſt perſon to regulate the finances, which at that time ſtood in much need of reformation. Louis accepted the recommendation, and made Colbert intendant of the finances. He applied himſelf to their regulation, and ſucceeded, though it procured him many enemies, and ſome affronts. France is alſo obliged to this miniſter for eſtabliſhing at that time her trade with the Eaſt and Weſt Indies: a great deſign, and from which ſhe has reaped innumerable advantages.

In 1664, he became ſuperintendant of the buildings; and from that time applied himſelf ſo earneſtly to the enlarging and adorning of the royal edifices, that they are at preſent ſo many maſterpieces of architecture: witneſs the palace of the Thuilleries, the Louvre, St Germain, Fountainbleau, and Chambord. As for Verſailles, it may be ſaid that he raiſed it from the ground.

ground. It was formerly a dog-kennel, where Louis XIII. kept his hunting furniture: it is now a palace fit for the greateſt monarch. But royal palaces were not Colbert's only care; he formed ſeveral deſigns for increaſing the beauty and convenience of the capital city, and he did it with great magnificence and grandeur. The public was obliged to this ſame miniſter for the eſtabliſhment of the academy for painting and ſculpture in 1664. The king's painters and ſculptors, with other ſkilful profeſſors of thoſe arts, being proſecuted at law by the maſter-painters at Paris, joined together, and began to form a ſociety, under the name of the Royal Academy for Sculpture and Painting. Their deſign was to keep public exerciſes for the ſake of improving thoſe fine arts, and advancing them to the higheſt degree of perfection. They put themſelves under the protection of Mazarine, and choſe Chancellor Seguier their vice-protector; and after Mazarine's death choſe Seguier their protector, and Colbert their vice-protector. It was at his ſolicitation that they were finally eſtabliſhed by a patent, containing new privileges, 1664. Colbert, being made protector after the death of Seguier, thought fit that a hiſtoriographer ſhould be appointed, whoſe buſineſs it ſhould be to collect all curious and uſeful obſervations that might be made at their conferences. This was accordingly done; and his majeſty was pleaſed to ſettle on him a ſalary of 300 livres. To Colbert alſo the lovers of naval knowledge are obliged for the erection of the Academy of Sciences, for the making of which the more uſeful, he cauſed to be erected, in 1667, the royal obſervatory at Paris, which was firſt inhabited by Caſſini. But theſe are not the only obligations France has to that miniſter. She owes to him all the advantages ſhe receives by the union of the two ſeas; a prodigious work, begun in 1666 and finiſhed in 1680. Colbert was alſo very intent upon matters of a more private nature, ſuch as regarded the order, decency, and well-being of ſociety. He undertook to reform the courts of juſtice, and to put a ſtop to the uſurpation of noble titles, which it ſeems was then very common in France. In the former of theſe attempts he failed, in the latter he ſucceeded.

In 1669, he was made ſecretary of ſtate, and entruſted with the management of affairs relating to the ſea; and his performances in this province were anſwerable to the confidence his majeſty repoſed in him. He ſuppreſſed ſeveral offices, which were chargeable, but uſeleſs; and in the mean time, perceiving the king's zeal for the extirpation of hereſy, he ſhut up the chamber inſtituted by the edicts of Paris and Roan. He propoſed ſeveral new regulations concerning criminal courts, and was extremely ſevere with the parliament of Thoulouſe for obſtructing the meaſures he took to carry the ſame into execution. His main deſign in reforming the tedious methods of proceeding at law, was to give the people more leiſure to apply themſelves to trading; for the advancement of which he procured an edict, to erect a general inſurance-office at Paris, for merchants, &c. In 1672, he was made miniſter of ſtate; for how buſied ſoever he was in the regulation of public affairs, yet he never neglected his own or his family's intereſt and grandeur, or miſſed any opportunity of advancing either. He had been married many years, had ſons and daughters grown up, all of which, as occaſion ſerved, he took care to marry to great perſons. For though he had no reaſon to doubt of his maſter's favour, yet he wiſely ſecured his fortune by powerful alliances. However, buſineſs was certainly Colbert's natural turn, and he not only loved it, but was very impatient to be interrupted in it, as the following anecdote may ſerve to ſhow. A lady of great quality was one day urging him, when he was in the height of his power, to do her ſome piece of ſervice, and perceiving him inattentive and inflexible, threw herſelf at his feet, in the preſence of above 100 perſons, crying, "I beg your greatneſs, in the name of God, to grant me this favour." Upon which Colbert, kneeling down over againſt her, replied, in the ſame mournful tone, "I conjure you madam, in the name of God, not to diſturb me."

This great miniſter died of the ſtone, September 6. 1683, in his 65th year, leaving behind him ſix ſons and three daughters. He was of a middle ſtature, rather lean than fat. His mien was low and dejected, his air gloomy, and his aſpect ſtern. He ſlept little, and was very ſober. Though naturally ſour and moroſe, he knew how to act the lover, and had miſtreſſes. He was of a ſlow conception, but ſpoke judiciouſly of every thing after he had once comprehended it. He underſtood buſineſs pretty well, and he purſued it with unwearied application. Thus he filled the moſt important places with high reputation and credit; and his influence diffuſed itſelf through every part of the government. He reſtored the finances, the navy, the commerce; and he erected thoſe various works of art, which have ever ſince been monuments of his taſte and magnificence. He was a lover of learning, though he never applied to it himſelf; and therefore conferred donations and penſions upon ſcholars in other countries, while he eſtabliſhed and protected academies in his own. He invited into France painters, ſtatuaries, mathematicians, and artiſts of all kinds, who were any way eminent, thus giving new life to the ſciences, and making them flouriſh, as they did, exceedingly. Upon the whole, he was a wiſe, active, generous-ſpirited miniſter; ever attentive to the intereſts of his maſter, the happineſs of the people, the progreſs of arts and manufactures, and in ſhort to every thing that could advance the credit and intereſt of his country. He was a pattern for all miniſters of ſtate; and every nation may wiſh themſelves bleſſed with a Colbert.

COLCHESTER, the chief town of Eſſex, is pleaſantly ſituated upon an eminence, gradually riſing on the ſouth ſide of the river Colne. It is the ancient *Colonia Camulodunum*, from which word, *Colonia*, both the town and the river Colne received their names. The Saxons called it Colneceaſter. That it flouriſhed under the Romans, ſeveral buildings full of their bricks, and innumerable quantities of coin dug in and about it, fully evince. In the year 1763, a curious teſſelated or moſaic pavement was found in a garden three feet under the ſurface of the earth. The emperor Conſtantine the Great was born here, his mother Helen being daughter of Cool, governor or king of this diſtrict under the Romans. She is ſaid to have found out the croſs of Chriſt at Jeruſalem; and on that account

count the arms of this town are a crofs regulee between three ducal coronets, two in chief and one in bafe, the coronet in bafe paffing through the crofs.

The walls of the town are ftill tolerably entire on the fouth, eaft, and weft fides, but much decayed on the north fide; they are generally about nine feet thick. By a ftatute of Henry VIII. this town was made the fee of a fuffragan bifhop.

This town is the moft noted in England for making of baize; it is alfo of fpecial note for candying the eringo roots, and for oyfters.

In the conclufion of the civil war 1648, this town fuftained a fevere fiege of 10 weeks; and the befieged making a very gallant defence, it was changed into a blockade, wherein the garrifon and inhabitants fuffered the utmoft extremity of hunger, being reduced to the neceffity of eating horfe-flefh, dogs, and cats, and were at laft obliged to furrender at difcretion, when their two valiant chief officers, Sir Charles Lucas, and Sir George Lifle, were fhot under the caftle walls in cold blood. Colchefter is a borough by prefcription, and under that right fends two members to parliament, all their charters being filent on that head. The charter was renewed in 1763. The town is now governed by a mayor, recorder, 12 aldermen, 18 affiftants, 18 common-council men. Quarter feffions are held here four times in the year.

The famous abbey-gate of St John is ftill ftanding, and allowed to be a furprifing, curious, and beautiful piece of Gothic architecture, great numbers of perfons coming from diftant places to fee it. It was built, together with the abbey, in 1097; and Guido, fteward to King William Rufus, laid the firft ftone.

St Ann's chapel, ftanding at the eaft end of the town, is valuable in the efteem of antiquarians as a building of great note in the early days of Chriftianity, and made no fmall figure in hiftory many centuries paft. It is ftill pretty entire. St Botoph's priory was founded by Ernulphus, in the reign of Henry I. in the year 1110. It was demolifhed in the wars of Charles I. by the parliament army under Sir Thomas Fairfax. The ruins ftill exhibit a beautiful fketch of ancient mafonry, much admired by the lovers of antiquities. The caftle is ftill pretty entire, and is a magnificent ftructure, in which great improvements have of late been made. Here is an excellent and valuable library.

The markets, which are on Wednefday and Saturday, are very well fupplied with all kinds of provifions. There are no fewer than fix diffenting meeting houfes in this town. Colchefter is 51 miles from London, and 22 ENE of Chelmsford. It had 16 parifh churches, in and out of the walls, only 12 of which are now ufed, the reft being damaged at the fiege in 1648. E. Long. 1. 0. N. Lat. 51. 55.

COLCHI (Arrian, Ptolemy), a town of the Hither India, thought to be *Cochin*, on the coaft of Malabar; now a factory and ftrong fort of the Dutch. E. Long. 75. 0. N. Lat. 10. 0.

COLCHICUM, Meadow-saffron. See Botany *Index*.

COLCHIS, a country of Afia, at the fouth of Afiatic Sarmatia, eaft of the Euxine fea, north of Armenia, and weft of Iberia. It is famous for the expedition of the Argonauts, and as the birth-place of Medea. It was fruitful in poifonous herbs, and produced excellent flax. The inhabitants were originally Egyptians, who fettled there when Sefoftris king of Egypt extended his conquefts in the north.

COLCOTHAR, the fubftance remaining after the diftillation or calcination of martial vitriol or fulphate of iron. See Chemistry *Index*.

COLD, in a relative fenfe, fignifies the fenfation produced by the abftraction of heat from the body.

The nature of cold, and the methods of producing it artificially, have been treated of under the article Chemistry, to which we refer the reader.

Great degrees of cold occur naturally in many parts of the globe in the winter-time. In the winter of 1780, Mr Wilfon of Glafgow obferved, that a thermometer laid on the fnow funk to 25° below 0; but this was only for a fhort time; and in general our atmofphere does not admit of very great degrees of cold for any length of time. In 1732, the thermometer at Peterfburg ftood at 28° below 0; and in 1737, when the French academicians wintered at the north polar circle, or near it, the thermometer funk to 33° below 0; and in the Afiatic and American continent, ftill greater degrees of cold are very common.

The effects of thefe extreme degrees of cold are very furprifing. Trees are burft, rocks rent, and rivers and lakes frozen feveral feet deep; metallic fubftances blifter the fkin like red-hot iron: the air, when drawn in by refpiration, hurts the lungs, and excites a cough: even the effects of fire in a great meafure feem to ceafe; and it is obferved, that though metals are kept for a confiderable time before a ftrong fire, they will ftill freeze water when thrown upon them. When the French mathematicians wintered at Torneo in Lapland, the external air, when fuddenly admitted into their rooms, converted the moifture of the air into whirls of fnow; their breafts feemed to be rent when they breathed it, and the contact of it was intolerable to their bodies; and the alcohol, which had not been highly rectified, burft fome of their thermometers by the congelation of the aqueous part.

Extreme cold very often proves fatal to animals in thofe countries where the winters are very fevere; and thus 7000 Swedes perifhed at once in attempting to pafs the mountains which divide Norway from Sweden. It is not neceffary indeed, that the cold, in order to prove fatal to the human life, fhould be fo very intenfe as has been juft mentioned. There is only requifite a degree fomewhat below 32° of Fahrenheit, accompanied with fnow or hail, from which fhelter cannot be obtained. The fnow which falls upon the clothes, or the uncovered parts of the body, then melts, and by a continual evaporation carries off the animal heat to fuch a degree, that a fufficient quantity is not left for the fupport of life. In fuch cafes, the perfon firft feels himfelf extremely chill and uneafy; he begins to turn liftlefs, unwilling to walk or ufe exercife to keep himfelf warm; and at laft turns drowfy, fits down to refrefh himfelf with fleep, but wakes no more. An inftance of this was feen not many years ago at Terra del Fuego, when Dr Solander, with fome others, having taken an excurfion up the country, the cold was fo intenfe, that one of their number died. The Doctor himfelf, though he had warned his companions of the

the danger of ſleeping in that ſituation, yet could not be prevented from making that dangerous experiment himſelf; and though he was awakened with all poſſible expedition, his body was ſo much ſhrunk in bulk, that his ſhoes fell off his feet, and it was with the utmoſt difficulty that he was recovered.

In thoſe parts of the world where vaſt maſſes of ice are produced, the accumulation of it, by abſorbing the heat of the atmoſphere, occaſions an abſolute ſterility in the adjacent countries, as is particularly the caſe with the iſland of Iceland, where the vaſt collections of ice floating out from the northern ocean, and ſtopped on that coaſt, are ſometimes ſeveral years in thawing. Indeed, where great quantities of ice are collected, it would ſeem to have a power like fire, both augmenting its own cold and that of the adjacent bodies. An inſtance of this is related under the article EVAPORATION, in Mr Wedgewood's experiment, where the true cauſe of this phenomenon is alſo pointed out.

COLD, in *Medicine*. See MEDICINE *Index*.

COLD. See FARRIERY *Index*.

COLDENIA. See BOTANY *Index*.

COLDINGHAM, ſuppoſed to be the *Colonia* of Ptolemy, and called by Bede the city Coldana and of Colud (*Coludum*), ſituated on the borders of Scotland, about two miles from Eyemouth, was a place famous many ages ago for its convent. This was the oldeſt nunnery in Scotland, for here the virgin-wife Etheldreda took the veil in 670; but by the ancient name *Coludum* it ſhould ſeem that it had before been inhabited by the religious called *Culdees*. In 870 it was deſtroyed by the Danes, but its name rendered immortal by the heroiſm of its nuns; who, to preſerve themſelves inviolate from thoſe invaders, cut off their lips and noſes; and thus rendering themſelves objects of horror, were, with their abbeſs Ebba, burnt in the monaſtery by the diſappointed ſavages. After this it lay deſerted till the year 1098, when King Edgar founded on its ſite a priory of Benedictines in honour of St Cuthbert, and beſtowed it on the monk of Durham.

Mr Pennant's deſcription of the black, joyleſs, heathy moor where it was ſituated, might be ſufficient to guard the fair inhabitants of the nunnery were it ſtill ſubſiſting. That deſcription, however, is now altogether inapplicable: The whole tract, five miles over, has been ſince improved, and converted into corn fields; the cheerleſs village of Old Cambus is no more; a decent inn with good accommodations has been eſtabliſhed at a convenient diſtance; and the paſſage of the ſteep glen called the *Peaſe*, which terminates the moor on the road towards Edinburgh, and was formerly the terror of travellers, is now rendered ſafe and eaſy by means of a bridge extending from one ſide of the chaſm to the other.

COLDINGUEN, a town of Denmark, in North Jutland, and dioceſe of Ripen. It is remarkable for its bridge, over which paſs all the oxen and other cattle that go from Jutland into Germany, which brings in a conſiderable revenue to the king. It is ſeated on an eminence, in a pleaſant country abounding with game. E. Long. 9. 25. N. Lat. 55. 35.

COLD-FINCH, a ſpecies of MOTACILLA. See ORNITHOLOGY *Index*.

COLD-SHIRE IRON, that which is brittle when cold.

COLE, WILLIAM, the moſt famous botaniſt of his time, was born at Adderbury in Oxfordſhire about the year 1626, and ſtudied at Merton college in Oxford. He at length removed to Putney, near London; and publiſhed "The Art of Simpling; and Adam in Eden, or Nature's Paradiſe." Upon the reſtoration of King Charles II. he was made ſecretary to Dr Duppa, biſhop of Wincheſter; but died two years after, aged 37.

COLE-FISH, a ſpecies of GADUS. See ICHTHYOLOGY *Index*.

COLE-Seed, the ſeed of the *napus ſativa*, or long-rooted, narrow-leaved rapa, called in Engliſh *navew*, and reckoned by Linnæus among the braſſicas, or cabbage kind. See BRASSICA.

This plant is cultivated to great advantage in many parts of England, on account of the rape oil expreſſed from its ſeeds. The practice of ſowing it was firſt introduced by the Germans and Dutchmen who drained the fens of Lincolnſhire; and hence the notion hath generally prevailed, that it will thrive only in a marſhy ſoil; but this is now found to be a miſtake. In preparing the land which is to receive it, care muſt be taken to plough it in May, and again about midſummer, making the ground as fine and even as poſſible. It is to be ſown the very day of the laſt ploughing, about a gallon on an acre. In the months of January, February, and March, it affords very good food for cattle, and will ſprout again when cut; after which it is excellent nouriſhment for ſheep. After all, if it is not too cloſely fed, it will bear ſeed againſt next July. The ſame caution, however, is requiſite with this food as with clover, till cattle are accuſtomed to it, otherwiſe it is apt to ſwell them. When this plant is cultivated ſolely with a view to the ſeed, it muſt be ſown on deep ſtrong land without dung, and muſt be ſuffered to ſtand till one-half of the ſeeds at leaſt are turned brown; which, according to the ſeaſons, will be ſometimes ſooner, ſometimes later. In this ſtate it is to be cut in the ſame manner and with the ſame care as wheat; and every handful as it is cut is to be regularly ranged on ſheets, that it may dry leiſurely in the ſun, which will commonly be in a fortnight; after which it is to be carefully threſhed out, and carried to the mill for expreſſing the oil. The produce of cole-ſeed is generally from five to eight quarters on an acre; and is commonly ſold at 20s. per quarter.

COLEOPTERA, or BEETLE, the name of Linnæus's firſt order of inſects. See ENTOMOLOGY *Index*.

COLEWORT. See BRASSICA.

COLERAIN, a large town of Ireland, in the county of Londonderry and province of Ulſter; ſeated on the river Bann, four miles ſouth of the ocean, in W. Long. 7. 2. N. Lat. 55. 10. It was formerly a place of great conſideration, being the chief town of a county erected by Sir John Perrot, during his government of Ireland; whereas it is now only the head of one of the baronies in the county of Londonderry; but it is ſtill a corporation, and ſends two members to parliament. It is of a tolerable ſize, and very elegantly built. The port is very indifferent, occaſioned by the extreme rapidity of the river, which repels the

tide, and makes the coming up to the town difficult; so that it has but little trade, and might perhaps have less, if it was not for the valuable salmon-fishery, which amounts to some thousand pounds a-year. If the navigation of the Bann could be opened, which is totally obstructed by a ridge of rocks, it would quickly change the face of things; for then, by the help of this river, and the Newry canal, there would be a direct communication across the kingdom, and, with the assistance of the Black-water river, which likewise falls into Lough Neagh, almost all the counties of the province of Ulster might have a correspondence with each other by water-carriage, to their reciprocal and very great emolument.

COLES, Elisha, author of the well known Latin and English dictionary, was born in Northamptonshire about the year 1640; and was entered of Magdalene College Oxford, which he left without taking a degree; and taught Latin to young people, and English to foreigners, in London, about the year 1663. He afterwards became an usher in Merchant-taylors school; but for some great fault, nowhere expressly mentioned, he was forced to withdraw to Ireland, whence he never returned. He was, however, a good critic in the English and Latin tongues; and wrote several useful books of instruction in his profession.

COLET, John, dean of St Paul's, the son of Henry Colet, knight, was born in London in the year 1466. His education began in St Anthony's school in that city, from whence, in 1483, he was sent to Oxford, and probably to Magdalene college. After seven years study of logic and philosophy, he took his degrees in arts. About the year 1493, Mr Colet went to Paris and thence to Italy, probably with a design to improve himself in the Greek and Latin languages, which at this time were imperfectly taught in our universities. On his return to England in 1497, he took orders; and returned to Oxford, where he read lectures *gratis*, on the epistles of St Paul. At this time he possessed the rectory of St Dennington in Suffolk, to which he had been instituted at the age of 19. He was also prebendary of York, and canon of St Martin's le Grand in London. In 1502 he became prebendary of Sarum; prebendary of St Paul's in 1505; and immediately after dean of that cathedral, having previously taken the degree of doctor of divinity. He was no sooner raised to this dignity, than he introduced the practice of preaching and expounding the scriptures; and soon after established a perpetual divinity lecture in St Paul's church, three days in every week; an institution which gradually made way for the reformation. About the year 1508, Dean Colet formed his plan for the foundation of St Paul's school, which he completed in 1512, and endowed with estates to the amount of 122l. and upwards. The celebrated grammarian, William Lyle, was his first master, and the company of mercers were appointed trustees. The dean's notions of religion were so much more rational than those of his contemporary priests, that they deemed him little better than a heretic; and on that account he was so frequently molested, that he at last determined to spend the rest of his days in peaceful retirement. With this intention he built a house near the palace of Richmond; but being seized with the sweating sickness, he died in 1519, in the 53d year of his age. He was buried on the south side of the choir of St Paul's; and a stone was laid over his grave, with no other inscription than his name. Besides the preferments above mentioned, he was rector of the guild of Jesus at St Paul's, and chaplain to King Henry VIII. Dean Colet, though a Papist, was an enemy to the gross superstitions of the church of Rome. He disapproved auricular confession, the celibacy of the priests, and such other ridiculous tenets and ceremonies as have ever been condemned by men of sound understanding in every age and country. He wrote, 1. *Rudimenta grammatices*. 2. The construction of the eight parts of speech. 3. Daily devotions. 4. *Epistolæ ad Erasmum*. 5. Several sermons: and other works which still remain in manuscript.

COLIBERTS (*Coliberti*), in *Law*, were tenants in soccage, and particularly such villeins as were manumitted or made freemen. But they had not an absolute freedom; for though they were better than servants, yet they had superior lords to whom they paid certain duties, and in that respect might be called servants, though they were of middle condition between freemen and servants.

COLIC, a severe pain in the lower venter, so called because the colon was formerly supposed to be the part affected. See Medicine *Index*.

Colic, in *Farriery*. See Farriery *Index*.

COLIGNI, Gaspard de, admiral of France, was born in 1516. He signalized himself in his youth, in the reigns of Francis I. and Henry II. and was made colonel of infantry and admiral of France in 1552. Henry II. employed him in the most important affairs; but after the death of that prince, he embraced the reformed religion, and became the chief of the Protestant party: he strongly opposed the house of Guise, and rendered this opposition so powerful, that it was thought he would have overturned the French government. On the peace made after the battles of Jarnac and Montcontour, Charles IX. deluded Coligni into security by his deceitful favours; and though he recovered one attempt on his life, when he attended the nuptials of the prince of Navarre, yet he was included in the dreadful massacre of the Protestants on St Bartholomew's day 1572, and his body treated with wanton brutality by a misguided Popish populace.

COLIMA, a sea-port town of Mexico in North America, and capital of a fertile valley of the same name. It is seated at the mouth of a river, in W. Long. 109. 6. N. Lat. 18. 30.

COLIOURE, a small, but ancient and strong town of France, in Rousillon, seated at the foot of the Pyrenean mountains, with a small harbour. E. Long. 3. 10. N. Lat. 43. 24.

COLIR, an officer in China, who may properly be called an inspector, having an eye over what passes in every court or tribunal of the empire. In order to render him impartial, he is kept independent, by having his post for life. The power of the colirs is such, that they make even the princes of the blood tremble.

COLISEUM, or Colisæum, in the ancient architecture, an oval amphitheatre, built at Rome by Vespasian, in the place where stood the bason of Nero's gilded house. The word is formed from *colosseum*, on account of the colossus of Nero that stood near it;

or,

or, according to Nardini, from the Italian *colifeo*. In this were placed ftatues, reprefenting all the provinces of the empire; in the middle whereof ftood that of Rome, holding a golden apple in her hand. The fame term, *colifeum*, is alfo given to another amphitheatre of the emperor Severus. In thefe *colifea* were reprefented games, and combats of men and wild beafts; but there is now little remaining of either of them, time and war having reduced them to ruins.

COLLAERT, Adrian, an eminent engraver who flourifhed about 1550, was born at Antwerp. After having learned in his own country the firft principles of engraving, he went to Italy, where he refided fome time to perfect himfelf in drawing. He wrought entirely with the graver, in a firm neat ftyle, but rather ftiff and dry. The vaft number of plates executed by his hand fufficiently evince the facility with which he engraved; and though exceedingly neat, yet they are feldom highly finifhed.

Collaert, *Hans* or *John*, fon to the foregoing, was alfo an excellent artift. He drew and engraved exactly in the ftyle of his father, and was in every refpect equal to him in merit. He muft have been very old when he died; for his prints are dated from 1555 to 1622. He affifted his father in all his great works, and engraved befides a prodigious number of plates of various fubjects. One of his beft prints is *Mofes ftriking the rock*, a large print, lengthwife, from Lambert Lombard. A great number of fmall figures are introduced into this print; and they are admirably well executed: the heads are fine, and the drawing very correct.

COLLAR, in Roman antiquity, a fort of chain put generally round the neck of flaves that had run away, after they were taken, with an infcription round it, intimating their being deferters, and requiring their being reftored to their proper owners, &c.

Collar, in a more modern fenfe, an ornament confifting of a chain of gold, enamelled, frequently fet with ciphers or other devices, with the badge of the order hanging at the bottom, wore by the knights of feveral military orders over their fhoulders, on the mantle, and its figure drawn round their armories.

Thus, the collar of the order of the Garter confifts of S. S. with rofes enamelled red, within a garter enamelled blue, and the george at the bottom.

Lord Mayor's Collar is more ufually called chain. See Chain.

Knights of the Collar, a military order in the republic of Venice, called alfo the order of St Mark, or the Medal. It is the doge and the fenate that confer this order; the knights wear no particular habit, only the collar, which the doge puts around their neck, with a medal, wherein is reprefented the winged lion of the republic.

Collar of a Draught-horfe, a part of harnefs made of leather and canvas, and ftuffed with ftraw or wool, to be put about the horfes neck.

COLLARAGE, a tax or fine laid for the collars of wine-drawing horfes.

COLLATERAL, any thing, place, country, &c. fituated by the fide of another.

Collateral, in genealogy, thofe relations which proceed from the fame ftock, but not in the fame line of afcendants or defcendants, but being, as it were, afide of each other. Thus, uncles, aunts, nephews, nieces, and coufins, are collaterals, or in the fame collateral line: thofe in a higher degree, and nearer the common root, reprefent a kind of paternity with regard to thofe more remote. See Consanguinity.

Collateral Succeffion. When a defunct, for want of heirs defcended of himfelf, is fucceeded in his eftate by a brother or fifter, or their defcendants, the eftate is faid to have gone to *collateral heirs.*

COLLATIA, in *Ancient Geography*, a town of the Sabines, thought to be diftant between four and five miles from Rome to the eaft; fituated on an eminence (Virgil.) Of this place was Tarquinius Collatinus, married to Lucretia, ravifhed by Sextus Tarquinius (Livy); fituated on this or on the left fide of the Anio (Pliny). Extant in Cicero's time, but in Strabo's day only a village; now no trace of it remains.—Another fuppofed *Collatia* of Apulia, near Mount Garganus, becaufe Pliny mentions the *Collatini* in Apulia, and Frontinus the *Ager Collatinus*.

COLLATINA porta, a gate of Rome, at the Collis Hortulorum, afterwards called *Pinciana*, from the Pincii, a noble family. Its name *Collatina* is from *Collatia*, to the right of which was the Via Collatina, which led to that town.

COLLINA, a gate of Rome at the Collis Quirinalis not far from the temple of Venus Erycina (Ovid); called alfo *Salaria*, becaufe the Sabines carried their falt through it (Tacitus). Now *Salaro*.

COLLATION, in the canon law, the giving or beftowing of a benefice on a clergyman by a bifhop, who has it in his own gift or patronage. It differs from inftitution in this, that inftitution is performed by the bifhop, upon the prefentation of another; and collation is his own gift or prefentation; and it differs from a common prefentation, as it is the giving of the church to the perfon, and prefentation is the giving or offering of the perfon to the church. But collation fupplies the place of prefentation and inftitution, and amounts to the fame as inftitution where the bifhop is both patron and ordinary. Anciently the right of prefentation to all churches was in the bifhop; and now if the patron neglects to prefent to a church, this right returns to the bifhop by collation. If the bifhop neglects to collate within fix months after the elapfe of the patron, then the archbifhop hath a right to do it; and if the archbifhop neglects, then it devolves to the king; the one as fuperior, to fupply the defects of bifhops, the other as fupreme, to fupply all defects of government.

Collation, in common law, the comparifon or prefentation of a copy to its original, to fee whether or not it be conformable; or the report or act of the officer who made the comparifon. A collated act is equivalent to its original, provided all the parties concerned were prefent at the collation.

Collation, in *Scots Law*, that right which an heir has of throwing the whole heritable and moveable eftates of the deceafed into one mafs, and fharing it equally with the others in the fame degree of kindred, when he thinks fuch fhare will be more than the value of the heritage to which he had an exclufive title.

Collation is alfo ufed among the Romanifts for the meal or repaft made on a faft day, in lieu of a fupper. Only fruits are allowed in a collation: F. Lobineau

neau obſerves, that anciently there was not allowed even bread in the collations in Lent, nor any thing beſides a few comfits and dried herbs and fruits; which cuſtom, he adds, obtained till the year 1513. Cardinal Humbert obſerves farther, that in the middle of the 11th century there were no collations at all allowed in the Latin church in the time of Lent; and that the cuſtom of collations was borrowed from the Greeks, who themſelves did not take it up till about the 11th century.

COLLATION is alſo popularly uſed for a repaſt between meals, particularly between dinner and ſupper. The word collation, in this ſenſe, Du Cange derives from *collocutio*, "conference," and maintains, that originally collation was only a conference, or converſation on ſubjects of piety, held on faſt days in monaſteries; but that, by degrees, the cuſtom was introduced of bringing in a few refreſhments; and that by the exceſſes to which thoſe ſober repaſts were at length carried, the name of the abuſe was retained, but that of the thing loſt.

COLLATION of Seals, denotes one ſeal ſet on the ſame abel, on the reverſe of another.

COLLEAGUE, a partner or aſſociate in the ſame office or magiſtrature. See ADJUNCT.

COLLECT, COLLECTION, a voluntary gathering of money, for ſome pious or charitable purpoſe. Some ſay, the name *collect*, or *collection*, was uſed, by reaſon thoſe gatherings were anciently made on the days of *collects*, and in *collects*, i. e. in aſſemblies of Chriſtians; but, more probably, *quia colligebatur pecunia*.

COLLECT, is ſometimes alſo uſed for a tax, or impoſition, raiſed by a prince for any pious deſign. Thus, hiſtories ſay, that in 1166, the king of England coming into Normandy appointed a collect for the relief of the holy land, at the deſire and after the example of the king of France. See CROISADE.

COLLECT, in the liturgy of the church of England, and the maſs of the Romaniſts, denotes a prayer accommodated to any particular day, occaſion, or the like, See LITURGY and MASS.

In the general, all the prayers in each office are called *collects*; either becauſe the prieſt ſpeaks in the name of the whole aſſembly, whoſe ſentiments and deſires he ſums up by the word *oremus*, "let us pray," as is obſerved by Pope Innocent III. or, becauſe thoſe prayers are offered when the people are aſſembled together, which is the opinion of Pamelius on Tertullian.

The congregation itſelf is in ſome ancient authors called *collect*. The popes Gelaſius and Gregory are ſaid to have been the firſt who eſtabliſhed *collects*. Deſpence, a doctor of the faculty of Paris, has an expreſs treatiſe on *collects*, their origin, antiquity, authors, &c.

COLLECTIVE, among grammarians, a term applied to a noun expreſſing a multitude, though itſelf be only ſingular; as an army, company, troop, &c. called *collective nouns*.

COLLECTOR, in general, denotes a perſon who gets or brings together things formerly diſperſed and ſeparated. Hence,

COLLECTOR, in matters of civil polity, is a perſon appointed by the commiſſioners of any duty, the inhabitants of a pariſh, &c. to raiſe or gather any kind of tax.

COLLECTOR, among botaniſts, one who gets together as many plants as he can, without ſtudying botany in a ſcientifical manner.

COLLEGATORY, in the *Civil Law*, a perſon who has a legacy left him in common with one or more other perſons.

COLLEGE, an aſſemblage of ſeveral bodies or ſocieties, or of ſeveral perſons into one ſociety.

College, among the Romans, ſerved indifferently for thoſe employed in the offices of religion, of government, the liberal and even mechanical arts and trades; ſo that, with them, the word ſignified what we call a corporation or company.

In the Roman empire, there were not only the *college of augurs*, and the *college of capitolini*, i. e. of thoſe who had the ſuperintendance of the capitoline games; but alſo colleges of artificers, *collegium artificum*; college of carpenters, *fabricorum* or *fabrorum tignariorum*; of potters, *figulorum*; of founders, *ærariorum*; the college of lockſmiths, *fabrorum ferrariorum*; of engineers of the army, *tignariorum*; of butchers, *laniorum*; of dendrophori, *dendrophororum*; of centonaries, *centonariorum*; of makers of military caſques, *ſagariorum*; of tent-makers, *tabernaculariorum*; of bakers, *piſtorum*; of muſicians, *tibicinum*, &c. Plutarch obſerves, that it was Numa who firſt divided the people into colleges, which he did to the end that each conſulting the intereſts of their colleges, whereby they were divided from the citizens of the other colleges, they might not enter into any general conſpiracy againſt the public repoſe.

Each of theſe colleges had diſtinct meeting places or halls; and likewiſe, in imitation of the ſtate, a treaſury and common cheſt, a regiſter, and one to repreſent them, upon public occaſions, and acts of government. Theſe colleges had the privilege of manumitting ſlaves, of being legates, and making by-laws for their own body, provided they did not claſh with thoſe of the government.

There are various colleges on foot among the moderns, founded on the model of thoſe of the ancients. Such are the three colleges of the empire, viz.

COLLEGE of Electors, or their Deputies, aſſembled in the diet of Ratiſbon.

COLLEGE of Princes; the body of princes, or their deputies at the diet of Ratiſbon.

COLLEGE of Cities, is, in like manner, the body of deputies which the imperial cities ſend to the diet.

COLLEGE of Cardinals, or the *Sacred COLLEGE*; a body compoſed of the three orders of cardinals. See CARDINALS.

COLLEGE, is alſo uſed for a public place endowed with certain revenues, where the ſeveral parts of learning are taught.

An aſſemblage of ſeveral of theſe colleges conſtitutes an univerſity. The erection of colleges is part of the royal prerogative, and not to be done without the king's licenſe.

The eſtabliſhment of colleges or univerſities is a remarkable period in literary hiſtory. The ſchools in cathedrals and monaſteries confined themſelves chiefly to the teaching of grammar. There were only

ly one or two masters employed in that office. But, in colleges, professors are appointed to teach all the different parts of science. The first obscure mention of academical degrees in the university of Paris (from which the other universities in Europe have borrowed most of their customs and institutions), occurs A. D. 1215.

COLLEGE of Civilians, commonly called *Doctors Commons*; a college founded by Dr Harvey, dean of the arches, for the professors of the civil law residing in London; where usually, likewise, reside the judge of the arches court of Canterbury, judge of the admiralty, of the prerogative court, &c. with other civilians; who all live, as to diet and lodging, in a collegiate manner, commoning together; whence the appellation of *Doctors Commons*. Their house being consumed in the great fire, they all resided at Exeter-house in the Strand till 1672; when their former house was rebuilt, at their own expence, in a very splendid manner. To this college belong 34 proctors, who make themselves parties for their clients, manage their causes, &c.

COLLEGE of Physicians, a corporation of physicians in London, who, by several charters and acts of parliament of Henry VIII. and his successors, have certain privileges, whereby no man, though a graduate in physic of any university, may, without license, under the said college-seal, practise physic in or within seven miles of London; with power to administer oaths, fine and imprison offenders in that and several other particulars; to search the apothecaries shops, &c. in and about London, to see if their drugs, &c. be wholesome, and their compositions according to the form prescribed by the said college in their dispensatory. By the said charter they are also freed from all troublesome offices, as to serve on juries, be constable, keep watch, provide arms, &c.

The society had anciently a college in Knight-rider-street, the gift of Dr Linacre, physician to King Henry VIII. Since that time they have had a house built them by the famous Dr Harvey, in 1652, at the end of Amen-corner, which he endowed with his whole inheritance in his lifetime; but this being burnt in the great fire in 1666, a new one was erected at the expence of the fellows, in Warwick-lane, with a noble library, given partly by the marquis of Dorchester, and partly by Sir Theodore Mayerne.

Of this college there are at present a president, four censors, eight electors, a register, and a treasurer chosen annually in October; the censors have, by charter, power to survey, govern, and arrest, all physicians, or others practising physic, in or within seven miles of London, and to fine, amerce, and imprison them, at discretion. The number of fellows was anciently thirty, till King Charles II. increased their number to forty; and King James II. giving them a new charter, allowed the number of fellows to be enlarged so as not to exceed fourscore; reserving to himself and successors the power of placing and displacing any of them for the future.

The college is not very rigorous in asserting their privileges; there being a great number of physicians, some of very good abilities, who practise in London, &c. without their license, and are connived at by the college; yet, by law, if any person not expresly allowed to practise, take on him the cure of any disease, and the patient die under his hand, it is deemed felony in the practiser. In 1696, the college made a subscription, to the number of forty-two of their members, to set on foot a dispensatory for the relief of the sick poor: since that they have erected two other dispensatories.

Edinburgh COLLEGE of Physicians was erected on the 26th November 1681. The design of this institution was, to prevent the abuses daily committed by foreign and illiterate impostors, quacks, &c. For this reason, his majesty, at the time above mentioned, granted letters patent to erect into a body corporate and politic, certain physicians in Edinburgh and their successors, by the title of "the President and Royal College of Physicians at Edinburgh," with power to choose annually a council of seven, one whereof to be president: these are to elect a treasurer, clerk, and other officers; to have a common seal; to sue and be sued; to make laws for promoting the art of physic, and regulating the practice thereof within the city of Edinburgh, town of Leith, and districts of the Canongate, West-port, Pleasance, and Potterrow: through all which the jurisdiction of the college extends. Throughout this jurisdiction, no person is allowed to practise physic, without a warrant from the college, under the penalty of 5l. sterling the first month, to be doubled monthly afterwards while the offence is continued; one-half the money arising from such fines to go to the poor, the other to the use of the college. They are also empowered to punish all licentiates in physic within the above-mentioned bounds, for faults committed against the institutions of the college; and to fine them of sums not exceeding 40s. On such occasions, however, they must have one of the bailies of the city to sit in judgment along with them, otherwise their sentence will not be valid. They are also empowered to search and inspect all medicines within their jurisdiction, and throw out into the street all such as are bad or unwholesome. That they may the better attend their patients, they are exempted from watching, warding, and serving on juries. They are, however, restrained from erecting schools for teaching the art of physic, or conferring degrees on any person qualified for the office of a physician; but are obliged to license all such as have taken their degrees in any other university, and to admit as honorary members all the professors of physic in the rest of the universities of Scotland. These privileges and immunities are not, however, to interfere with the rights and privileges of the apothecary-surgeons, in their practice of curing wounds, contusions, fractures, and other external operations.

Edinburgh COLLEGE of Surgeons. This is but a very late institution, by which the surgeons of Edinburgh are incorporated into a *Royal College*, and authorized to carry into execution a scheme for making provision for their widows and children, &c. They have also the privilege of examining and licensing, if found qualified, all practitioners in surgery within certain bounds.

COLLEGE of Justice, the supreme civil court of Scotland; otherwise called *Court of Session*, or *of Council and Session*. See LAW *Index*.

Sion COLLEGE, or the college of the London clergy, which has been a religious house time out of mind, sometimes

sometimes under the denomination of a priory, sometimes under that of a spital or hospital: at its dissolution under 31st Henry VIII. it was called *Elson's Spital*, from the name of its founder, a mercer, in 1329. At present it is a composition of both, viz. a college for the clergy of London, who were incorporated in 1630, in pursuance to the will of Dr White, under the name of the *President and Fellows of Sion College*; and an hospital for ten poor men and as many women. The officers of the corporation are the president, two deans, and four assistants, who are annually chosen from among the rectors and vicars of London; and are subject to the visitation of the bishop. They have a good library, built and stocked by Mr Simpson, and furnished by several other benefactors, chiefly for the clergy of the city, without excluding other students on certain terms; and a hall, with chambers for students, generally occupied by the ministers of the neighbouring parishes.

Gresham COLLEGE, or COLLEGE *of Philosophy*; a college founded by Sir Thomas Gresham, and endowed with the revenue of the Royal Exchange. One moiety of this endowment the founder bequeathed to the mayor and aldermen of London and their successors, in trust, that they should find four able persons to read within the college, divinity, geometry, astronomy, and music; who are chosen by a committee of the common council, consisting of the lord mayor, three aldermen, and eight commoners, and allowed each, besides lodging, 50l. per annum. The other moiety he left to the company of mercers, to find three more able persons, chosen by a committee of that company, consisting of the master and three wardens, during their office, and eight of the court of assistants, to read law, physic, and rhetoric, on the same terms; with this limitation, that the several lecturers should read in termtime, every day in the week, except Sundays; in the morning in Latin, in the afternoon the same in English; but that in music to be read only in English. By 8th Geo. III. cap. 32. the building appropriated to this college was taken down, and the excise office erected in its room. Each of the professors is allowed 50l. per annum, in lieu of the apartments, &c. relinquished by them in the college, and is permitted to marry, notwithstanding the restriction of Sir Thomas Gresham's will. The lectures are now read in a room over the Royal Exchange; and the city and mercer's company are required to provide a proper place for this purpose.

In this college formerly met the Royal Society, that noble academy, instituted by King Charles II. and celebrated throughout the world for their improvements in natural knowledge. See their history and policy under SOCIETY.

COLLEGE *de Propaganda Fide*, was founded at Rome in 1622 by Gregory XV. and enriched with ample revenues. It consists of thirteen cardinals, two priests, and a secretary; and was designed for the propagation and maintenance of the Romish religion in all parts of the world. The funds of this college have been very considerably augmented by Urban VIII. and many private donations. Missionaries are supplied by this institution, together with a variety of books suited to their several appointments. Seminaries for their instruction are supported by it, and a number of charitable establishments connected with and conducive to the main object of its institution.

Another college of the same denomination was established by Urban VIII. in 1627, in consequence of the liberality of John Baptist Viles, a Spanish nobleman. This is set apart for the instruction of those who are designed for the foreign missions. It was at first committed to the care of three canons of the patriarchal churches; but ever since the year 1641 it is under the same government with the former institution.

COLLEGE *of Heralds*, commonly called the *Herald's Office*; a corporation founded by charter of King Richard III. who granted them several privileges, as to be free from subsidies, tolls, offices, &c. They had a second charter from King Henry VI.; and a house built near Doctors Commons, by the earl of Derby, in the reign of King Henry VII. was given them by the duke of Norfolk, in the reign of Queen Mary, which house is now rebuilt.

This college is subordinate to the earl marshal of England. They are assistants to him in his court of chivalry, usually held in the common hall of the college, where they sit in their rich coats of his majesty's arms. See HERALD.

COLLEGE *of Heralds in Scotland*, consists of Lyon king at arms, six heralds, and six pursuivants, and a number of messengers. See LYON.

COLLEGIANS, COLLEGIANI, COLLEGIANTS, a religious sect formed among the Arminians and Anabaptists in Holland, about the beginning of the seventeenth century; so called because of their colleges, or meetings, twice every week, where every one, females excepted, has the same liberty of expounding the Scripture, praying, &c. They are said to be all either Arians or Socinians; they never communicate in the college, but meet twice a-year from all parts of Holland at Rhinsbergh, whence they are also called *Rhinsberghers*, a village two miles from Leyden, where they communicate together; admitting every one that presents himself, professing his faith in the divinity of the Holy Scriptures, and resolution to live suitably to their precepts and doctrines, without regard to his sect or opinion. They have no particular ministers, but each officiates as he is disposed. They never baptize without dipping.

COLLEGIATE, or COLLEGIAL, churches, are those which have no bishop's see, yet have the ancient retinue of the bishop, the *canons and prebends*. Such are Westminster, Rippon, Windsor, &c. governed by deans and chapters.

Of these collegiate churches there are two kinds; some of royal, and others of ecclesiastical foundation; each of them, in matters of divine service, regulated in the same manner as the cathedrals. There are even some collegiate churches that have the episcopal rights. Some of these churches were anciently abbeys, which in time were secularized. The church of St Peter's, Westminster, was anciently a cathedral; but the revenues of the monastery being by act of parliament, 1 Elizabeth, vested in the dean and chapter, it commenced a collegiate church. In several causes the styling it *cathedral*, instead of *collegiate church* of Westminster, has occasioned error in the pleadings.

COLLET, among jewellers, denotes the horizontal face or plane at the bottom of brilliants. See BRILLIANT.

COLLET, in glafs-making, is that part of glafs veffels which fticks to the iron inftrument wherewith the metal was taken out of the melting-pot: thefe are afterwards ufed for making green glafs.

COLLETICS, in *Pharmacy*, denotes much the fame with AGGLUTINANTS or VULNERARIES.

COLLIER, JEREMY, a learned Englifh nonjuring divine, born in 1650, and educated in Caius college Cambridge. He had firft the fmall rectory of Ampton near St Edmund's Bury in Suffolk, which in fix years he refigned, to come to London, in 1685, where he was made lecturer of Gray's Inn; but the change of government that followed, foon rendered the public exercife of his function impracticable. He was committed to Newgate for writing againft the revolution; and again, for carrying on a correfpondence which that change of events made treafonable; but was releafed both times, without trial, by the intervention of friends. It is obfervable that he carried his fcruples fo far, as to prefer confinement to the tacit acknowledgment of the jurifdiction of the court by accepting his liberty upon bail. Suitable to thefe principles, he next acted a very extraordinary part with two other clergymen of his own way of thinking, at the execution of Sir John Friend and Sir William Perkins for the affaffination plot; by giving them folemn abfolution, and by impofition of hands. Abfconding for which, he continued under an outlawry to the day of his death in 1726. Thefe proceedings having put a ftop to his activity, he employed his retired hours rather more ufefully in literary works. In 1698, he attempted to reform our theatrical entertainments, by publifhing his "Short view of the immorality and profanenefs of the Englifh ftage," which engaged him in a controverfy with the wits of the time; but as Mr Collier defended his cenfures not only with wit, but with learning and reafon, it is allowed that the decorum obferved, for the moft part, by fucceeding dramatic writers, has been owing to his animadverfions. He next undertook a tranflation of Morreri's great Hiftorical and Geographical Dictionary; a work of extraordinary labour, and which appeared in 4 vols. folio. After this he publifhed "An Ecclefiaftical Hiftory of Great Britain, chiefly of England," in 2 vols. folio; which is allowed to be written with great judgment, and even with impartiality. He was befides engaged in feveral controverfies, which his conduct and writings gave rife to, not material to mention. In Queen Anne's reign, Mr Collier was tempted, by offers of confiderable preferment, to a fubmiffion; but as he was a nonjuror upon principle, he could not be brought to liften to any terms.

COLLIER, or COALLIER. See COALLIER.

COLLIERY, COALERY, or COALLIERY. See COALERY.

COLLINS, ANTHONY, a polemical writer, born at Heften near Hounflow in the county of Middlefex in 1676, was the fon of Henry Collins, a gentleman of about 1500l. a-year. He was firft bred at Eton college, and then went to King's-college Cambridge, where he had for his tutor Mr Francis Hare, afterwards bifhop of Chichefter. He was afterwards a ftudent of the Temple; but not relifhing the law, foon abandoned that ftudy. He was an ingenious man, and author of feveral curious books. His firft remarkable piece was publifhed in 1707, "An Effay concerning the ufe of reafon in propofitions, the evidence whereof depends on human teftimony." In 1702, he entered into the controverfy between Mr Clark and Dr Dodwell, concerning the immortality of the foul. In 1713, he publifhed his difcourfe on free-thinking, which made a prodigious noife. In 1725, he retired into the county of Effex, and acted as a juftice of peace and deputy lieutenant for the fame county, as he had done before for that of Middlefex and liberty of Weftminfter. The fame year, he publifhed a "Philofophical Effay concerning human liberty." In 1718, he was chofen treafurer of the county of Effex; and this office he difcharged with great honour. In 1724, he publifhed his "Hiftorical and critical Effay on the 39 Articles." Soon after, he publifhed his "Difcourfe of the Grounds and reafons of the Chriftian religion;" to which is prefixed, "An Apology for free debate and liberty of writing; which piece was immediately attacked by a great number of authors. In 1726 appeared his "Scheme of literary prophecy confidered, in a view of the controverfy occafioned by a late book entitled, A difcourfe of the grounds," &c. In this difcourfe he mentions a MS. differtation of his, to fhow the Sibylline oracles to be a forgery made in the times of the primitive Chriftians, who, for that reafon, were called *Sibyllifts* by the Pagans; but it never appeared in print. His Scheme of literary Prophecy was replied to by feveral writers; and particularly by Dr John Rogers, in his "Neceffity of divine revelation afferted." In anfwer to which our author wrote, "A letter to the Reverend Dr Rogers, on occafion," &c. His health began to decline fome years before his death, and he was very much afflicted with the ftone, which at laft put an end to his life at his houfe in Harley fquare in 1729. He was interred in Oxford chapel, where a monument was erected to him, with an epitaph in Latin. His curious library was open to all men of letters, to whom he readily communicated all the affiftance in his power; he even furnifhed his antagonifts with books to confute himfelf, and directed them how to give their arguments all the force of which they were capable. He was remarkably averfe to all indecency and obfcenity of difcourfe; and was, independent of his fcepticifm, a fincerely good man.

COLLINS, *John*, an eminent accountant and mathematician, born in 1624, and bred a bookfeller at Oxford. Befides feveral treatifes on practical fubjects, he communicated fome curious papers to the Royal Society, of which he was a member, which are to be found in the early numbers of the Philofophical Tranfactions: and was the chief promoter of many other fcientifical publications in his time. He died in 1683; and about 25 years after, all his papers coming into the hands of the learned William Jones, Efq. F. R. S. it appeared that Mr Collins held a conftant correfpondence for many years with all the eminent mathematicians; and that many of the late difcoveries in phyfical knowledge, if not actually made by him, were yet brought forth by his endeavours.

COLLINS, *William*, an admirable poet, was born at

Collins. at Chichester, about the year 1724. He received his classical education at Winchester, after which he studied at New college in Oxford, was admitted a commoner of King's college in the same university, and was at length elected a demy of Magdalene college. While at Oxford, he applied himself to the study of poetry, and published his Oriental Eclogues; after which he came to London. He was naturally possessed of an ear for all the varieties of harmony and modulation; his heart was susceptible of the finest feelings of tenderness and humanity, and was particularly carried away by that high enthusiasm which gives to imagination its strongest colouring; and he was at once capable of soothing the ear with the melody of his numbers, of influencing the passions by the force of the pathos, and of gratifying the fancy by the luxury of description. With these powers, he attempted lyric poetry; and in 1746, published his Odes, descriptive and allegorical; but the sale of this work being not at all answerable to its merit, he burnt the remaining copies in indignation. Being a man of a liberal spirit and a small fortune, his pecuniary resources were unhappily soon exhausted; and his life became a miserable example of necessity, indolence, and dissipation. He projected books which he was well able to execute; and became in idea an historian, a critic, and a dramatic poet; but wanted the means and encouragement to carry these ideas into execution. Day succeeded day, for the support of which he had made no provision; and he was obliged to subsist, either by the repeated contributions of a friend or the generosity of a casual acquaintance. His spirits became oppressed, and he sunk into a sullen despondence. While in this gloomy state of mind, his uncle Colonel Martin died, and left him a considerable fortune. But this came too late for enjoyment; he had been so long harassed by anxiety and distress that he fell into a nervous disorder, which at length reduced the finest understanding to the most deplorable childishness. In the first stages of this disorder he endeavoured to relieve himself by travelling, and passed into France; but the growing malady obliged him to return; and having continued, with short intervals, in this pitiable state till the year 1756, he died in the arms of his sister.

The following character of the poetry of Collins is drawn by Mrs Barbauld, and is extracted from an essay prefixed to an edition of his works published in 1797. "He will be acknowledged to possess imagination, sweetness, bold and figurative language. His numbers dwell on the ear, and easily fix themselves in the memory. His vein of sentiment is by turns tender and lofty, always tinged with a degree of melancholy, but not possessing any claim to originality. His originality consists in his manner, in the highly figurative garb in which he clothes abstract ideas, in the felicity of his expressions, and his skill in embodying ideal creations. He had much of the mysticism of poetry, and sometimes became obscure, by aiming at impressions stronger than he had clear and well-defined ideas to support. Had his life been prolonged, and with life had he enjoyed that ease which is necessary for the undisturbed exercise of the faculties, he would probably have risen far above most of his contemporaries'."

COLLINSON, Peter, an eminent naturalist and antiquarian, descended of an ancient family, was born on the paternal estate called *Hugal Hall*, or *Height of Hugal*, near Windermere lake, in the parish of Stavely, about ten miles from Kendal in Westmoreland. Whilst a youth, he discovered his attachment to natural history. He began early to make a collection of dried specimens of plants, and had access to the best gardens at that time in the neighbourhood of London. He became early acquainted with the most eminent naturalists of his time; the Drs Derham, Woodward, Hale, Lloyd, and Sloane, were amongst his friends. Among the great variety of articles which form that superb collection, now (by the wise disposition of Sir Hans and the munificence of parliament) the British Museum, small was the number of those with whose history Mr Collinson was not well acquainted; he being one of those few who visited Sir Hans at all times familiarly; their inclinations and pursuits in respect to natural history being the same, a firm friendship had early been established between them. Peter Collinson was elected a fellow of the Royal Society on the 12th of December 1728; and perhaps was one of the most diligent and useful members, not only in supplying them with many curious observations himself, but in promoting and preserving a most extensive correspondence with learned and ingenious foreigners in all countries and on every useful subject. Besides his attention to natural history, he minuted every striking hint that occurred either in reading or conversation; and from this source he derived much information, as there were very few men of learning and ingenuity who were not of his acquaintance at home; and most foreigners of eminence in natural history, or in arts and sciences, were recommended to his notice and friendship. His diligence and economy of time were such, that though he never appeared to be in a hurry, he maintained an extensive correspondence with great punctuality; acquainting the learned and ingenious in distant parts of the globe with the discoveries and improvements in natural history in this country, and receiving the like information from the most eminent persons in almost every other. His correspondence with the ingenious Cadwallader Colden, Esq. of New-York, and the justly celebrated Dr Franklin of Philadelphia, furnish instances of the benefit resulting from his attention to all improvements. The latter of these gentlemen communicated his first essays on electricity to Mr Collinson, in a series of letters, which were then published, and have been reprinted in a late edition of the Doctor's ingenious discoveries and improvements. Perhaps, in some future period, the account procured of the management of sheep in Spain, published in the Gentleman's Magazine for May and June 1764, may not be considered among the least of the benefits accruing from his extensive and inquisitive correspondence. His conversation, cheerful and usefully entertaining, rendered his acquaintance much desired by those who had a relish for natural history, or were studious in cultivating rural improvements; and secured him the intimate friendship of some of the most eminent personages in this kingdom, as distinguished by their taste in planting and horticulture, as by their rank and dignity. He was the first who introduced the great variety of seeds and shrubs which are now the principal

principal ornaments of every garden; and it was owing to his indefatigable induftry, that fo many perfons of the firft diftinction are now enabled to behold groves tranfplanted from the weftern continent flourifhing as luxuriantly in their feveral domains as if they were already become indigenous to Britain. He had fome correfpondents in almoft every nation in Europe, fome in Afia, and even at Pekin; who all tranfmitted to him the moft valuable feeds they could collect, in return for the treafures of America. The great Linnæus, during his refidence in England, contracted an intimate friendfhip with Mr Collinfon, which was reciprocally increafed by a multitude of good offices, and continued to the laft. Befides his attachment to natural hiftory, he was very converfant in the antiquities of our own country, having been elected a member of the Society of Antiquaries April 7. 1737; and he fupplied them often with many curious articles of intelligence and obfervation, refpecting both our own and other countries. He died in 1768, leaving behind him many materials for the improvement of natural hiftory.

COLLINSONIA. See BOTANY *Index*.

COLLIQUAMENTUM, in *Natural Hiftory*, an extreme tranfparent fluid in an egg, obfervable after two or three days incubation, containing the firft rudiments of the chick. It is included in one of its own proper membranes, diftinct from the albumen. Harvey calls it the *oculus*.

COLLIQUATION, in *Chemiftry*, is applied to animal, vegetable, and mineral fubftances, tending towards fufion. See FUSION.

COLLIQUATION, in *Phyfic*, a term applied to the blood, when it lofes its crafis or balfamic texture; and to the folid parts, when they wafte away by means of the animal fluids flowing off through the feveral glands, and particularly thofe of the fkin, fafter than they ought; which occafions fluxes of many kinds, but moftly profufe, greafy, and clammy fweats.

COLLIQUATIVE FEVER, in *Phyfic*, a fever attended with a diarrhœa, or with profufe fweats.

COLLISION, the ftriking of one hard body againft another; or the friction or percuffion of bodies moving violently with different directions, and dafhing againft each other, as flint and fteel.

COLLUM, the fame with NECK.

COLLUSION, in *Law*, a fecret underftanding between two parties, who plead or proceed fraudulently againft each, to the prejudice of a third perfon.

COLLUTHIANS, a religious fect who rofe about the beginning of the fourth century, on occafion of the indulgence fhown to Arius by Alexander, patriarch of Alexandria. Several people being fcandalized at fo much condefcenfion; and, among the reft, Colluthus, a prieft of the fame city, he hence took a pretence for holding feparate affemblies, and by degrees proceeded to the ordination of priefts, as if he had been a bifhop, pretending a neceffity for this authority in order to oppofe Arius. To his fchifm he added herefy, teaching, that God did not create the wicked; that he was not author of the evils that befal men, &c. He was condemned by a council held at Alexandria by Ofius, in the year 330.

COLLYBUS (Κολλυβος), in antiquity, the fame with what is now called *the rate of exchange*.

COLLYRÆ, or COLLYRIDES, in antiquity, a certain ornament of hair, worn by the women on their necks. It was made up in the form of the fmall roundifh cakes called κολλυραι, *collyræ*.

COLLYRIDIANS, in church hiftory, a fect, towards the clofe of the 4th century, denominated from a little cake, called by the Greeks κολλυριδιαι, *collyridia*, which they offered to the Virgin Mary.

This fect, it feems, confifted chiefly of Arabian women, who out of an extravagance of devotion to the Virgin, met on a certain day in the year, to celebrate a folemn feaft, and to render divine honours to Mary as to a goddefs, eating the cake which they offered in her name. St Epiphanius, who relates the hiftory of this fuperftitious ceremony, ridicules it. They fprung up in oppofition to the ANTIDICO-MARIANITES.

COLLYRIUM, in *Pharmacy*, a topical remedy for a diforder of the eyes, defigned to cool and repel hot fharp humours.

COLMAN, GEORGE, a mifcellaneous and theatrical writer, was born at Florence about the year 1733. He was the fon of Mr Colman, at that time Britifh refident at the court of the duke of Tufcany, and of a fifter of the countefs of Bath. He received the early part of his education at Weftminfter fchool, where Lloyd, Churchill, Bonnel, Thornton, and fome others who became afterwards diftinguifhed literary characters, were among his intimate companions. While at fchool he appeared in the character of a poet, having addreffed a copy of verfes to his coufin Lord Pulteney, which were afterwards publifhed in the magazine of St James. He was next fent to Chrift Church College, Oxford, where he gave many proofs of his lively genius, uniting with Thornton in producing a weekly periodical paper, entitled the "Connoiffeur," which was continued from January 1754, to September 1756, and afterwards publifhed in 4 vols. 12mo. Although this work met not with an equal fhare of approbation with the World, the Adventurer, and the Rambler, which made their appearance much about the fame time, yet it may with juftice be affirmed, that fome papers of it are fuperior to any which thefe performances contain, for a ludicrous delineation of the current manners, which has always been confidered as an effential department of every periodical work. When Mr Colman took the degree of A. M. he left the college and refided in London. He entered at Lincoln's Inn, and in proper time was admitted to the bar; but literary purfuits were much more confonant to the bent of his genius. He publifhed in 1760 a dramatic piece of great humour, called *Polly Honeycombe*, which was fuccefsfully acted in Drury-Lane; and the following year he gave the world his comedy of the Jealous Wife, deemed the beft which had for many years appeared. By the demife of Lord Bath he came to the poffeffion of a handfome fortune, and it was farther augmented by the death of General Pulteney, in 1767. He ftill continued to write for the ftage, and produced, along with Garrick, that excellent comedy called the Clandeftine Marriage. He alfo tranflated the comedies of Terence into a kind of blank verfe, which gained him confiderable applaufe.

He foon after this made a purchafe of Haymarket theatre from Mr Samuel Foote, which he fupplied with

 pieces

pieces either original or tranflations, and felected the ableft actors, particularly in comedy. To a tranflation he made of Horace's Art of Poetry, he prefixed an ingenious account of the intention of its author; and added importance to the whole work by many critical notes. The Genius, and the Gentleman, were other two of his performances, as alfo a number of fmall pieces of the humorous kind. His underftanding was much impaired by a ftroke of the palfy, which feized him in the year 1789, in confequence of which melancholy event, his fon was intrufted with the management of the theatre. He died in the month of Auguft 1794. in the 62d year of his age.

COLMAR, a confiderable town of France, in Upper Alface, of which it is the capital. It has great privileges, and the Proteftants have liberty of confcience. It is feated near the river Ill, in E. Long. 7. 27. N. Lat. 48. 5.

COLMARS, a town of France in Provence, and the diocefe of Sens. It is feated near the Alps, in E. Long. 6. 35. N. Lat. 44. 7.

COLMOGOROD, a town of the empire of Ruffia, with an archbifhop's fee, feated in an ifland formed by the river Dwina, in E. Long. 39. 42. N. Lat. 64. 14.

COLNBROOK, a town of Buckinghamfhire in England, feated on the river Coln, which feparates this county from Middlefex. It is a great thoroughfare on the weftern road, and has feveral good inns. W. Long. 0. 25. N. Lat. 51. 30.

COLNE, a town of Lancafhire in England, feated on a fmall hill near the confines of the county. W. Long. 2. 5. N. Lat. 53. 50.

COLOCHINA, an ancient town of the Morea, in Turkey in Europe. E. Long. 23. 22. N. Lat. 36. 32.

COLOCYNTHIS, in *Botany*, a fpecies of CUCUMIS.

COLOCZA, a town of Hungary, feated on the Danube, and capital of the county of Bath, with an archbifhop's fee. It was taken by the Turks in 1686, but afterwards retaken by the Imperialifts. E. Long. 18. 29. N. Lat. 46. 38.

COLOGNA, a town of Italy, in Padua, and in the territory of Venice. E. Long. 17. 27. N. Lat. 45. 14.

COLOGNE, The ARCHBISHOPRIC or DIOCESE of, one of the ftates that compofe the electoral circle of the Rhine, in Germany. It is bounded on the north by the duchy of Cleves and Gueldres, on the weft by that of Juliers, on the fouth by the archbifhopric of Cleves, and on the eaft by the duchy of Berg, from which it is almoft wholly feparated by the Rhine. This country is very fruitful in corn and wine, which the inhabitants difpofe of by embarking it on the Rhine, it extending above feventy miles along that river. It is divided into the Higher and Lower Diocefe: the Higher Diocefe contains that part which lies above Cologne, wherein is Bonne, the capital town of this electorate, and where the elector refides; befides which there are Leichnich, Andernach, Bruyl, Zulich, and Kerpen. The Lower Diocefe is on the other fide of Cologne, and contains the towns of Zonz, Neuys, Heizarwart, Kempen, Rhynberg, and Alpen. The city of Cologne and county of Meurs, though within the diocefe of Cologne, do not belong to it; for Cologne is a free city, and Meurs belongs to the houfe of Naffau Orange; but by way of recompenfe, the elector has confiderable dominions in Weftphalia, which they call the *Domain*. It contains the duchy of Weftphalia, and the county of Rechlinchufen. This prelate is one of the electors of the empire, and holds alternately with that of Treves the fecond or third rank in the electoral college. He is arch chancellor of the empire in Italy, which dignity was very important when the emperors were mafters of Italy, but now it is next to nothing. When the emperors were crowned at Aix-la-chapelle, the archbifhop of Cologne performed the ceremony, which caufed him to pretend to the fame right elfewhere; but he was oppofed by the archbifhop of Mentz. This occafioned an order, that they fhould each of them have that honour in his own diocefe, but if it was done elfewhere, they fhould perform it alternately. The archbifhop of Cologne is elected by the chapter in that city, which is the moft illuftrious in all Germany. They are all princes or counts, except eight doctors, who have no occafion to prove their nobility.

COLOGNE, an ancient and celebrated town of Germany, in the diocefe of that name, with an archbifhop's fee, and a famous univerfity, feated on the river Rhine, in E. Long. 7. 10. N. Lat. 50. 55. In the times of the Romans, this city was called *Colonia Agrippina*, and *Ubiorum*, becaufe it was built by Agrippina, the wife of Claudius I. and mother of Nero; and becaufe the Ubii inhabited this country on the Lower Rhine. In 755 it was an archbifhopric, and in 1260 entered into the Hanfeatic league, which has now no exiftence. The univerfity was eftablifhed in 1388 by Pope Urban VI. The city is fortified with ftrong walls, flanked with 83 large towers, and furrounded with three ditches; but thefe fortifications being executed after the ancient manner, could make but a poor defence at prefent. It lies in the fhape of a half-moon, and is faid to have 20 gates, 19 parifhes, 17 monafteries, and 365 churches and chapels; but the ftreets, in general, are dirty and badly paved, the windows of the houfes compofed of fmall bits of round glafs, and the inhabitants are but few for fo large a place. It is inhabited moftly by Papifts; but there are alfo many Proteftants, who repair to the neighbouring town of Mulheim, in the duchy of Berg, for public worfhip. Its trade, which is confiderable, efpecially in Rhenifh wine, is chiefly in the hands of Proteftants, and carried on by the Rhine. The fhips with which they trade to the Netherlands are of a particular conftruction, and confiderable burden. The clergy here are very numerous, and have large revenues. That of the archbifhop is 130,000l. Baron Polnitz fays, that though Cologne is one of the greateft cities, it is one of the moft melancholy in all Europe; there being nothing to be feen but priefts, friars, and ftudents, many of whom beg alms with a fong, and nothing to be heard but the ringing of bells; that there are very few families of quality; that the vulgar are very clownifh; and that the noblemen of the chapter ftay no longer in town than their duty obliges them. Mr Wright, in his Travels, fays, that the women go veiled; and that the beft gin is that diftilled from the juniper berries which grow in this neighbourhood. This city is perhaps the moft remarkable of any in the world for the great number of precious relics it contains, of which the Popifh clergy no-

no doubt make their advantage. In the church of St Urſula, they pretend to ſhow her tomb, and the bones of the 11,000 pretended virgin martyrs, though that ſtory is entirely owing to a miſtaken inſcription. The heads of ſome of theſe imaginary martyrs are kept in caſes of ſilver, others are covered with ſtuffs of gold, and ſome have caps of cloth of gold and velvet. Brevat ſays, he ſaw between 4000 and 5000 ſkulls, decked with garlands and coronets, ranged on ſhelves. The canoneſſes of St Urſula, who muſt be all counteſſes, have a handſome income. In their church they pretend to ſhow three of the thorns of our Saviour's crown, and one of the veſſels which contained the water that he converted into wine at the marriage of Cana. In the church of St Gereon are 900 heads of Mooriſh cavaliers, ſaid to have been in the army of Conſtantine before it was converted, and to have been beheaded for refuſing to ſacrifice to idols. Every one of the heads has a cap of ſcarlet, adorned with pearls. In the magnificent cathedral of St Peter, the three wiſe men who came from the eaſt to viſit our Saviour, are ſaid to be interred. They lie in a large purple ſhrine ſpangled with gold, ſet upon a pedeſtal of braſs, in the midſt of a ſquare mauſoleum, faced within and without with marble and jaſper. It is opened every morning at nine o'clock, if two of the canons of the cathedral are preſent, when the kings or wiſe men are ſeen lying at full length, with their heads bedecked with a crown of gold garniſhed with precious ſtones. Their names, which are *Gaſper*, *Melchier*, and *Balthaſar*, are in purple characters on a little grate, which is adorned with an infinite number of large rich pearls and precious ſtones, particularly an oriental topaz as big as a pigeon's egg, and valued at above 30,000 crowns. Over againſt them are ſix large branches of ſilver, with wax candles, which burn night and day. The bones of theſe men, we are told, were brought to Conſtantinople by Helena mother to Conſtantine, from thence to Milan by Euſtorpius biſhop of that ſee, and afterwards hither by Archbiſhop Rainold. In the Jeſuits college are the portraits of the firſt 13 generals of that order, with Ignatius Loyola at their head; and in the church, which is the fineſt in Cologne, are many rich ſtatues, with an amazing quantity of fine ſilver plate; and the utenſils for maſs are all of gold enriched with precious ſtones. In the Cordeliers church, is the tomb of the famous Duns Scotus, ſurnamed *Doctor Subtilis*, with this epitaph, "Scotia me genuit, Anglia me ſuſcepit, Gallia me docuit, Colognia me tenet." Cologne is a free imperial city, and as ſuch has a ſeat and voice at the diets of the empire, and circle of the Lower Rhine. In thoſe of the empire, it has the firſt place on the Rheniſh bench. Towards the defence of the empire, its aſſeſſment is 825 florins; and towards the maintenance of the chamber-court, 405 rix-dollars 72¼ kruitzers, each term. Its militia conſiſts of four companies of foot, who keep guard at the gates. It is governed by its own ſenate, in reſpect to civil matters and cauſes; but the criminal juriſdiction belongs to the elector and his chapter; and ſo jealous are the inhabitants of him, that they will not permit him to ſtay in the city above three days at a time, nor to come into it with a large retinue. For this reaſon the elector reſides commonly at Bonn. Cologne ſurrendered to the French in 1794.

COLOGNE-Earth, a kind of very light baſtard ochre, of a deep brown colour.

COLOMBO, a handſome, pleaſant, and ſtrong town of Aſia, ſeated on the eaſtern ſide of the iſland of Ceylon in the Eaſt Indies. It was built by the Portugueſe in 1638; and in 1658 they were driven from it by the natives, aſſiſted by the Dutch, who are now in poſſeſſion of it. It is about three quarters of a mile long, and as much in breadth. The natives live in the old town, without the walls of the new; the ſtreets of this laſt are wide and ſpacious; and the buildings are in the modern taſte, particularly the governor's houſe, which is a handſome ſtructure. E. Long. 80. 25. N. Lat. 7. 10.

COLOMEY, or COLOMIA, a town of Poland in Red Ruſſia, ſeated on the river Pruth, in E. Long. 25. 9. N. Lat. 48. 45.

COLOMNA, FABIO, a very learned botaniſt, born at Naples about the year 1567. He became ſkilled in the languages, in muſic, deſigning, painting, and the mathematics; and died about the middle of the 17th century. He wrote, 1. Φυτοβασανος, ſeu Plantarum aliquot (ac piſcium) hiſtoria. 2. Minus cognitarum rariorumque ſtirpium εκφρασις; itemque de aquatilibus, aliiſque nonnullis animalibus, libellus; and other works.

COLON, in *Anatomy*, the firſt and moſt conſiderable of the large inteſtines. See ANATOMY, N° 194.

COLON, in *Grammar*, a point or character formed thus [:], ſerving to mark a pauſe, and to divide the members of a period. See POINTING; ſee alſo PERIOD, COMMA, and SEMICOLON. Grammarians generally aſſign the uſe of a colon to be, to mark the middle of a period; or to conclude a ſenſe leſs perfect than the dot or period:—but, a ſenſe leſs perfect than the period, is an expreſſion extremely vague and indeterminate. See PERIOD.

Others ſay, a colon is to be uſed when the ſenſe is perfect, but the ſentence not concluded; but neither is this over clear and expreſs.

A late author, in a ingenious diſcourſe, *De ratione interpungendi*, marks the office of the colon, and wherein it differs from the ſemicolon, &c. more preciſely. A colon, on his principles, ſerves to diſtinguiſh thoſe conjunct members of a ſentence, which are capable of being divided into other members; whereof one, at leaſt, is conjunct. Thus, in the ſentence, *As we cannot diſcern the ſhadow moving along the dial-plate, ſo the advances we make in knowledge are only perceived by the diſtance gone over;* the two members being both ſimple, are only ſeparated by a comma. In this, *As we perceive the ſhadow to have moved, but did not perceive it moving; ſo our advances in underſtanding, in that they conſiſt of ſuch minute ſteps, are only perceivable by the diſtance;*—the ſentence being divided into two equal parts, and thoſe conjunct ones, ſince they include others; we ſeparate the former by a ſemicolon, and the latter by commas. But in this, *As we perceive the ſhadow to have moved along the dial, but did not perceive it moving; and it appears the graſs has grown, though nobody ever ſaw it grow: ſo the advances we make in knowledge, as they conſiſt of ſuch minute ſteps, are*

are only perceivable by the diſtance—the advancement in knowledge is compared to the motion of a ſhadow, and the growth of graſs; which compariſon divides the ſentence into two principal parts: but ſince what is ſaid of the movement of the ſhadow, and likewiſe of the growth of graſs, contains two ſimple members, they are to be ſeparated by a ſemicolon; conſequently a higher pointing is required to ſeparate them from the other part of the ſentence, which they are oppoſed to: and this is a colon. See PUNCTUATION.

COLONEL, in military matters, the commander in chief of a regiment, whether horſe, foot, or dragoons.

Skinner derives the word from colony, being of opinion, the chiefs of colonies, called *coloniales*, might give the name to chiefs of forces. In the French and Spaniſh armies, colonel is confined to the infantry and dragoons: the commanding officer of a regiment of horſe they uſually call *meſtre de camp*. Formerly, inſtead of colonel, the French uſed the word coronel: and this old ſpelling comes nearer to our common way of pronouncing the word *colonel*.

A colonel may lay any officer of his regiment in arreſt, but muſt acquaint the general with it; he is not allowed a guard, only a ſentry from the quarter-guard.

COLONEL-Lieutenant, he who commands a regiment of guards, whereof the king, prince, or other perſon of the firſt eminence, is colonel. Theſe colonel-lieutenants have always a colonel's commiſſion, and are uſually general officers.

Lieutenant COLONEL, the ſecond officer in a regiment, who is at the head of the captains, and commands in the abſence of the colonel.

COLONIA, in *Ancient Geography*, a town of the Trinobantes, a little above Camelodunum. Now Colcheſter in Eſſex, according to Camden, who ſuppoſes it to take its name from the river Colne, and not that it was a colony; though others think Antonine's diſtance agrees with Sudbury.

COLONIA Equeſtris, an ancient and noble colony on the Lacus Lemanus. It appears to be the work of Julius Cæſar, who ſettled there *Equites Limatenei*; and to this Lucan is thought to refer. By the Itinerary it is ſuppoſed to have ſtood between Lauſanne and Geneva, 12 miles from the laſt place by Peutinger's map, which directs to Nyon, placed in Cavo Lemano, according to Lucan's expreſſion, that is, a bay or cove of the lake. Its ancient name was *Noviodunum*, (Notitia Galliæ): hence its modern name.

COLONIA Metallina, or *Metallinenſis*, a town of Luſitania, ſituated on the right or weſt ſide of the Anas, or Guadiana; but now on the left or eaſt ſide, from the river's ſhifting its bed or channel, and called Medelin, a town in Eſtremadura. W. Long. 6. 12. Lat. 38. 45.

COLONIA Morinorum, a town in Belgica, thought to be Tarvenna, the capital of the Morini. Now Terrouen, a town of Artois. E. Long. 2. 15. Lat. 37. 50.

COLONIA Norbenſis, or *Norba Cæſarea*, a town of Luſitania, to the ſouth of Trajan's bridge on the Tagus. Now *Alcantara*, in Eſtremadura. W. Long. 7. 10. N. Lat. 39. 10.

COLONIA Trajana, (Antonine, Peutinger); a town of Belgica, ſurnamed alſo *Ulpia*, (Antonine); and *Triceſima*, from being the ſtation of the thirtieth legion, (Ammian). Now Kellen, a village of the duchy of Cleves, a mile from the Rhine.

COLONIA Valentia, (Ptolemy, Livy); a town of the Hither Spain, on the Turias; deſtroyed by Pompey, (Salluſt); reſtored by Julius Cæſar. Still called Valencia, on the river Guadalaviar, in Valencia. W. Long. 35. Lat. 39. 20.

COLONNA, a town of Italy in the Campagna of Rome, 18 miles eaſtward of that city. E. Long. 12. 56. N. Lat. 41. 55.

COLONNA, *Pompey*, cardinal archbiſhop of Montreal in Sicily, and biſhop of a very great number of places, made a conſpicuous figure in the world. He was equally qualified to wear the cardinal's hat and the helmet, and experienced more than once the reverſes of fortune. Julius II. removed him from all his dignities; but Leo I. reſtored him, created him cardinal, and ſent him on ſeveral embaſſies. Clement VII. diveſted him of the purple, and again reſtored him to it. It was pretended he was obliged to him for his exaltation to the papal throne. The pope refuſing him ſome requeſt, he reproached him, ſaying, "That it was by his intereſt he had arrived at his dignity." The pope replied, "It is true, but let me be pope, and do not endeavour to be ſo yourſelf; for by acting as you do, you endeavour to diſpoſſeſs me of that you have raiſed me to." He died viceroy of Naples in 1532. He wrote ſome poems in praiſe of Iſabella Filamarini, in which he proteſts the chaſtity of his wiſhes. He wrote another work, *De laudibus mulierum*.

COLONNADE, in *Architecture*, a periſtyle of a circular figure; or a ſeries of columns diſpoſed in a circle, and inſulated within ſide.

A Polyſtyle COLONNADE, is that whoſe numbers of columns are too great to be taken in by the eye at a ſingle view. Such is the colonnade of the palace of St Peter's at Rome, conſiſting of 284 columns of the Doric order, each above four feet and a half diameter, all in Tiburtine marble.

COLONOS, in *Ancient Geography*, an eminence near Athens, whither Oedipus, after his baniſhment from Thebes, is ſaid to have retired; and hence it is that Sophocles calls the tragedy on the ſubject *Oedipus Coloneus*. A place ſacred to Neptune, and where ſtood an equeſtrian ſtatue of him. Here alſo ſtood Timon's tower; who, for his love of ſolitude, and hatred to mankind, was called *Miſanthropos*, (Pauſanias).

COLONSAY, one of the Hebrides or Weſtern Iſlands belonging to Scotland. It comprehends that of Oronſay, from which it is only ſeparated in time of flood, and both belong to the ſame proprietor, viz. Mr M'Neil. See ORONSAY.

COLONUS, a huſbandman or villager, who was bound to pay yearly a certain tribute, or at certain times of the year to plough ſome part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch, *boor*.

COLONY, a company of people tranſplanted into a remote province in order to cultivate and inhabit it.

We may diſtinguiſh three kinds of colonies. Firſt, thoſe

those serving to ease or discharge the inhabitants of a country, where the people are become too numerous, so that they cannot any longer conveniently subsist.

The second are those established by victorious princes and people, in the middle of vanquished nations, to keep them in awe and obedience.

The third may be called *colonies of commerce;* because, in effect, it is trade that is the sole occasion and object thereof.

It was by means of the first kind of colonies that, some ages after the deluge, the east first, and successively all the other parts of the earth, became inhabited; and without mentioning any thing of the Phœnician and Grecian colonies, so famous in ancient history, it is notorious that it was for the establishment of such colonies, that, during the declension of the empire, those torrents of barbarous nations, issuing, for the generality, out of the north, overran the Gauls, Italy, and the other southern parts of Europe; and, after several bloody battles, divided it with the ancient inhabitants.

For the second kind of colonies, the Romans used them more than any other people; and that to secure the conquests they had made from the west to the east. It is well known how many cities in Gaul, Germany, Spain, and even England, value themselves on their having been of the number of Roman colonies.

There were two kinds of colonies among the Romans: those sent by the senate; and the military ones, consisting of old soldiers, broken and disabled with the fatigues of war, who were thus provided with lands as the reward of their services. See Benefice. The colonies sent by the senate were either Roman or Latin, i. e. composed either of Roman citizens or Latins. The coloniæ Latinæ were such as enjoyed the *jus Latii;* said to consist in those two things; one, that whoever was edile or prætor in a town of Latium, became for that reason a Roman citizen; the other, that the Latins were subject to the edicts of their own and not to those of the Roman magistrates: in the year of the city six hundred and sixty-two, after the Social war, the city was granted to all Latium, by the *lex Julia.* The coloniæ Romanæ, were such as had the jus Romanum, but not in its full extent; namely, in the right of suffrage, putting up for honours, magistracies, command in the army, &c.; but the jus Quiritum only, or private right; as right of liberty, of gentility, or dignity of family, sacrifice, marriage, &c. For it was long a rule, never to grant the liberty of the city in full to colonies; nor is there any instance to the contrary, till after the Social war, in the year of the city six hundred and sixty-two. According to Ulpian (l. 1. *D. de Cens.*), there were other colonies, which had little more than the name, only enjoying what they called *jus Italicum*, i. e. they were free from the tributes and taxes paid by the provinces. Such were the colonies of Tyre, Berytus, Heliopolis, Palmyra, &c. M. Vaillant has filled a volume in folio with medals struck by the several colonies, in honour of the emperors who founded them. The ordinary symbol they engraved on their medals, was either an eagle; as when the veteran legions were distributed in the colonies: or a labourer, holding a plough drawn by a pair of oxen; as when the colony consisted of ordinary inhabitants. On all the medals are seen the names of the decemviri, who held the same rank and had the same authority there as the consuls had at Rome.

Lastly, the colonies of commerce are those established by the English, French, Spaniards, Portuguese, and other nations, within these two last centuries, and which they continue still to establish, in several parts of Asia, Africa, and America: either to keep up a regular commerce with the natives, or to cultivate the ground, by planting sugar-canes, indigo, tobacco, and other commodities. The principal of this kind of colonies are in the one and the other America, northern and southern; particularly Peru, Mexico, Canada, (lately Virginia, New England, Carolina), la Louisiana, l'Acadia, Hudson's Bay, the Antilles islands, Jamaica, Domingo, and the other islands.—In Africa, Madagascar, Cape of Good Hope, Cape Verd, and its islands, and all those vast coasts extending thence as far as to the Red sea. Lastly, in Asia, the famous Batavia of the Dutch; Goa, Diu, of the Portuguese; and some other less considerable places of the English, French, and Danes.

The practice of settling commercial colonies in distant countries hath been adopted by the wisest nations of antiquity, who acted systematically upon maxims of sound policy. This appears to have been the case with the ancient Egyptians, the Chinese, the Phœnicians, the commercial states of Greece, the Carthaginians, and even the Romans; for though the colonies of the latter were chiefly military, it could easily be shown that they were likewise made use of for the purposes of trade. The savage nations who ruined the Roman empire, sought nothing but to extirpate or hold in vassalage those whom they overcame; and therefore, whenever princes enlarged their dominions at the expence of their neighbours, they had recourse to strong forts and garrisons to keep the conquered in awe. For this they have been blamed by the famous Machiavel, who labours to show, that the settling of colonies would have been a cheaper and better method of bridling conquered countries, than building fortresses in them. John de Witt, who was one of the ablest and best statesmen that ever appeared, strongly recommended colonies; as affording a refuge to such as had been unfortunate in trade; as opening a field for such men to exert their abilities, as through want of interest could not raise themselves in their own country; and as a supplement to hospitals and other charitable foundations, which he thought in time might come to be overcharged. Some, however, have ridiculed the supposed advantages of colonies, and asserted that they must always do mischief by depopulating the mother-country.

The history of the British colonies undoubtedly shows, that when colonists become numerous and opulent, it is very difficult to retain them in proper subjection to the parent state. It becomes then a question not very easily answered, how far they are entitled to the rights they had as inhabitants of the mother-country, or how far they are bound by its laws? On this subject Mr Blackstone hath the following observations.

"Plantations, or colonies in distant countries, are either

either ſuch where the lands are claimed by right of occupancy only, by finding them deſert and uncultivated, and peopling them from the mother-country; or where, when already cultivated, they have either been gained by conqueſt, or ceded to us by treaties. And both the rights are founded upon the law of nature, or at leaſt on that of nations. But there is a difference between theſe two ſpecies of colonies with reſpect to the laws by which they are bound. For it hath been held, that if an uninhabited country be diſcovered and planted by Engliſh ſubjects, all the Engliſh laws then in being, which are the birthright of every ſubject, are immediately there in force. But this muſt be underſtood with many and very great reſtrictions. Such coloniſts carry with them only ſo much of the Engliſh law as is applicable to their own ſituation, and the condition of an infant colony; ſuch, for inſtance, as the general rules of inheritance, and of protection from perſonal injuries. The artificial refinements and diſtinctions incident to the property of a great and commercial people, the laws of policy and revenue (ſuch eſpecially as are enforced by penalties), the mode of maintenance for the eſtabliſhed clergy, the juriſdiction of ſpiritual courts, and a multitude of other proviſions, are neither neceſſary nor convenient for them, and therefore are not in force. What ſhall be admitted, and what rejected, at what times, and under what reſtrictions, muſt, in caſes of diſpute, be decided in the firſt inſtance by their own provincial judicature, ſubject to the reviſion and controul of the king in council; the whole of their conſtitution being alſo liable to be new-modelled and reformed by the general ſuperintending power of the legiſlature in the mother-country. But in conquered or ceded countries that have already laws of their own, the king may indeed alter and change thoſe laws; but, till he does actually change them, the ancient laws of the country remain, unleſs ſuch as are againſt the law of God, as in an infidel country. Our American plantations are principally of this latter ſort, being obtained in the laſt century, either by right of conqueſt and driving out the natives (with what natural juſtice I ſhall not at preſent inquire), or by treaties. And therefore, the common law of England, as ſuch, has no allowance or authority there; they being no part of the mother-country, but diſtinct (though dependent) dominions. They are ſubject, however, to the controul of the parliament; though (like Ireland, Man, and the reſt) not bound by any acts of parliament, unleſs particularly named."

With reſpect to their interior polity, our colonies, whether thoſe we formerly poſſeſſed or ſtill poſſeſs, may be diſtinguiſhed into three ſorts. 1. Provincial eſtabliſhments, the conſtitutions of which depend on the reſpective commiſſions iſſued by the crown to the governors, and the inſtructions which uſually accompany thoſe commiſſions; under the authority of which provincial aſſemblies are conſtituted, with the power of making local ordinances not repugnant to the laws of Britain. 2. Proprietary governments, granted out by the crown to individuals, in the nature of feudatory principalities, with all their inferior regalities, and ſubordinate powers of legiſlation, which formerly belonged to the owners of counties palatine; yet ſtill with theſe expreſs conditions, that the ends for which the grant was made be ſubſtantially purſued, and that nothing be attempted which may derogate from the ſovereignty of the mother-country. 3. Charter governments, in the nature of civil corporations; with the power of making bye-laws for their own interior regulation, not contrary to the laws of Britain; and with ſuch rights and authorities as are ſpecially given them in their ſeveral charters of incorporation. The form of government, in moſt of them, is borrowed from that of England. They have a governor named by the king (or, in ſome proprietary colonies, by the proprietor), who is repreſentative or deputy. They have courts of juſtice of their own, from whoſe deciſions an appeal lies to the king in council here in England. Their general aſſemblies, which are their houſe of commons, together with their council of ſtate, being their upper houſe, with the concurrence of the king, or his repreſentative the governor, make laws ſuited to their own emergencies. But it is particularly declared, by ſtat. 7 and 8 W. III. c. 22. that all laws, bye-laws, uſages, and cuſtoms, which ſhall be in practice in any of the plantations, repugnant to any law made or to be made in this kingdom relative to the ſaid plantations, ſhall be utterly void and of none effect. And, becauſe ſeveral of the colonies had claimed the ſole and excluſive right of impoſing taxes upon themſelves, the ſtatute 6 Geo. III. c. 12. expreſsly declares, that all his majeſty's colonies in America, have been, are, and of right ought to be, ſubordinate to and dependent upon the imperial crown and parliament of Great Britain, who have full power and authority to make laws and ſtatutes of ſufficient validity to bind the colonies and people of America, ſubjects to the crown of Great Britain in all caſes whatſoever. And the attempting to enforce this by other acts of parliament, penalties, and at laſt by military power, gave riſe, as is well known, to the late revolt and final ſeparation of thirteen colonies. See the article AMERICA. This country is now detached from Britain, and conſiſts of 13 independent ſtates, ſometimes denominated the UNITED PROVINCES.

COLOPHON, in *Ancient Geography*, a town of Ionia, in the Hither Aſia, on a promontory on the Ægean ſea, and waſhed by the Haleſus. The ancient Colophon was deſtroyed by Lyſimachus, in his war with Antigonus, in order to enlarge Epheſus. Pauſanias ſays, it was rebuilt in the neighbourhood, in a more commodious ſcite. This was one of the cities that laid claim to Homer. *Colophonem addere*, a proverbial ſaying, explained by Strabo to denote, that the Colophonian horſe turned the ſcales in favour of the ſide on which they fought. The Colophonians had a grove, a temple, and an oracle of Apollo Clarius (Strabo). Of this town was the poet Antimachus, remarked on for his turgid ſtyle by Catullus. He wrote a life of Homer, whom he makes a Colophonian (Plutarch).

COLOPHONY, in *Pharmacy*, black reſin, or turpentine, boiled in water, and afterwards dried; or, which is ſtill better, the caput mortuum remaining after the diſtillation of the ethereal oil, being further urged by a more intenſe and long continued fire.—It receives its name of *colophonia*, from Colophon, a city of Ionia, becauſe the beſt was formerly brought from thence. Two ſorts are mentioned in ancient writings; the

the one dry, the other in a liquid ſtate. The latter ſeems to have been liquid pitch, which is the crude reſin of the pine brought from Colophon; the other was called *reſina fricta*, and conſiſted only of the former deprived of its humid parts.

COLOQUINTIDA, in *Botany*. See CUCUMIS.

COLORATURA, in *Muſic*, denotes all manner of variations, trillos, diminutions, &c. ſerving to make a ſong agreeable.

COLORNO, a town of Italy, in the Parmaſan, near the river Po, eight miles from Parma. The duke of Parma has a pleaſure-houſe here, one of the moſt delightful ſeats in all Italy, and the gardens are very fine. E. Long. 9. 15. N. Lat. 44. 54.

COLOSSÆ, or COLOSEÆ, in *Ancient Geography*, a conſiderable town of Phrygia Magna, in which the Lycus falls into a gulf, and at the diſtance of five ſtadia emerges again, and runs into the Meander (Herodotus). Others ſay, the genuine name is *Coloſſæ*, and the people *Coloſſenſes*, to whom St Paul wrote an epiſtle: Strabo calls them *Coloſſeni*. In Nero's time the town was deſtroyed by an earthquake (Oroſius).

COLOSSUS, a ſtatue of enormous or gigantic ſize. The moſt eminent of this kind was the Coloſſus of Rhodes, a ſtatue of Apollo, ſo high that ſhips paſſed with full ſails betwixt its legs. It was the workmanſhip of Chares, a diſciple of Lyſippus, who ſpent 12 years in making it: it was at length overthrown by an earthquake, after having ſtood 1360 years. Its height was ſix ſcore and ſix feet: there were few people who could fathom its thumb, &c. When the Saracens became poſſeſſed of the iſland, the ſtatue was found proſtrate on the ground: they ſold it to a Jew, who loaded 900 camels with the braſs.

The baſis that ſupported it was a triangular figure; its extremities were ſuſtained with 60 pillars of marble. There was a winding ſtaircaſe to go up to the top of it, from whence one might diſcover Syria, and the ſhips that went into Egypt, in a great looking glaſs, that was hung about the neck of the ſtatue. Among the antiquities of Rome, there are ſeven famous coloſſuſes; two of Jupiter, as many of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOSTRUM, the firſt milk of any animal after bringing forth young, called in ſome places *beeſtings*. It is remarkable that this milk is generally cathartic, and purges the meconium; thus ſerving both as an aliment and medicine.

An emulſion prepared with turpentine diſſolved with the yolk of an egg, is ſometimes called by this name.

COLOSWAR, a large and celebrated town of Tranſylvania, where the ſenates have their meetings. It is ſeated on the river Samos, in E. Long. 21. 35. N. Lat. 46. 53.

COLOUR, in *Phyſics*, a property inherent in light, by which, according to the various ſizes of its parts, or from ſome other cauſe, it excites different vibrations in the optic nerve; which propagated to the ſenſorium, affect the mind with different ſenſations. See CHROMATICS and OPTICS.

COLOUR, in *Painting*, is applied both to the drugs, and to the tints produced by thoſe drugs variouſly mixed and applied.

The principal colours uſed by painters are red and white lead or ceruſe; yellow and red ochres; ſeveral kinds of earth, umber, orpiment, lamp-black, burnt ivory, black lead, cinnabar or vermilion, gamboge, lacca, blue and green aſhes, verdigris, biſtre, bice, ſmalt, carmine, ultramarine; each of which, with their uſes, &c. are to be found under their proper articles.

Of theſe colours, ſome are uſed tempered with gum-water, ſome ground with oil, others only in freſco; and others for miniature.

Painters reduce all the colours they uſe under theſe two claſſes, of dark and light colours: dark colours are black, and all others that are obſcure and earthy, as umber, biſtre, &c.

Under light colours are comprehended white, and all others that approach neareſt to it.

Painters alſo diſtinguiſh colours into ſimple and mineral.

Under ſimple colours they rank all thoſe which are extracted from vegetables, and which will not bear the fire; as the yellow made of ſaffron, French berries, lacca, and other tinctures extracted from flowers, uſed by limners, illuminers, &c.

The mineral colours are thoſe which being drawn from metals, &c. are able to bear the fire, and therefore uſed by enamellers. Changeable and permanent colours is another diviſion, which, by ſome, is made of colours.

Changeable colours are ſuch as depend on the ſituation of the objects with reſpect to the eye, as that of a pigeon's neck, taffeties, &c.: the firſt, however, being attentively viewed by the microſcope, each fibre of the feathers appears compoſed of ſeveral little ſquares, alternately red and green, ſo that they are fixed colours.

Water-COLOURS are ſuch as are uſed in painting with gum-water or ſize, without being mixed with oil.

Incapacity of diſtinguiſhing COLOURS. Of this extraordinary defect in viſion, we have the following inſtances in the Philoſophical Tranſactions for 1777. One of the perſons lived at Maryport in Cumberland. The account was communicated by Mr Huddart to Dr Prieſtley, and is as follows. "His name was Harris, by trade a ſhoemaker. I had often heard from others, that he could diſcern the form and magnitude of all objects very diſtinctly, but could not diſtinguiſh colours. This report having excited my curioſity, I converſed with him frequently on this ſubject. The account he gave was this: That he had reaſon to believe other perſons ſaw ſomething in objects which he could not ſee; that their language ſeemed to mark qualities with preciſion and confidence, which he could only gueſs at with heſitation, and frequently with error. His firſt ſuſpicion of this aroſe when he was about four years old. Having by accident found in the ſtreet a child's ſtocking, he carried it to a neighbouring houſe to inquire for the owner; he obſerved the people called it a *red* ſtocking, though he did not underſtand why they gave it that denomination, as he himſelf thought it completely deſcribed by being called *a ſtocking*. This circumſtance, however, remained in his memory, and, together with ſubſequent obſervations, led him to the knowledge of his defect.

Colour.

"He also observed, that when young, other children could discern cherries on a tree, by some pretended difference of colour, though he could only distinguish them from the leaves by the difference of their size and shape. He observed also, that by means of this difference of colour they could see the cherries at a greater distance than he could, though he could see other objects at as great a distance as they, that is, where the sight was not assisted by the colour. Large objects he could see as well as other persons; and even the smaller ones if they were not enveloped in other things, as in the case of cherries among the leaves.

"I believe he could never do more than guess the name of any colour; yet he could distinguish white from black, or black from any light or bright colour. Dove or straw colour he called *white*, and different colours he frequently called by the same name; yet he could discern a difference between them when placed together. In general, colours of an equal degree of brightness, however they might otherwise differ, he confounded together. Yet a striped ribbon he could distinguish from a plain one; but he could not tell what the colours were with any tolerable exactness. Dark colours, in general, he often mistook for black; but never imagined white to be a dark colour, nor dark to be a white colour.

"He was an intelligent man, and very desirous of understanding the nature of light and colours; for which end he had attended a course of lectures in natural philosophy.

"He had two brothers in the same circumstances as to sight; and two other brothers and sisters, who, as well as their parents, had nothing of this defect.

"One of the first mentioned brothers, who is now living, I met with at Dublin, and wished to try his capacity to distinguish the colours in a prism; but not having one by me, I asked him, Whether he had ever seen a rainbow? he replied, He had often, and could distinguish the different colours; meaning only, that it was composed of different colours, for he could not tell what they were.

"I then procured and showed him a piece of ribbon; he immediately, and without any difficulty, pronounced it a striped, and not a plain, ribbon. He then attempted to name the different stripes: the several stripes of white he uniformly and without hesitation called white; the four black stripes he was deceived in; for three of them he thought brown, though they were exactly of the same shade with the other, which he properly called black. He spoke, however, with diffidence, as to all those stripes; and it must be owned, that the black was not very distinct; the light green he called yellow; but he was not very positive; he said, "I think this is what you call yellow." The middle stripe, which had a slight tinge of red, he called a sort of blue. But he was most of all deceived by the orange colour, of which he spoke very confidently, saying, "This is the colour of grass, this is green." I also showed him a great variety of ribbons, the colour of which he sometimes named rightly, and sometimes as differently as possible from the true colour.

"I asked him whether he imagined it possible for all the various colours he saw to be mere difference of light and shade; and that all colours could be composed of these two mixtures only? With some hesitation he replied, No, he did imagine there was some other difference.

"It is proper to add, that the experiment of the striped ribbon was made in the day-time, and in a good light."

Colours for staining different kinds of Stones. See Chemistry.

Colour, in *Dyeing*. See Dyeing.

Colour of Plants, is an attribute found to be very variable. Different colours are observed, not only in different individuals of the same species, but likewise in different parts of the same individual. Thus, marvel of Peru, and sweet-william, have frequently petals of different colours on the same plant. Three or four different colours are frequently found upon the same leaf or flower, as on the leaves of the amaranthus tricolor, and the flowers of the tulip, auricula, three-coloured violet and others. To produce the most beautiful and striking variety of colours in such flowers, is the principal delight and business of the florist.

The primitive colours, and their intermediate shades or gradations enumerated by botanists, are as follow:

Water-colour, *hyalinus*.
 White.
Lead-colour, *cinereus*.
 Black, *niger*.
Brown, *fuscus*.
Pitch-black, *ater*.
 Yellow, *luteus*.
Straw-colour, *flavus*.
Flame-colour, *fulvus*.
Iron-colour, *gilvus*.
 Red.
Flesh-colour, *incarnatus*.
Scarlet, *coccineus*.
 Purple.
Violet-colour, *cæruleo-purpureus*.
 Blue, *cæruleus*.
 Green.

These colours seem to be appropriated to particular parts of the plant. Thus white is most common in roots, sweet berries, and the petals of spring flowers. Water-colour, in the filaments and styles. Black, in the roots and seeds; rarely in the seed-vessel, and scarce ever to be found in the petals. Yellow is frequently in the antheræ or tops of the stamina; as likewise in the petals of autumnal flowers, and the compound ligulated flowers of Linnæus. Red is common in the petals of summer flowers, and in the acid fruits. Blue and violet-colour in the petals. Green in the leaves and calyx, but rarely in the petals. In the interchanging of colours, which in plants is found to depend upon differences in heat, climate, soil, and culture, a sort of elective attraction is observed to take place. Thus, red is more easily changed into white and blue; blue into white and yellow; yellow into white; and white into purple. A red colour is often changed into a white, in the flowers of heath, mother of thyme, betony, pink, viscous campion, *cucubalus*, trefoil, orchis, foxglove, thistle, cudweed, saw-wort, rose,

rose, poppy, fumitory, and geranium. Red passes into blue in pimpernel. Blue is changed into white in bell-flower, greek-valerian, bind-weed, columbine, violet vetch, milk-wort, goat's rue, viper's bugloss, comfrey, borrage, hyssop, dragon's head, scabious, blue-bottle, and succory. Blue is changed into yellow in crocus. Yellow passes easily into white in melilot, agrimony, mullein, tulip, *blattaria* or moth-mullein, and corn marigold. White is changed into purple in wood-sorrel, thorn-apple, pease, and daisy.

Although plants are sometimes observed to change their colour upon being moistened with coloured juices, yet that quality in vegetables seems not so much owing to the nature of their nourishment, as to the action of the internal and external air, heat, light, and the primitive organization of the parts. In support of this opinion, we may observe with Dr Grew, that there is a far less variety in the colours of roots, than of the other parts of the plant; the pulp within the skin, being usually white, sometimes yellow, rarely red. That this effect is produced by their small intercourse with the external air, appears from this circumstance, that the upper parts of roots, when they happen to stand naked above the ground, are often dyed with several colours: thus the tops of sorrel roots turn red; those of turnips, mullein, and radishes, purple; and many others green; whilst those parts of the same roots which lie more under ground, are commonly white. The green colour is so proper to leaves, that many, as those of sage, the young sprouts of St John's wort, and others which are reddish when in the bud, acquire a perfect green upon being fully expanded. In like manner, the leaves of the sea-side grape (*polygonum*), which when young are entirely red, become, as they advance in growth, perfectly green, except the middle and transverse ribs, which retain their former colour.

As flowers gradually open and are exposed to the air, they throw off their old colour and acquire a new one. In fact, no flower has its proper colour till it is fully expanded. Thus the purple stock-julyflowers are white or pale in the bud. In like manner bachelor's buttons, blue-bottle, poppy, red daisies, and many other flowers, though of divers colours when blown, are all white in the bud. Nay, many flowers change their colour thrice successively; thus, the very young buds of lady's looking-glass, bugloss, and the like, are all white; the larger buds purple or murrey; and the open flowers blue.

With respect to the colours of the juices of plants, we may observe, that most resinous gums are tinctured; some, however, are limpid; that which drops from the domestic pine is clear as rock-water. The milk of some plants is pale, as in burdock; of others white, as in dandelion, euphorbium, and scorzonera; and of others yellow, as in lovage, and greater celandine. Most mucilages have little colour, taste, or smell. Of all the colours above enumerated, green is the most common to plants, black is the most rare.

Colour being a quality in plants so apt to change, ought never to be employed in distinguishing their species. These ought to be characterized from circumstances not liable to alteration by culture or other accidents. The same inconstancy of colour observed in the flowers, is likewise to be found in the other parts of plants. Berries frequently change from green to red, and from red to white. Even in ripe fruits, the colour, whether white, red, or blue, is apt to vary; particularly in apple, pear, plum, and cherry trees. Seeds are more constant in point of colour than the vessel which contains them. In the seeds, however, of the poppy, oats, pea, bean, and kidney-bean, variations are frequently observed. The root, too, although not remarkably subject to change, is found to vary in some species of carrot and raddish. Leaves frequently become spotted, as in a species of orchis, hawk-weed, ranunculus, knot-grass, and lettuce; but seldom relinquish their green colour altogether. Those of some species of amaranthus, or flower-gentle, are beautifully coloured. The spots that appear on the surface of the leaves are of different colours, liable to vary, and not seldom disappear altogether. The leaves of officinal lung-wort, and some species of sow-bread, sorrel, trefoil, and ranunculus, are covered with white spots. Those of dog's-tooth violet, with purple and white. Those of several species of ranunculus, and orchis, with black and purple. Those of amaranthus tricolor, with green, red, and yellow. Those of ranunculus acris, and a species of bog-bean, with red or purple. The under surface of the leaves of some species of pimpernel and the sea-plantain is marked with a number of dots or points; a white line runs through the leaves of Indian reed, black-berried heath, and a species of Canary grass: and the margin or brim of the leaf, in some species of box, honeysuckle, ground-ivy, and the ever-green oak, is of a silver-white colour. The whole plant is often found to assume a colour that is unnatural or foreign to it. The varieties in some species of eryngo, mug-wort, orrach, amaranthus, purslane, and lettuce, furnish examples.

Such being the inconstancy of colours in all the parts of the plant, specific names derived from that quality are very properly, by Linnæus, deemed erroneous; whether they respect the colour of the flower, fruit, seeds, roots, leaves, or express in general the beauty or deformity of the entire plant, with a particular view to that circumstance. Of this impropriety, committed by former botanists, Linnæus himself is not always guiltless. Thus the two species of *sarracena*, or the side-saddle flower, are distinguished by the colour of their petals into the yellow and purple sarracena; although the shapes and figure of the leaves afforded much more constant as well as striking characters. The same may be said of his lupinus albus and luteus; reseda alba, glauca, and lutea; angelica atro-purpurea; dictamnus albus; lamium album; selago coccinea; sida alba; passiflora rubra, lutea, incarnata, and cœrulea; and of many others, in which the specific name is derived from a character or quality that is so liable to vary in the same species.

We shall conclude this article with observing, that of all sensible qualities, colour is the least useful in indicating the virtues and powers of vegetables. The following general positions on this subject are laid down by Linnæus, and seem sufficiently confirmed by experiment. A yellow colour generally indicates a bitter taste; as in gentian, aloe, celandine, turmeric, and other yellow flowers. Red indicates an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries, the fruit of the rose, sea-buck-

thorn,

Colours, Colour-making.

thorn, and ſervice-tree. Herbs that turn red towards autumn, have likewiſe a ſour taſte; as ſorrel, wood-ſorrel, and bloody dock. Green indicates a crude alkaline taſte, as in leaves and unripe fruits. A pale colour denotes an inſipid taſte, as in endive, aſparagus, and lettuce. White promiſes a ſweet luſcious taſte; as in white currants and plums, ſweet apples, &c. Laſtly, black indicates a harſh, nauſeous, diſagreeable taſte; as in the berries of deadly nightſhade, myrtle-leaved ſumach, herb-chriſtopher, and others; many of which are not only unpleaſant to the taſte, but pernicious and deadly in their effects.

To be aſcertained of the acid or alkaline property of any plant, expreſs ſome of the juice, and rub it upon a piece of blue paper; which, if the plant in queſtion is of an acid nature, will turn red; if of an alkaline, green. For the methods of extracting colours from the different parts of plants, ſee the article *COLOUR Making*.

Difference of COLOUR *in the Human Species*. See COMPLEXION.

COLOUR, in *Heraldry*. The colours generally uſed in heraldry are, red, blue, black, green, and purple; which the heralds call *gules*, *azure*, *ſable*, *vert* or *ſinople*, and *purpure*; tenne or tawny, and ſanguine, are not ſo common; as to yellow and white, called *or* and *argent*, they are metals, not colours.

The metals and colours are ſometimes expreſſed in blazon by the names of precious ſtones, and ſometimes by thoſe of planets or ſtars. See BLAZONING.

Oenomaus is ſaid firſt to have invented the diſtinctions of colours, to diſtinguiſh the gundillæ of combatants at the Circenſian games; the green for thoſe who repreſented the earth, and blue for thoſe who repreſented the ſea,

COLOURS, in the military art, include the banners, flags, enſigns, &c. of all kinds, borne in the army or fleet. See FLAG and STANDARD.

COLOURS, in the Latin and Greek churches, are uſed to diſtinguiſh ſeveral myſteries and feaſts celebrated therein.

Five colours only are regularly admitted in the Latin church: theſe are white, green, red, violet, and black. The white is for the myſteries of our Saviour, the feaſt of the Virgin, thoſe of the angels, ſaints, and confeſſors: the red is for the myſteries and ſolemnities of the holy ſacrament, the feaſts of the apoſtles and martyrs; the green for the time between pentecoſt and advent, and from epiphany to ſeptuageſima; the violet in advent and Chriſtmas, in vigils, rogations, &c. and in votive maſſes in time of war; laſtly, the black is for the dead, and the ceremonies thereto belonging.

In the Greek church, the uſe of colours is almoſt aboliſhed, as well as among us. Red was, in the Greek church, the colour for Chriſtmas and the dead, as black among us.

To COLOUR *Strangers Goods*, is when a freeman allows a foreigner to enter goods at the cuſtomhouſe in his name.

COLOUR-Making, the art of preparing the different kinds of colours uſed in painting.

This art properly belongs to chemiſtry; and is one of the moſt curious, though leaſt underſtood, parts of it. The principles on which colour-making depends are entirely different from thoſe on which the theory of other parts of chemiſtry is founded; and the practical part being in the hands of thoſe who find it their intereſt to conceal their methods as much as poſſible, it thence happens, that there is not only no diſtinct theory of this art, but ſcarce a ſingle good receipt for making any one colour hath ever yet appeared.

1 Diviſion of colours into opaque and tranſparent.

The firſt general diviſion of colours is into opaque and tranſparent. By the firſt are meant ſuch colours as, when laid over paper, wood, &c. cover them fully, ſo as to efface any other painting or ſtain that might have been there before; the others are of ſuch a nature as to leave the ground on which they are laid viſible through them. Of the firſt kind are white-lead, red-lead, vermilion, &c.; of the latter kind are the colours uſed for illuminating maps, &c.

2 Oil and water colours.

Another diviſion is into oil-colours and water-colours; by which is meant ſuch as are appropriated to painting in oil and in water. Moſt of thoſe which are proper for painting in water, are alſo proper for being uſed in oil. There is, however, this remarkable difference betwixt colours when mixed with water and with oil, that ſuch as are quite opaque in water will become perfectly tranſparent in oil. Thus, blue verditer, though exceedingly opaque in water, if ground with oil, ſeems totally to diſſolve, and will become very tranſparent. The ſame thing happens to ſuch colours as have for their baſis the oxide of tin, alabaſter, or calcareous earth. The moſt perfectly opaque colours in oil are ſuch as have lead, mercury, or iron, for their baſis: to the latter, however, Pruſſian blue is an exception; for though the baſis of that colour is iron, it proves quite tranſparent when ground with oil. In water colours, thoſe prepared from metals, Pruſſian blue alone excepted, are always opaque; from vegetables or animals, tranſparent. Coals, however, whether vegetable or animal, are opaque both in water and oil.

3 Simple and compound ones.

Colours, again, may be conſidered as either ſimple or compound. The ſimple ones are ſuch as require nothing to be ſuperadded to them, in order to make a full ſtrong colour, without regarding whether they are formed of many or few ingredients; and in this view, white-lead, red-lead, vermilion, oxides of iron, &c. are ſimple colours. The compound ones are formed by the union of two or more colouring ſubſtances; as blue and yellow united together to form a green, red and yellow to form an orange, a white earth or oxide with the red colour of cochineal or brazil to form a lake, &c.; and thus carmine, lake, roſe-pink, Dutch-pink, Engliſh-pink, &c. are compound colours.

4 True and falſe colours.

The laſt and moſt important diviſion of colours is into true and falſe. By the former are meant thoſe which retain their colour under every poſſible variety of circumſtances, without fading in the leaſt: the others are ſuch as do not; but either loſe their colour altogether, or change to ſome other. What is chiefly apt to affect colours, is their being expoſed to the ſun in ſummer, and to the cold air in winter: but to this there is one exception, viz. white-lead; which, when ground with oil, retains its whiteneſs if expoſed to the weather, but degenerates into a browniſh or yellowiſh colour if cloſe kept. In water this ſubſtance is very apt to loſe its colour, whether expoſed to the air or not.

not. The great defideratum in colour-making is to produce the firft kind of colours, viz. fuch as will not fade by expofure to the weather; and indeed it is to be regretted, that the moft beautiful are in general the leaft permanent. It may, for the moft part, however, be expected, that the more fimple any colour is, the lefs liable will it be to change upon expofure to the air.

The great difficulty of knowing *à priori* whether a colour will fade or not, is owing to our ignorance concerning the nature of colouring fubftances. With all our difadvantages, however, we may obferve, that whatever change of colour is produced in any fubftance by expofure to the fun and air, that colour to which it changes will bid fair for being permanent, and therefore ought to be employed where it can be done. Of thefe changes the inftances are but very rare. One is the purple of the ancients, which affumed its colour by expofure to the fun, and confequently was exceedingly permanent. Another is in the folution of filver; which, being mixed with chalk, the precipitate turns to purplifh black where it is expofed to the fun. A third is in folutions of indigo by alkaline fubftances, which conftantly appear green till expofed to the air by fpreading them very thin, upon which they become almoft inftantaneoufly blue, and continue fo ever after. Sometimes, though ftill more rarely, a very remarkable change of colour happens, upon mixing two vegetable juices together. Almoft the only inftance of this we have on the authority of Mr George Forfter, who informs us, that the inhabitants of Otaheite dye their cloth of a crimfon colour, by mixing together the yellow juice of a fmall fpecies of fig with the greenifh juice of a kind of fern. But the moft remarkable alterations of colour are effected by different metallic and faline folutions mixed with certain animal or vegetable fubftances; and with thefe the colour-maker will be principally converfant.

It is a common obfervation in chemiftry, that acids mixed with blue vegetable juices turn them red, and alkalies green. It is equally certain, though not fo generally known, that acids of all kinds generally tend to heighten red colours, fo as to make them approach to the fcarlet or true crimfon; and alkalies to darken, or make them approach to blue or purple. Mixed with yellow colours, acids alfo univerfally tend to brighten the yellow; and alkalies to turn it to an orange, and make it become more dull. But though this is very generally the cafe, we are not to expect that all acids are equally powerful in this refpect. The nitric acid is found to heighten the moft of any, and the muriatic acid the leaft of the mineral ones. The vegetable, as might be expected, are lèfs powerful than the mineral acids. Thus, if with a tincture of cochineal, either in water or alcohol, is mixed the pure nitrous acid, it will change the colour to an exceeding high orange or flame colour, which it will impart to cloth. If fulphuric acid is ufed, a full fcarlet, inclining to crimfon rather than orange, is produced. With muriatic acid, a true crimfon colour, bordering on purple, is the confequence. Alkalies, both fixed and volatile, change the colour to a purple, which is brighter with the volatile than the fixed alkalies.

Here it is obvious, that whatever colours are produced by the mixture of different fubftances together; the permanency of thefe colours can only be in proportion to the ability of fuch mixtures to refift the weather. Thus, fuppofe a high fcarlet or orange colour is produced by means of fpirit of nitre, it is plain that, was fuch a colour expofed to the air, it could remain no longer than the fpirit of nitre which produced it remained. In proportion, therefore, as the fpirit of nitre was exhaled into the air, or otherwife deftroyed, the colour behoved to fade, and at laft to be totally deftroyed; and thus, in proportion to the deftructibility of the fubftances by which colours are produced, will be the difpofition of fuch colours to fade, or the contrary. In this refpect alkalies are much more deftructible than acids, and confequently lefs proper for the preparation of colours. With regard to acids, the nitric feems moft deftructible, the fulphuric lefs fo, and the muriatic the leaft of all. From the extreme fixity of the phofphoric acid and fedative falt, perhaps they might be of fervice in preferving colours.

As all colours, whether derived from the animal or vegetable kingdom, muft be extracted either by pure water or fome other liquid menftruum, they cannot be ufed for the purpofes of painting till the colouring fubftance is united with fome earthy or folid matter capable of giving it a *body*, as the workmen call it; and, according to the nature of this fubftance, the colour will be tranfparent or otherwife. This bafis ought to be of the moft fixed and durable nature; unalterable by the weather, by acids, or by alkalies. It ought alfo to be of a pure white colour, and eafily reducible into an impalpable powder. For this reafon all earthy fubftances fhould be avoided as being acted upon by acids; and therefore, if any of thefe were added to heighten the colour, they would not fail to be deftroyed, and their effect totally loft. Precipitates of lead, bifmuth, &c. though exceedingly fine and white, ought alfo to be avoided, as being apt to turn black by expofure. The only fubftance to be chofen in preference to all others, is oxide of tin, prepared either by fire or the nitric acid. This is fo exceedingly refractory as not only to be unalterable by alkalies, acids, or the fun and weather, but even by the focus of a very large burning mirror. It is befides white as fnow, and capable of being reduced to an extreme degree of finenefs, infomuch that it is made ufe of for polifhing metallic fpeculums. For thefe reafons, it is the moft proper bafis for all fine colours. For coarfe ones, the white precipitate of lead, mentioned under the article CHEMISTRY, will anfwer very well. It hath a very ftrong body, i. e. is very opaque, and will cover well; may be eafily ground fine, and is much lefs apt to turn black than white lead; it is befides very cheap, and may be prepared at the fmall expence of 3d. per pound.

If what we have juft now obferved is attended to, the general method of extracting colours from any vegetable or animal fubftance, and fixing them on a proper bafis, muft be very eafily underftood. For this purpofe, a quantity of oxide of tin is to be procured in proportion to the quantity of colour defired. This muft be well rubbed in a glafs mortar, with a little of the fubftance defigned for brightening the colour, as alum, cream of tartar, fpirit of nitre, &c. after which it muft be dried, and left for fome time, that

Colour-making.

that the union between the two ſubſtances may be as perfect as poſſible. If the colour is to be a very fine one, ſuppoſe from cochineal, the colouring matter muſt be extracted with alcohol without heat. When the ſpirit is ſufficiently impregnated, it is to be poured by little and little upon the oxide, rubbing it conſtantly, in order to diſtribute the colour equally through all parts of the oxide. The ſpirit ſoon evaporates, and leaves the oxide coloured with the cochineal. More of the tincture is then to be poured on, rubbing the mixture conſtantly as before; and thus, with proper management, may very beautiful colours, not inferior to the beſt carmine, be prepared at a moderate expence. If, inſtead of cochineal, we ſubſtitute brazil-wood, turmeric, logwood, &c. different kinds of red, yellow, and purple, will be produced. For the coarſer colours, aqueous decoctions are to be uſed in a ſimilar manner; only, as theſe are much longer in evaporating than the alcohol, very little muſt be poured on at a time, and the colours ought to be made in large quantity, on account of the tediouſneſs of the proceſs.

13 Effects of different kinds of ſalts.

Hitherto we have conſidered only the effects of the pure and ſimple ſalts, viz. acids and alkalies, on different colours; but by combining the acids with alkalies, earths, or metals, theſe effects may be varied almoſt *in infinitum;* neither is there any rule yet laid down by which we can judge *à priori* of the changes of colour that will happen on the admixture of this or that particular ſalt with any colouring ſubſtance. In general, the perfect neutrals act weakly; the imperfect ones, eſpecially thoſe formed from metals, much more powerfully. Alum and ſal ammoniac conſiderably heighten the colour of cochineal, brazil, turmeric, fuſtic, madder, logwood, &c. The ſame thing is done, though in a leſs degree, by common ſalt, Glauber's ſalt, nitre, and many other neutrals. Solutions of iron in all the acids ſtrike a black with every one of the above-mentioned ſubſtances; and likewiſe with ſumach, galls, and other aſtringents. Solutions of lead, or ſaccharum ſaturni, univerſally debaſe red colours to a dull purple. Solution of copper changes the purple colour of logwood to a pretty good blue; and, in general, ſolutions of this metal are friendly to blue colours. The effects of ſolutions of gold, ſilver, and mercury, are not ſo well known; they ſeem to produce dark colours of no great beauty.

14 Solution of tin the moſt powerful.

The moſt powerful ſolution, however, with regard to a great number of colours, is that of tin, made in nitro-muriatic acid. Hence we may ſee the fallacy of Mr Delaval's hypotheſis concerning colours*, that the leaſt refrangible ones are produced by the moſt denſe metals: for tin, which hath the leaſt denſity of any metal, hath yet, in a ſtate of ſolution, the moſt extraordinary effects upon the leaſt refrangible colours as well as thoſe that are moſt ſo. The colour of cochineal is changed by it into the moſt beautiful ſcarlet; a ſimilar change is made upon the colouring matter of gum-lac. Brazil-wood is made to yield a fine purpliſh crimſon; logwood, a beautiful dark purple; turmeric, fuſtic, weld, and all yellow-colouring woods and flowers, are made to communicate colours far more beautiful than can be got from them by any other method. The blue colour of the flowers of violets, eye-bright, iris, &c, are heightened ſo as to equal, if not excel, the blue produced by a ſolution of copper in volatile alkali. In ſhort, this ſolution ſeems to be of much more extenſive uſe in colour-making, when properly applied, than any thing hitherto thought of. It is not, however, univerſally ſerviceable. The colour of madder it totally deſtroys, and likewiſe that of ſaf-flower, changing them both to a dull orange. It likewiſe ſpoils the colour of archil; and what is very remarkable, the fine red colour of tincture of roſes made with ſulphuric acid is by ſolution of tin changed to a dirty green.

* See *Chromatics*, N° 8.

15 Directions for the choice of colouring materials.

The moſt important conſideration in colour-making is to make choice of ſuch materials as produce the moſt durable colours; and if theſe can be produced, an ordinary colour from them is to be preferred to a bright one from thoſe which fade ſooner. In what the difference conſiſts between the colours that fade and thoſe which do not, is not known with any degree of certainty. From ſome appearances it would ſeem, that thoſe ſubſtances which are moſt remarkable for keeping their colour, contain a viſcous glutinous matter, ſo combined with a reſinous one as to be ſoluble both in water and alcohol. The moſt durable red colour is prepared from gum-lac. This is very ſtrongly reſinous, though at the ſame time ſo far glutinous, that the colouring matter can be extracted from it by water. Next to gum-lac are madder-roots and cochineal. The madder is an exceedingly penetrating ſubſtance, inſomuch that, when given to animals along with their food, it tinges their bones of a deep red colour. Its colouring matter is ſoluble both in water and alcohol. Along with the pure red, however, there is in madder a kind of viſcous aſtringent ſubſtance, of a dark brown colour, which ſeems to give the durability to the whole. The colouring matter of cochineal, though ſoluble both in water and alcohol, is very tenacious and mucilaginous, in which it bears ſome reſemblance to the *purpura* of the ancients, which kept its colour exceedingly well. Where the colours are fugitive, the tinging ſubſtance ſeems to be too reſinous or too mucilaginous. Thus the colours of brazil, turmeric, &c. are very reſinous, eſpecially the latter, inſomuch that the colouring matter of turmeric can ſcarcely be extracted by water. Both theſe are periſhable, though beautiful colours; and much more are the red, purple, and blue flowers, commonly to be met with. Theſe ſeem to be entirely mucilaginous, without the leaſt quantity of reſinous matter. The yellow flowers are different, and in general keep their colour pretty well. Whether it would be poſſible, by adding occaſionally a proper quantity of gum or reſin, to make the fugitive colours more durable, hath not yet been tried, but ſeems to have ſome probability.

16 M. Hellot's method of improving the durability of brazil-wood.

What tends a little to confirm this, is a proceſs given by M. Hellot for imparting durability to the colour of brazil. It conſiſts only in letting decoctions of the wood ſtand for ſome time in wooden caſks till they grow ſtale and *ropy*. Pieces of woollen cloth now dyed in the liquor acquired a colour ſo durable, that they were not in the leaſt altered by expoſure to the air during four months in the winter ſeaſon. Whether this change in the durability of the colour was effected by the ropineſs following the fermentation,

Colour-making.

tion, or by ſome other cauſe, or whether the experiment can be at all depended upon, muſt be referred to future obſervation.

17 Preparation of different colours.

Having thus collected all that can as yet be depended upon for eſtabliſhing a general theory of colour-making, we ſhall now proceed to give an account of the different pigments generally to be met with in the colour-ſhops.

18 Lamp-black.

1. *Black.* Theſe are lamp-black, ivory-black, blue-black, and Indian-ink. The firſt is the fineſt of what are called the ſoot-blacks, and is more uſed than any other. Its preparation is deſcribed in the Swediſh Tranſactions for the year 1754, as a proceſs dependent on the making of common reſin: the impure reſinous juice collected from inciſions made in pine and fir trees, is boiled down with a little water, and ſtrained whilſt hot through a bag; the dregs and pieces of bark left in the ſtrainer are burnt in a low oven, from which the ſmoke is conveyed through a long paſſage into a ſquare chamber, having an opening on the top on which is a large ſack made of thin woollen ſtuff: the ſoot, or lamp-black, concretes partly in the chamber, from whence it is ſwept out once in two or three days, and partly in the ſack, which is now and then gently ſtruck upon, both for ſhaking down the ſoot, and for clearing the interſtices betwixt the threads, ſo as to procure a ſufficient draught of air through it. In this manner lamp-black is prepared at the turpentine houſes in England, from the dregs and refuſe of the reſinous matters which are there manufactured.

19 Dr Lewis's obſervations.

On this ſubject Dr Lewis hath ſome curious obſervations. "The ſoot (ſays he) ariſing in common chimneys, from the more oily or reſinous woods, as the fir and pine, is obſerved to contain more diſſoluble matter than that from the other woods; and this diſſoluble matter appears, in the former, to be more of an oily or reſinous nature than in the latter, alcohol extracting it moſt powerfully from the one, and water from the other. The oilineſs and ſolubility of the ſoot ſeeming therefore to depend on thoſe of the ſubject it is made from, it has been thought that lamp-black muſt poſſeſs theſe qualities in a greater degree than any kind of common ſoot. Nevertheleſs, on examining ſeveral parcels of lamp-black, procured from different ſhops, I could not find that it gave any tincture at all, either to alcohol or to water.

Suſpecting ſome miſtake or ſophiſtication, or that the lamp-black had been burnt or charred, as it is to fit it for ſome particular uſes, I prepared myſelf ſome ſoot from linſeed-oil, by hanging a large copper pan over the flame of a lamp to receive its ſmoke. In this manner the more curious artiſts prepare lamp-black for the nicer purpoſes; and from this collection of it from the flame of a lamp, the pigment probably received its name. The ſoot ſo prepared gave no tincture either to water or to alcohol, any more than the common lamp-black of the ſhops. I tried different kinds of oily and reſinous bodies with the ſame reſult; even the ſoots obtained from fiſh oils and tallow did not appear to differ from thoſe of the vegetable oils and reſins. They were all of a finer colour than the lamp-black commonly ſold.

"Some ſoot was collected in like manner from fir and other woods, by burning ſmall pieces of them ſlowly under a copper-pan. All the ſoots were of a deeper black colour than thoſe obtained from the ſame kinds of wood in a common chimney; and very little, if at all, inferior to thoſe of the oils: they gave only a juſt diſcernible tincture to water and alcohol, while the ſoots of the chimney imparted a ſtrong deep one to both. The ſoot of mineral bitumens, in this cloſe way of burning, appears to be of the ſame qualities with thoſe of woods, oil, and reſins: in ſome parts of Germany, great quantities of good lamp-black are prepared from a kind of pit-coal.

"It appears, therefore, that the differences of ſoots do not depend altogether on the qualities of the ſubjects, but in a great meaſure on the manner in which the ſubject is burnt, or the ſoot caught. The ſoots produced in common chimneys, from different kinds of wood, reſinous and not reſinous, dry and green, do not differ near ſo much from one another, as thoſe which are produced from one kind of wood in a common chimney, and in the confined way of burning above mentioned.

20 Ivory-black.

Ivory-black is prepared from ivory or bones burnt in a cloſe veſſel. This, when finely ground, forms a more beautiful and deeper colour than lamp-black; but in the common methods of manufacturing, it is ſo much adulterated with charcoal-duſt, and ſo groſsly levigated, as to be unfit for uſe. An opaque deep black for water-colours, is made by grinding ivory-black with gum water, or with the liquor which ſettles from the whites of eggs after they have been ſuffered to ſtand a little. Some uſe gum water and the whites of eggs together, and report, that a ſmall addition of the latter makes the mixture flow more freely from the pencil, and improves its gloſſineſs. It may be obſerved, however, that though ivory-black makes the deepeſt colour in water as well as in oil painting, yet it is not on this account always to be preferred to other black pigments. A deep jet-black colour is ſeldom wanted in painting; and in the lighter ſhades, whether obtained by diluting the black with white bodies, or by applying it thin on a white ground, the particular beauty of the ivory-black is in a great meaſure loſt.

21 Blue-black.

Blue black is ſaid to be prepared from the burnt ſtalks and tendrils of the vine. Theſe, however, the colour-makers ſeldom give themſelves the trouble of procuring, but ſubſtitute in its place a mixture of ivory-black, and the common blue uſed for clothes.

22 Indian-ink.

Indian-ink is an excellent black for water-colours. It hath been diſcovered by Dr Lewis to conſiſt of a mixture of lamp-black and common glue. Ivory black, or charcoal, he found to anſwer equally well, provided they were levigated to a ſufficient degree of fineneſs, which indeed requires no ſmall trouble.

23 White-colours.

2. *White.* The white colours commonly to be met with are, white-flake, white-lead, calcined hartſhorn, pearl-white, Spaniſh-white, egg-ſhell-white, and nitrate of biſmuth. The flake-white and white-lead are properly the ſame. The preparation of the former is kept a ſecret; the method of preparing the latter is deſcribed under CHEMISTRY, N° 1856. Theſe are the only whites that can be uſed in oil, all the reſt being tranſparent unleſs they are laid on with water. Calcined hartſhorn is the moſt uſeful of the earthy whites, as being the leaſt alkaline. Spaniſh white is only finely

Colour-making.

finely prepared chalk. Pearl-white is made from oyfter-fhells; and egg-fhell white from the fhells of eggs. All thefe, by their attraction for acids, muft neceffarily deftroy fuch colours as have any acid or metallic falt in their compofition. The nitrate of bifmuth is apt to turn black, as are alfo flake-white and white-lead, when ufed in water. The white precipitate of lead recommended under CHEMISTRY, N° 1856. is greatly fuperior as a water-colour to all thefe, being perfectly free of any alkaline quality, and not at all apt to lofe its own colour, or to injure that of other fubftances. It is a carbonate of lead.

24 Red colours.

3. *Red.* The red colours ufed in painting are of two forts, viz. thofe which incline to the purple, and fuch as are of a full fcarlet, and tend rather to the orange. The firft are carmine, lake, rofe-pink, red-ochre, and Venetian-red. The fecond are vermilion, red-lead, fcarlet-ochre, common Indian red, Spanifh-brown, and terra di Sienna, burnt.

We have already laid down fome general rules for the preparation of carmine and lake. Particular receipts have been delivered with the greateft confidence for making thefe fine colours; but all of them muft neceffarily prove ineffectual, becaufe an earthy bafis is recommended for ftriking the colour upon. From the principles of chemiftry, however, we are certain, that if nitric acid, or folution of tin, is made ufe of for brightening a colour made with any earthy bafis, it muft infallibly be deftroyed by that bafis, by reafon of its alkaline quality. Carmine is the brighteft and moft beautiful red colour known at prefent; the beft comes from France. Lake differs from it in being capable of mixture with oil, which carmine is not, unlefs with great difficulty. The former is alfo much more inclined to purple than carmine. This laft quality, however, is reckoned a defect; and accordingly, the more that lake approaches to the fcarlet or true crimfon, the more it is valued. On dropping folution of tin into an aqueous tincture of brazil wood, a beautiful precipitate falls, of a purplifh crimfon colour. This may be very well fubftituted in place of the dearer lakes on many occafions.

Rofe-pink is a very beautiful colour, inclining more to the purple than fcarlet. It feems to be made of chalk, coloured with a decoction of brazil-wood, heightened by an alkaline falt; for which reafon it is exceedingly perifhable, and but little efteemed. The colour might be made much more durable, as well as better, by employing for a bafis the white precipitate of lead abovementioned, and brightening it with folution of tin.

Red ochre and Venetian red differ in nothing from the colcothar of vitriol well calcined. The oxides of iron may be made to appear either purplifh, or inclining to the fcarlet, according to the manner in which the calcination is performed. If the matter is perfectly deprived of its phlogifton, and fubjected to an intenfe fire, it always turns out red; but the mixture of a fmall quantity of inflammable matter gives it a purplifh caft. Hence various paints are kept in the fhops under different names, which yet differ from each other only in the flight circumftances above mentioned; and fuch are the fcarlet-ochre, Spanifh brown, and terra di Sienna burnt. It is remarkable, that the oxides of iron never fhow their colour till they become cold. Colcothar of vitriol, while hot, always appears of a very dark dufky purple.

Of the preparation of vermilion and red-lead, an account is given under the article CHEMISTRY, N° 1701. 1832. Thefe are very durable colours: the firft is the beft red ufed in oil painting, but does not anfwer well in water; the other is rather an orange; and, like other preparations of lead, is in fome cafes apt to turn black.

25 Orange colours.

4. *Orange.* The only true orange-coloured paints are red orpiment and orange lake. The firft is a fublimate formed of arfenic and fulphur; the other may be prepared from turmeric infufed in alcohol having its colour ftruck upon oxide of tin, and brightened by a folution of that metal. All the fhades of orange, however, may be extemporaneoufly prepared by mixing red and yellow colours together, in due proportions.

26 Yellow colours.

5. *Yellow.* The yellow paints moft commonly in ufe are, king's-yellow, Naples-yellow, Dutch-pink, Englifh-pink, mafticot, common orpiment, yellow-ochre, terra di Sienna unburnt, and turpith mineral.

King's-yellow is evidently an arfenical preparation. Its colour is exceedingly beautiful, but apt to fade; on which account, and its great price, it is feldom ufed.

Naples-yellow was for a long time thought to be a preparation of arfenic, but is now difcovered to have lead for its bafis. It is therefore apt to turn black and lofe its colour, which makes it the lefs valuable. It is neverthelefs ufed in preference to king's-yellow, on account of its inferiority in price. This colour is particularly liable to be fpoiled by iron when moift, and therefore fhould never be touched by that metal unlefs previoufly ground in oil.

Dutch-pink is faid to be prepared by ftriking the colour of yellow berries upon finely levigated chalk. But of this there is great reafon to doubt; the bafis of Dutch-pink feems much more hard and gritty than chalk, and its colour more durable than thofe ftruck upon that earth ufually are. Very good yellows may be prepared with the white precipitate of lead, formerly mentioned, by ufing either yellow berries, fuftic, or any other fubftance capable of yielding that colour. Englifh pink is paler than the Dutch, and keeps its colour greatly worfe.

Mafticot is prepared by calcining white-lead till it affumes a yellowifh colour. It is not apt to change, but the colour is fo dull that it is feldom ufed either in oil or water.

Common orpiment is a pretty bright greenifh-yellow, prepared by fubliming arfenic with fulphur. Its naufeous fmell, which is greatly increafed by grinding in oil, makes it very difagreeable; nor does it keep its colour for any length of time. That kind of orpiment leaft inclined to green is to be preferred for the purpofes of painting.

Yellow-ochre and terra di Sienna are ferruginous earths, capable of becoming red by calcination. Green vitriol precipitated by lime may be advantageoufly fubftituted for either of them. See CHEMISTRY.

Turpith mineral is but little ufed in painting, though its fine yellow colour feems greatly to recommend it. This preparation is in all probability very durable; and

Colour-making.

and ſhould ſeem therefore worthy of a preference either to king's or Naples yellow. See CHEMISTRY *Index*.

Gamboge is a paint that can only be uſed in water, and is the moſt common yellow made uſe of for colouring maps, &c.; but for this it is not very proper, being neither quite tranſparent, nor very durable.

27 Green colours.

6. *Green*. The only ſimple green colour that hath a tolerable degree of brightneſs is verdigris, or preparations of it. This, however, though a very beautiful colour, is far from being durable. It is improved in colour, though not in durability, by diſſolution and cryſtallization in diſtilled vinegar, in which ſtate it is called *diſtilled verdigris*. A more durable water colour is made by diſſolving the verdigris in cream of tartar, or rather the pure tartaric acid; but in oil this is found to be equally fugitive with the verdigris itſelf. See CHEMISTRY *Index*.

Compound greens are either made of Pruſſian or ſome other blue, mixed with yellow; but in whatever way theſe colours can be compounded, the beauty of the green produced is greatly inferior to diſtilled, or even common verdigris. The tartaric ſolution of verdigris, mixed with a little gamboge, is the beſt tranſparent green water-colour we have had an opportunity of trying; and a mixture of Pruſſian blue and turpith mineral is probably the beſt opaque one.

Sap-green is a ſimple colour, but exceedingly inferior to diſtilled verdigris, or even to the tartaric ſolution of verdigris with gamboge. It is prepared from the juice of unripe buckthorn berries evaporated to the conſiſtence of a gum. Its green colour is greatly inclined to yellow. A kind of compound green has been ſometimes uſed, called *Pruſſian green*, which conſiſts only of Pruſſian blue and yellow ochre. It has no beauty, nor is it durable. It is prepared as Pruſſian blue, only not pouring on any muriatic acid to diſſolve the ochreous ſediment which falls at the ſame time.

Another green ſometimes uſed is called *terre verte*. This is a native earth, probably impregnated with copper. It is of a bluiſh-green colour, much of that tint called *ſea-green*. It is gritty, and therefore muſt be well levigated before it is uſed. Its colour is durable, but not very bright.

28 Blue colours.

7. *Blue*. The blue colours are ultramarine, Pruſſian blue, verditer, ſmalt, bice, and indigo. Of theſe the ultramarine is the fineſt, but its great price hinders it being much uſed. It is a preparation from lapis lazuli; is an exceeding bright colour, and never fades with whatever ſubſtance it is mixed. It is now, however, in a great meaſure ſuperſeded by Pruſſian blue, to the diſadvantage of painting in general; as Pruſſian blue, though very beautiful, is far from being durable. For an account of its preparations ſee the article ULTRAMARINE.

The proceſs for making Pruſſian blue is deſcribed, and its nature fully conſidered, under CHEMISTRY, N° 774; ſo that it is ſufficient here to obſerve, that Pruſſian blue is to be accounted of the beſt quality when it is deep, bright, and not inclined to purple. It ought to be tried by mixture with white lead, as the brightneſs of the colour will appear much more when diluted than when concentrated in the lumps of the blue itſelf.

The preparation of blue verditer is kept a ſecret, and the beſt chemiſts have been puzzled to find out the method. The colour is exceedingly bright, and has a conſiderable tinge of green. A method of preparing a colour equally beautiful, and agreeing in all reſpects with what is ſold in the ſhops, except that of effervescing with acids, we have found to be as follows: Diſſolve copper in ſtrong cauſtic alkali, until the liquid has aſſumed a very deep blue colour; and the deeper this colour is, the finer will your verditer be. When the menſtruum has diſſolved as much of the metal as it can take up, it is to be poured out into a broad and well glazed earthen pan, held over a very gentle fire; and from the moment it is put on, the liquor is to be continually agitated with a wooden ſpatula, ſo that the liquor may be heated as equally as poſſible. The whole ſecret conſiſts in properly regulating the degree of heat; for if it exceeds the due proportion ever ſo little, the verditer will turn out of a dirty green. The proper degree is about 90° of Fahrenheit's thermometer. In this gentle heat the alkali ſlowly evaporates; and in proportion to its doing ſo the verditer falls to the bottom. After it is once formed, freed from the alkaline liquor, and dried, it can bear the effuſion of boiling water without the leaſt injury. Dr Prieſtley, in his ſixth volume, takes notice, that a ſolution of copper in volatile alkali affords a blue precipitate by heat, but without taking notice of the requiſites for its ſucceſs. In making this preparation it is neceſſary to diſſolve copper in its metallic ſtate; for the ſolution of any oxide will not yield a blue but a green colour. This colour is durable in water, but diſſolves in oil, and has then all the inconveniences of verdigris above mentioned.

Smalt is glaſs coloured with zaffre, a preparation from cobalt *. It is commonly ſo groſsly powdered that it cannot be uſed in painting, and its texture is ſo hard that it cannot eaſily be levigated. Its colour is exceedingly bright and durable; ſo that when finely levigated it is uſed inſtead of ultramarine. The moſt proper materials for levigating this ſubſtance ſeem to be the plates of M. Reaumur's porcelain recommended by Dr Lewis. See CHEMISTRY *Index*. For the preparation and qualities of bice, ſee the articles *ARMENUS Lapis* and BICE.

* See *Zaffre* and *Smalt*.

Indigo is but little uſed in painting either in oil or water, on account of the dulneſs of the colour. It requires no other preparation than being waſhed over. Its goodneſs is known by the darkneſs and brightneſs of the colour. See INDIGO.

29 Purple colours.

8. *Purple*. The only ſimple colour of this kind uſed at preſent is colcothar of vitriol. A beautiful purple lake may be prepared from logwood by means of ſolution of tin; but this method of preparing colours is very little known as yet.

30 Brown colours.

9. *Brown*. The brown colours are, biſtre, brown-ochre, Cologne-earth, umber, and brown-pink. Under the article BISTRE is given a proceſs for making that colour, by infuſing ſoot in water, pouring off the tincture, and then evaporating it to an extract; but Dr Lewis is of opinion, with M. Landois in the French *Encyclopédie*, that the ſoot is either boiled in water, or ground with a little liquid of ſome kind into a ſmooth paſte; it is then diluted with more water, and after ſtanding for about half an hour till the groſſer ſubſtance of the ſoot has ſettled, the liquor is poured off into

31 Dr Lewis's opinion concerning biſtre.

Colour-making

into another veſſel, and ſet by for two or three days, that the finer parts may fall to the bottom, and this fine matter is the biſtre. This is a very uſeful colour in water, being exceedingly fine, durable, and not apt to ſpoil any other colours with which it is mixed. The brown pink is ſaid to conſiſt of chalk tinged with the colouring matter of fuſtic, heightened by fixed alkaline ſalts. It is therefore very periſhable, and is ſeldom uſed. The other browns are a kind of ochreous earths; for a deſcription of which ſee their proper articles.

32
Attempts to make lake of all colours.

Having now conſidered moſt of the colouring ſubſtances uſually to be met with in the ſhops, we ſhall next take notice of ſome attempts that have been made to produce all the different colours from vegetables, after the manner of lakes; which, though the methods hitherto tried have for the moſt part failed of ſucceſs, may perhaps ſome time or other be found applicable to valuable purpoſes.

33
Black from aſtringents.
* See *Dyeing*.

From infuſions of aſtringent vegetables mixed with green vitriol, is produced a deep black liquor of very extenſive uſe in dyeing*. The ſubſtances which produce the deepeſt blacks are galls and logwood. When a decoction or infuſion of the galls is dropped into a ſolution of the vitriol largely diluted with water, the firſt drops produce bluiſh or purpliſh red clouds, which ſoon mingling with the liquor, turn it uniformly of their own colour. It ſeems to be on the quality of the water that this difference in the colour depends. With diſtilled water, or the common ſpring waters, the mixture is always blue. If we previouſly diſſolve in the water the moſt minute quantity of any alkaline ſalt, too ſmall to be diſcovered by any of the common means by which waters are uſually tried, or if the water is in the leaſt putrid, the colour of the mixture proves purple or reddiſh. Rain-water, caught as it falls from the clouds in an open field in clean glaſs-veſſels, gives a blue; but ſuch as is collected from the tops of the houſes, grows purple with the mixture of vitriol and galls: from whence it may be preſumed, that this laſt has contracted a putrid tendency, or received an alkaline impregnation, though ſo ſlight as not to be ſenſible on other ways of trial.

Both the purple and blue liquors, on adding more of the aſtringent infuſion, deepen to a black, more or leſs intenſe according to the nature of dilution: if the mixture proves of a deep opaque blackneſs, it again becomes bluiſh or purpliſh when further diluted. If ſuffered to ſtand in this diluted ſtate for two or three days, the colouring matter ſettles to the bottom in form of a fine black mud, which by ſlightly ſhaking the veſſel is diffuſed again through the liquor, and tinges it of its former colour. When the mixture is of a full blackneſs, this ſeparation does not happen, or in a far leſs degree; for though a part of the black matter precipitates in ſtanding, yet ſo much remains diſſolved, that the liquor continues black. This ſuſpenſion of the colouring ſubſtance, in the black liquid, may be attributed in part to the gummy matter of the aſtringent infuſion increaſing the conſiſtence of the watery fluid; for the ſeparation is retarded in the diluted mixture by a ſmall addition of gum arabic. If the mixture either in its black or diluted ſtate is poured into a filter, the liquor paſſes through coloured; only a part of the black matter remaining on the filter. The filtered liquor on ſtanding for ſome time becomes turbid and full of fine black flakes: being freed from theſe by a ſecond filtration, it again puts on the ſame appearance: and thus repeatedly till all the colouring parts are ſeparated, and the liquor has become colourleſs.

Dr Lewis, from whoſe Philoſophical Commerce of Arts this account is taken, further informs us, that this colouring matter, when ſeparated from the liquor and dried, appeared of a deep black, which did not ſeem to have ſuffered any change from the air by expoſure for upwards of four months. Made red hot, it glowed and burnt, but did not flame, and became a ruſty brown powder, which was readily attracted by a magnetic bar; though in its black ſtate the magnet had no action upon it. Sulphuric acid, diluted with water and digeſted on the black powder, diſſolved the greateſt part of it, leaving only a very ſmall quantity of whitiſh matter. Solution of pure fixed alkaline ſalt diſſolved very little of it: the liquor received a reddiſh brown colour, and the powder became blackiſh brown. This reſiduum was attracted by the magnet after being red hot, though not before: the alkaline tincture, paſſed through a filter, and mixed with a ſolution of green vitriol, ſtruck a deep browniſh black colour, nearly the ſame with that which reſults from mixing with the vitriolic ſolution an alkaline tincture of galls.

34
Black from a combination of other colours.

It hath alſo been attempted to produce black from a combination of other colours; as green may be produced from a mixture of blue and yellow. M. le Blon, in his Harmony of Colours, gives a method of forming black, by mixing together the three colours called *primitive*, viz. blue, red, and yellow; and M. Caſtel, in his *Optique des Couleurs*, publiſhed in 1740, ſays that this compound black has an advantage in painting, above the ſimple ones, of anſwering better for the darkening of other colours. Thus, if blue, by the addition of black, is to be darkened into the colour called *blue-black*, the ſimple blacks, according to him, if uſed in ſufficient quantity to produce the requiſite deepneſs, conceal the blue, while the compound blacks leave it diſtinguiſhable. Le Blon does not mention the proportion of the three colours neceſſary for producing black. Caſtel directs 15 parts of blue, five of red, and three of yellow; but takes notice that theſe proportions are rather ſpeculatively than practically juſt, and that the eye only can be the true judge; our colours all being very imperfect, and our pigments or other bodies of one denomination of colour being very unequal in their degree of intenſity. He obſerves, that the pigments ſhould all be of the deepeſt and darkeſt kind; and that inſtead of taking one pigment for each colour, it is better to take as many as can be got; for the greater diſcord there is of heterogeneous and diſcordant drugs, the more true and beautiful, he ſays, will the black be, and the more capable of uniting with all other colours, without ſuppreſſing them, and even without making them tawny.

Dr Lewis acquaints us, that by mixing different blue, red, and yellow colours, he has not been able to produce a perfect black; but has often obtained from them very dark colours, ſuch as may be called *brown-blacks*, or *gray-blacks*; ſuch as we commonly ſee in the dark

Colour-making.

dark parts of paintings, and ſuch as the charcoal and ſoot blacks appear when diluted a little. The ingredients being each of a dark deep colour is a very neceſſary condition; for bright blues, bright reds, and bright yellows, mixed in ſuch proportions that neither colour prevailed, produced only a gray. In effect, all compoſitions of this kind, phyſically conſidered, can be no other than grays, or ſome of the intermediate tints between whiteneſs and darkneſs; and theſe grays will be ſo much the lighter or darker as the component colours of themſelves are bright or dark.

With regard to the extraction of the colouring matter from the different kinds of vegetables commonly to be met with of all colours, this would certainly be a very valuable acquiſition, could the colours ſo procured be made durable. On this ſubject nothing hath yet appeared more ſatisfactory than what is delivered by Dr Lewis in his notes on Neumann's chemiſtry. His obſervations are curious, but promiſe very little ſucceſs to any who ſhall attempt to fix theſe vegetable colours.

35 Dr Lewis's experiments on vegetable colours.

" Among the infinite variety of colours (ſays he), which glow in the flowers of plants, there are very few which have any durability, or whoſe fugitive beauty can be arreſted by art, ſo as to be applied to any valuable purpoſes. The only permanent ones are the yellow, the red, the blue; and all the intermediate ſhades of purple, crimſon, violet, &c. are extremely periſhable. Many of theſe flowers loſe their colours on being barely dried; eſpecially if they are dried ſlowly, as has been uſually directed, in a ſhady, and not warm place. The colours of all of them periſh on keeping even in the cloſeſt veſſels. The more haſtily they are dried, and the more perfectly they are ſecured from the air, the longer they retain their beauty. The colouring matter extracted and applied on other bodies is ſtill more periſhable: oftentimes it is changed or deſtroyed in the hands of the operator.

" The colour of many blue flowers is extracted by infuſion in water; but there are ſome from which water gains only reddiſh or purpliſh blue. Of thoſe that have been tried there is not one which gives any blue tincture to ſpirituous liquors: ſome give no colour at all, and ſome a reddiſh one. The juice preſſed out from the freſh flowers is for the moſt part blue. The blue juices and infuſions are changed red by all acids. The muriatic acid ſeems to ſtrike the moſt florid red. The flowers themſelves, macerated in acid liquors, impart alſo a deep red tincture. Alkalies, both fixed and volatile, and lime-water, change them to a green. Thoſe infuſions of the juices which have nothing of the native colour of the flowers, ſuffer the ſame changes from the addition of acid and alkaline liquors: even when the flowers have been kept till their colour is loſt, infuſions made from them acquire ſtill a red colour from the one, and a green from the other, though in a leſs degree than when the flowers were freſh. The red colour produced by acids is ſcarcely more durable than the original blue: applied upon other bodies and expoſed to the air, it gradually degenerates into a faintiſh purple, and at length diſappears, leaving hardly any ſtain behind. The green produced by alkalies changes to a yellow, which does not fade ſo ſoon. The green, by lime-water, is more permanent and more beautiful; green lakes, prepared from theſe flowers by lime-water, have been uſed as pigments by the painter. The flowers of cyanus have been greatly recommended, as affording elegant and durable blue pigments; but I have never been able to extract from them any blue colour at all. They retain their colour indeed, when haſtily dried, longer than ſome other blue flowers; but they communicate nothing of it to any kind of menſtruum. Infuſions of them in watery, ſpirituous, and oily liquors, are all of them more or leſs of a reddiſh caſt, without any tendency to blue. Alum, which is ſaid to heighten and preſerve their blue colour, changes it, like that of other blue flowers, to a purpliſh red; acids to a deep red; alkalies and lime-water to a green: ſolution of tin added to the watery infuſion, turns it to a fine crimſon; on ſtanding, a beautiful red fæcula ſubſides, but it loſes all its colour as ſoon as it is dry. The watery infuſion, inſpiſſated to the conſiſtence of an extract, appears of a dark reddiſh brown: an extract made with rectified ſpirit is of a purpliſh colour. The colour of both extracts ſpread thin, and expoſed to the air, quickly fades. The flowers employed in theſe experiments were thoſe of the common blue-bottle of the corn-fields.

" Red flowers readily communicate their own red colour to watery menſtrua; among thoſe that have been tried, there is not one exception. Thoſe of a full red colour give to rectified ſpirit alſo a deep red tincture, brighter, though ſomewhat paler, than the watery infuſion: but the lighter red flowers, and thoſe which have a tendency to purpliſh, impart very little colour to ſpirit, and ſeem to partake more of the nature of the blue flowers than of the pure red. Infuſions of red flowers are ſuppoſed to be heightened by acids, and turn green by alkalies, like thoſe of the blue; but this is far from being univerſal. Among theſe I have examined, the roſe-colours and purpliſh reds were changed nearly in the ſame manner as the blues; but the full deep reds were not. The deep infuſion of red poppies is changed by alkalies, not to a green, but to duſky purple.

" The colours of yellow flowers, whether pale or deep, are in general durable. Many of them are as much ſo, perhaps, as any of the native colours of vegetables. The colour is extracted both by water and by ſpirit. The watery infuſions are the deepeſt. Neither alkalies nor acids alter the ſpecies of the colour; though both of them vary its ſhade; acids rendering it paler, and alkalies deeper; alum likewiſe conſiderably heightens it, though not ſo much as alkalies. An infuſion of the flowers, made in alkaline ley, precipitated by alum, gives a durable yellow lake. In ſome of the deep reddiſh yellow, or orange-coloured flowers, the yellow matter ſeems to be of the ſame kind with that of the pure yellow flowered, but the red to be of a different kind from the pure red ones; watery menſtrua take up only the yellow, and leave the red, which may afterwards be extracted by alcohol, or by water acuated by fixed alkaline ſalt. Such particularly are the ſaffron-coloured flowers of carthamus. Theſe, after the yellow matter has been extracted by water, are ſaid to give a red tincture to ley; from which, on ſtanding at reſt for ſome time, a deep bright red fæcula ſubſides; called from one of the

names

Colour-making.

names of the plant which produces it, *safflower;* and from the countries whence it is commonly brought to us, *Spanish-red*, and *China lake*. This pigment impregnates alcohol with a beautiful red tincture, but communicates no colour to water. I have endeavoured to separate, by the same treatment, the red matter of some of the other reddish yellow flowers, as those of garden marigold, but without success. Plain water extracted a yellow colour, and alkaline ley extracted afterwards only a paler yellow: though the digestions were continued till the flowers had lost their colour, the tinctures were no other than yellow, and not so deep as those obtained from the pure yellow flowers. The little yellow flocculi, which in some kinds of flowers are collected into a compact round disc, as in the daisy and corn marigold, agree, so far as they have been examined, with the expanded yellow petala. Their colour is affected in the same manner by acids, by alkalies, and by alum; and equally extracted by water and by spirit. But the yellow farina, or fine dust, lodged on the tips of the stamina of flowers, appears to be of a different kind. It gives a fine bright yellow to spirit, and a duller yellow to water; the undissolved part proving in both cases of a pale yellowish white. Both the watery and spirituous tinctures were heightened by alkaline liquors, turned red by acids, and again to a deep yellow on adding more of the alkali: I know no other vegetable yellow that is turned red by acids.

" White flowers are by no means destitute of colouring matter. Alkaline lixivia extract from some of them a green tincture, and change their colourless expressed juices to the same colour; but I have not observed that they are turned red by acids. The flowers of the common wild convolvulus or bind-weed, which in all their parts are white, give a deep yellow or orange tincture to plain water; which, like the tinctures of flowers that are naturally of that colour, is rendered paler by acids, heightened a little by alum, and more considerably by alkaline salts. The vapours of the volatile sulphuric acid, or of burning sulphur, which whiten or destroy the colour of the coloured flowers, make no change in the white.

36 Colours from fruits.

" The red juices of fruits, as currants, mulberries, elder-berries, morello, black cherries, &c. gently inspissated to dryness, dissolve again almost totally in water, and appear nearly of the same red colour as at first. Rectified spirit extracts the tinging particles, leaving a considerable portion of mucilaginous matter undissolved; and hence the spirituous tincture proves of a brighter colour than the watery. The red solutions, and the juices themselves, are sometimes made dull, and sometimes more florid by acids, and generally turned purplish by alkalies. The colours of these juices are for the most part perishable. They resist, indeed, the power of fermentation, and continue almost unchanged, after the liquor has been converted into wine; but when the juice is spread thin upon other bodies, exsiccated, and exposed to the air, the colour quickly alters and decays; the bright lively red changes the soonest: the dark dull red stain from the juice of the black cherry, is of considerable durability. The fruit of the American opuntia or prickly pear, the plant upon which the cochineal insect is produced, is perhaps an exception: This bright red fruit, according to Labat, gives a beautiful red dye. Some experiments, however, made upon the juice of that fruit, as brought into England, did not promise to be of any great advantage; but the particulars I cannot now recollect.

" The ripe berries of buckthorn stain paper of a green colour. From these is prepared the substance called *sap green*, a pigment sufficiently durable, readily soluble in water, but not miscible with oil. The berries dried while green, and macerated in alum-water, are said to yield a yellow pigment; and when they have grown over ripe so as to fall off spontaneously, a purple one. It is said that the berry of the heliotropum tricoccum, which grows wild about Montpelier, stains paper of a green colour, and that this green turns presently to a blue: that the common blue paper receives its colour from this juice: and that the red rags called *turnsol*, employed for colouring wines and other liquors, are tinctured by the same juice turned red by acids. According to M. Nissole of the French academy of sciences (as quoted by Savary in his Dictionnaire de Commerce), the following juice is obtained, not from the berries, but from tops of the plant gathered in August, ground in mills, and then committed to the press. The juice is exposed to the sun about an hour, the rags dipt in it, dried in the sun, moistened by the vapour which arises during the slacking of quicklime with urine, then dried again in the sun, and dipped again in the juice. The Dutch and others are said to prepare turnsol rags, and turnsol in the mass, from different ingredients, among which archil is a principal one.

" In some plants, peony for instance, the seeds at a certain point of maturity are covered with a fine shining red membrane. The pellicles of the seeds of a certain American tree afford the red masses brought into Europe under the names of *annotto*, *orlean*, and *raucou**. Mr Pott, in the Berlin Memoirs for the year 1752, mentions a very extraordinary property of this concrete. ' With sulphuric acid it produces a blue colour, of extreme beauty; but with this capital defect, that all salts and liquors, and even common water, destroy it.' The specimen of annotto, which I examined, was not sensibly acted upon by sulphuric acid; it received no change in its own colour, and communicated none to the liquor. Nor did any visible changes ensue upon dropping the acid into tincture of annotto made in water, or in spirit.

* See *Annotto*.

37 Colours from leaves.

" The green colour of the leaves of plants is extracted by rectified spirit of wine and by oils. The spirituous tinctures are generally of a fine deep green, even when the leaves themselves are dull-coloured, or yellowish, or hoary. The colour, however, seldom continues long even in the liquor; much less when the tinging matter is separated in a solid form; and exposed with a large surface to the air. The editor of the Wirtemberg Pharmacopœia observes, that the leaves of acanthus, brankursine, or bear's-breach, give a more durable green tincture to spirit than those of any other herb. Alkalies heighten the colour both of the tinctures and green juices; acids weaken, destroy, or change it to a brownish: lime water improves both the colour and durability: by means of lime, not inelegant green lakes are procurable from the leaves of acanthus, lily of the valley, and several other plants. There

Colour-making

There are very few herbs which communicate any ſhare of their green colour to water; perhaps none that give a green of any conſiderable deepneſs. It is ſaid, however, that the leaves of ſome plants give a green dye to woollen, without the addition of any other colouring matter; particularly thoſe of the wild cervil, or cow-weed, the common ragwort, and devil's-bit. The leaves of many kinds of herbs and trees give a yellow dye to wool or woollen cloth that has been previouſly boiled with a ſolution of alum and tartar. Weld, in particular, affords a fine yellow, and is commonly made uſe of for this purpoſe by the dyers, and cultivated in large quantity in ſome parts of England. There is no colour for which we have ſuch plenty of materials as for yellow. M. Hellot obſerves that all leaves, barks, and roots, which on being chewed diſcover a ſlight aſtringency, as the leaves of the almond, peach, and pear trees, aſh bark, (eſpecially that taken off after the firſt riſing of the ſap in the ſpring), the roots of wild patience, &c. yield durable yellows, more or leſs beautiful accordding to the length of time that the boiling is continued, and the proportions of alum and tartar in the preparatory liquor: that a large quantity of alum makes theſe yellows approach to the elegant yellow of weld: that if the tartar is made to prevail, it inclines them to an orange; that if the roots, barks, or leaves be too long boiled, the yellow proves tarniſhed, and acquires ſhades of brown." See the article DYEING.

The moſt capital preparations from the leaves of plants are thoſe of indigo, and weld; which are both very much uſed in dyeing, though the firſt only in painting *. Both the indigo and woad plants, give out their colour, by proper management, to water, in form of a blue fæcula or lake. M. Hellot ſuſpects that a like blue fæcula is procurable from many other vegetables. Blue and yellow blended together, compoſe a green. He ſuppoſes the natural greens in vegetables to be compounded in like manner of theſe two colours; and that the blue is oftentimes the moſt permanent, ſo as to remain entire after the putrefaction or deſtruction of the yellow. The theory is ſpecious, and perhaps juſt: we know of no other that accounts in any degree for the production of the indigo and woad blue. Dr Lewis, however, informs us, that he never was able to produce the leaſt appearance of either blue or yellow from any of the plants he tried by treating them in the manner uſed for the preparation of indigo.

* See *Indigo* and *Woad*.

38 Production of indigo accounted for.

39 Colours from mosses.

There are ſundry moſſes, which in their natural ſtate, like the indigo and woad plants, promiſe nothing of the elegant colours that can be extracted from them by art. The moſt remarkable of theſe is archil; for the preparation of which, and the colours that may be produced from it, ſee the article. Linnæus ſuſpects that there are ſeveral other more common moſſes from which valuable colours might be extracted: a quantity of ſea-moſs, having rotted in heaps on the ſhore, he obſerved the liquor in the heaps to be as red as blood; the ſea-water, the ſun, and the putrefaction, having brought out the colour. Mr Kalm, in an appendix to Linnæus's paper, in 1745, mentions two ſorts of moſſes actually employed in Sweden for dyeing woollen red: one is the lichenoides coralliforme apicibus coccineis of Ray's Synopſis; the other the lichenoides tartareum, farinaceum, ſcutellarum umbone fuſco, of Dillenius. This laſt is a white ſubſtance like meal clotted together, found on the ſides and tops of hills. It is ſhaved off from the rocks after rain, purified from the ſtony matters intermixed with it by waſhing with water, then dried in the ſun, ground in mills, and again waſhed and dried: it is then put into a veſſel with urine, and ſet by for a month: a little of this tincture added to boiling water makes the dyeing colour. In the ſame Tranſactions for the year 1754, there is an account of another moſs which, prepared with urine, gives a beautiful and durable red or violet dye to wool and ſilk. This is the lichen foliaceus umbilicatus ſubtus lacunenſis, Linn. flor. Suec. It grows upon rocks, and is readily diſtinguiſhable from others of that claſs, by looking as if burnt or parched, conſiſting of leaves as thin as paper, convex all over on the upper ſide, with correſponding cavities underneath, adhering firmly to the ſtones by a little root under the leaves, and coming aſunder, when dry, as ſoon as touched. It is gathered after rain, as it then holds beſt together, and parts eaſieſt from the ſtone. In France, a cruſtaceous moſs, growing upon rocks in Auvergne, is prepared with lime and urine, and employed by the dyers as a ſuccedaneum for the Canary archil, to which it is ſaid to be very little inferior. M. Hellot relates, that he has met with ſeveral other moſſes, which on being prepared in the ſame manner, acquire the ſame colour. The moſt expeditious way, he ſays, of trying whether a moſs will yield an archil or not, is to moiſten a little of it with a mixture of equal parts of ſpirit of ſal ammoniac and ſtrong lime water, and add a ſmall proportion of crude ſal ammoniac. The glaſs is then to be tied over with a piece of bladder, and ſet by for three or four days. If the moſs is of the proper kind, the little liquor which runs from it upon inclining the veſſel, will appear of a deep crimſon colour; and this afterwards evaporating, the plant itſelf acquires the ſame colour. Dr Lewis informs us, that he has tried a good number of the common moſſes, many both of the cruſtaceous and foliaceous kind, and not a few of the fungi; as alſo the herbs chamomile and milfoil, which yield a blue eſſential oil; and thyme, whoſe oil becomes blue by digeſtion with volatile ſpirits; but never met with any that yielded a colour like archil. Moſt of them gave a yellow or reddiſh brown tincture. A few gave a deep red colour to the liquor: but when diluted, it ſhowed a yellowiſh caſt, and when applied on cloth it gave only a yellowiſh red.

40 Some blue flowers may probably yield permanent colours.

To theſe obſervations we ſhall only add, that though in general the blue colours of flowers are exceedingly periſhable, there ſeem to be at leaſt two exceptions to this rule; for the blue flowers of iris, or flower-de-luce, and thoſe of columbine, when treated with ſolution of tin, yielded a colour tolerably permanent. Indeed when experiments are made with a view to extract the colour from any part of a vegetable, it will always be proper to try whether it can bear a mixture with this ſolution. If the colour is not deſtroyed by it, there is a very great probability that the ſolution will, by proper management, preſerve, and give a durability to it, which could ſcarce be obtained by

Colour-making || Colt.

by any other method. It muſt, however, be obſerved, that there are ſeveral ſubſtances uſed in colour-making, which ſolution of tin cannot bear to be mixed with. Theſe are principally ſugar of lead and cream of tartar, as well as all the calcareous earths and alkaline ſalts. With alum it may be mixed very ſafely, and is in many caſes the better for it. The roots of plants, however, ſeem to promiſe more durability of colour than the upper parts. We have ſeen a blue colour of conſiderable durability and brightneſs prepared from the roots of common radiſhes by expreſſing the juice, combining it with tobacco-pipe clay, and brightening it with a little alum. The root of the red beet is alſo ſaid to yield a durable colour of a beautiful red, inclining to ſcarlet; but this we cannot affirm from our own experience.

41 Colours from roots.

42 Colours for maps.

With regard to liquid colours for maps, &c. we apprehend there can be very little difficulty in preparing all the poſſible varieties of them, if what we have above laid down is attended to. The only colour with which there can be any difficulty is *blue*; but the common ſolution of indigo in alkalies or acids may be made to anſwer this purpoſe, though, on account of their ſtrongly ſaline quality, they are not very proper. A very curious method of procuring a beautiful tranſparent blue colour is by extracting the colouring matter from Pruſſian blue, by means of a cauſtic alkali. This, when laid upon paper, appears of a dirty brown colour; but if waſhed over with a weak ſolution of green vitriol, is inſtantly changed to a moſt beautiful blue. This ſeems to afford a method of procuring blue tranſparent colours of greater beauty than they are uſually met with.—See ſpecimens of tranſparent colours prepared according to the above rules, on the *Chart* ſubjoined to HISTORY.

COLOURING, among painters, the manner of applying and conducting the colour of a picture; or the mixtures of light and ſhade, formed by the various colours employed in painting. See PAINTING.

COLOURING of Glaſs. See GLASS.

COLOURING of Porcelain. See PORCELAIN.

COLT, in *Zoology*, a general name for the young of the horſe kind: the male being likewiſe, for diſtinction's ſake, called a *horſe-colt*; the female, a *filly*.

Sportſman's Dictionary.

After the colts have been foaled, you may ſuffer them to run with the mare till about Michaelmas, ſooner or later, according as the cold weather comes in; then they muſt be weaned; though ſome perſons are for having them weaned after Martinmas, or the middle of November. The author of the *Complete Horſeman* is of opinion, that the reaſon why moſt foals advance ſo ſlowly, and are not capable of ſervice till they are ſix or ſeven years old, is becauſe they have not ſuckled long enough; whereas, if they had ſucked the whole winter over, they would be as good at four or five years old as they are now at eight.

They ought now to be kept in a convenient houſe, with a low rack and manger for their hay and oats, which muſt be ſweet and good; with a little wheaten bran mixed with the oats to cauſe them to drink, and to keep their bodies open. But, ſince there are ſome who allege, that oats make foals become blind, or their teeth crooked; the ſame author is of opinion, that oats will wear their teeth, and make them the ſooner to change, and alſo to raze; therefore he judges it to be the beſt way to break them in a mill, becauſe, that by endeavouring with their jaws to bruiſe and chew them, they ſtretch and ſwell their eye and nether-jaw veins, which ſo attract the blood and humours that they fall down upon the eyes, and frequently occaſion the loſs of them; ſo that it is not the heating quality of the oats, but the difficulty in chewing, that is the cauſe of their blindneſs.

Colt.

Further, colts thus fed with grain do not grow thickiſh upon their legs, but grow broader and better knit than if they had eaten nothing but hay and bran, and will endure fatigue the better. But above all they muſt be kept from wet and cold, which are hurtful to them, nothing being more tender than they are. For proof of this, take a Spaniſh ſtallion, and let him cover two mares, which for age, beauty, and comelineſs may admit of no difference between them; and if they produce both horſe-colts, or both fillies, which is one and the ſame thing, let one run abroad, and the other be houſed every winter, kept warm, and ordinarily attended; and that colt which has been kept abroad ſhall have large fleſhy ſhoulders, flabby and gouty legs, weak paſterns, and ill hoofs; and ſhall be a dull heavy jade, in compariſon to the other which is houſed, and orderly kept; and which will have a fine forehead, be fine ſhaped, and have good legs and hoofs, and be of good ſtrength and ſpirit; by which you may know, that to have the fineſt ſtallion, and the moſt beautiful mare, is nothing, if they are ſpoiled in the breeding up. It is worth obſervation, that ſome foals, under ſix months old, though their dams yield plenty of milk, yet decay daily, and have a cough, proceeding from certain pellicles or ſkins that breed in their ſtomachs, which obſtruct their breathing, and at laſt deſtroy them entirely. To remedy this malady, take the bag wherein the colt was foaled, dry it, and give him as much of it in milk as you can take up with three fingers; but if you have not preſerved the bag, procure the lungs of a young fox, and uſe it inſtead of the aforeſaid powder.

It will be proper to let the colts play an hour or two in ſome court-yard, &c. when it is fair weather, provided you put them up again carefully, and ſee that they take no harm. When the winter is ſpent, turn them into ſome dry ground, where the graſs is ſhort and ſweet, and where there is good water, that they may drink at pleaſure; for it is not neceſſary that a colt ſhould fill his belly immediately, like a horſe that labours hard. The next winter you may take them into the houſe, and uſe them juſt as you do your other horſes; but let not your horſe-colts and fillies be kept together after the firſt year. This method may be obſerved every ſummer and winter till you break them, which you may do after they have been three years old; and it will be a very eaſy thing, if you obſerve the aforeſaid method of houſing them; for ordering them the ſecond year as you do your other horſes, they will be ſo tame and gentle, that you need not fear their leaping, plunging, kicking, or the like; for they will take the ſaddle quietly. As for all thoſe ridiculous methods of beating and curbing them, they are in effect ſpoiling them, whatever they call it, in ploughed fields, deep ways, or the like; inſtead of which, let the rider ſtrive to win them by gentle uſage, never correcting them but when it is neceſſary,

necessary, and then with judgment and moderation. You will not need a cavesson of cord, which is a head strain, nor a pad of straw; but only a common saddle, and a common cavesson on his nose, such as other horses are ridden with; but it ought to be well lined with double leather; and, if you please, you may put on his mouth a watering bit, but without reins, only the head-stall, and this but for a few days; and then put on such a bit as he should be always ridden with; and be sure not to use spurs for some time after backing. Take notice, that as yearlings must be kept abroad together, so those of two years old together; and the like for those of three yearlings; which ordering is most agreeable to them.

In order to make him endure the saddle the better, the way to make it familiar to him will be by clapping the saddle with your hand as it stands upon his back, by striking it, and swaying upon it, dangling the stirrups by his sides, rubbing them against his sides, and making much of them, and bringing him to be familiar with all things about him; as straining the crupper, fastening and loosening the girths, and taking up and letting out the stirrups. Then, as to his motion, when he will trot with the saddle obediently, you may wash a trench of a full mouth, and put the same into his mouth, throwing the reins over the forepart of the saddle, so that he may have a full feeling of it; then put on a martingale, buckled at such a length that he may but just feel it when he jerks up his head; then take a broad piece of leather, and put it about his neck, and make the ends of it fast by plaiting it, or some other way, at the withers, and the middle part before his weasands, about two handfuls below the thropple, betwixt the leather and his neck; let the martingale pass so, that when at any time he offers to duck, or throw down his head, the cavesson being placed upon the tender gristle of his nose, may correct and punish him; which will make him bring his head to, and form him to an absolute rein; trot him abroad, and if you find the reins or martingale grow slack, straiten them, for when there is no feeling, there is no virtue.

COLT Evil, among farriers. See FARRIERY.

COLT-Taming, is the breaking of a colt so as to endure a rider. Colts are most easily broken at three or four years of age; but he who will have patience to see his horse at full five, will have him much more free of diseases and infirmities than if he was broken sooner.

Preparatory to their breaking for the saddle, they should be used to familiar actions, as rubbing, clawing, haltering, leading to water, taking up their feet, knocking their hoofs, &c. In order to bridle and saddle a colt, when he is made a little gentle, take a sweet watering trench, washed and anointed with honey and salt, which put into his mash, and so place it that it may hang about his tush; then offer him the saddle, but take care not to frighten him with it. Suffer him to smell at it, to be rubbed with it, and then to feel it; after that fix it, and gird it fast, and make that motion the most familiar to him to which he seems most averse. Being thus saddled and bridled, lead him out to water, and bring him in again; when he has stood reined upon the trench an hour or more, take off the bridle and saddle, and let him go to his meat till the evening, and then lead him out as before; and when you carry him in again to set him up, take off his saddle gently, clothing him for the night.

COLTIE, a term used by timber-merchants, for a defect or blemish in some of the annular circles of a tree, whereby its value is much diminished.

COLUBER, in *Zoology*, a genus of serpents belonging to the order of amphibia. See OPHIOLOGY *Index*.

COLUMB-KILL. See JONA.

COLUMBA, the PIGEON, in *Ornithology*, a genus of birds belonging to the order of passeres. See ORNITHOLOGY *Index*.

COLUMBA, ST, in allusion to whose name the island of Jona (one of the Hebrides), received its name; *Jona* being derived from a Hebrew word signifying a dove. This holy man, instigated by his zeal, left his native country, Ireland, in the year 565, with the pious design of preaching the gospel to the Picts. It appears that he left his native soil with warm resentment, vowing never to make a settlement within sight of that hated island. He made his first trial at Oransay; and finding that place too near to Ireland, succeeded to his wish at *Hy*, for that was the name of Jona at the time of his arrival. He repeated here the experiment on several hills, erecting on each a heap of stones; and that which he last ascended is to this day called *Carnan-chul-reh-Eirium*, or "The eminence of the back turned to Ireland.

Columba was soon distinguished by the sanctity of his manners: a miracle that he wrought so operated on the Pictish king Bradeus, that he immediately made a present of the little isle to the saint. It seems that his majesty had refused Columba an audience; and even proceeded so far as to order the palace-gates to be shut against him: but the saint, by the power of his word, instantly caused them to fly open. As soon as he was in possession of Jona, he founded a cell of monks, borrowing his institutions from a certain oriental monastic order. It is said that the first religious were canons regular, of whom the founder was the first abbot; and that his monks, till the year 716, differed from those of the church of Rome, both in the observation of Easter, and in the clerical tonsure. Columba led here an exemplary life, and was highly respected for the sanctity of his manners for a considerable number of years. He is the first on record who had the faculty of *second sight*, for he told the victory of Aidan over the Picts and Saxons on the very instant it happened. He had the honour of burying in his island, Convallius and Kinnatil, two kings of Scotland, and of crowning a third. At length, worn out with age, he died in Jona in the arms of his disciples; was interred there, but (as the Irish pretend) in after times translated to Down; where, according to the epitaph, his remains were deposited with those of St Bridget and St Patrick.

> Hi tres in *Duno* tumulo tumulantur in uno;
> *Brigida*, *Patricius*, atque *Columba* pius.

But this is totally denied by the Scots; who affirm, that the contrary is shown in the life of the saint, extracted out of the Pope's library, and translated out of the Latin into Erse, by Father *Cail o haran*; which

which decides in favour of Jona the momentous dispute.

COLUMBANUS, a saint and a poet, was born in Ireland, and brought up to a religious life among the disciples of St Columba. He made uncommon progress in learning; and very early in life distinguished himself for poetical abilities, by the composition of a book of psalms, and a number of moral poems, intended also to be set to music. Jonas, a writer of ecclesiastical history, mentions, that Columbanus belonged originally to a monastery of the name of *Benchor*. The same monastery is mentioned by St Bernard in his life of his friend St Malachi; and he relates that it sent out a great number of monks, who spread over Europe. Columbanus passed from Britain into France, and founded the monastery of Luxeville near Besançon. He had been kindly received and patronized by King Childebert; but he was afterwards expelled out of France by the wicked queen Brunichild. He retired to Lombardy in Italy, and was well received by King Argulphus. In Lombardy he again founded the monastery of Bobio. The *Regula Cœnobialis* and *Penitentialis*, which he established in that monastery, have been published in the *Codex Regularum* compiled by the learned Holstenius. He was contemporary with St Benedict. It was in the year 589 he went into France.

COLUMBARIA, in *Ancient Geography*, an island like a rock on the west of Sicily, opposite to Drepanum; said by Zonares to have been taken from the Carthaginians by Numerius Fabius the consul. Now *Columbara*, with a very strong and almost impregnable citadel (Cluverius).

COLUMBIC ACID. See CHEMISTRY *Index*.

COLUMBINE. See AQUILEGIA, BOTANY *Index*.

COLUMBIUM, a new metal which was discovered in a mineral from North America. See CHEMISTRY *Index*.

COLUMBO ROOT, an article lately introduced into the materia medica, the natural history of which is not yet well known. According to Dr Percival's account, it grew originally on the continent of America, from whence it was transplanted to Columbo, a town in Ceylon, which gives name to, and supplies all India with it. The inhabitants of these countries have for a long time used it in disorders of the stomach and bowels. They carry it about with them, and take it sliced or scraped in Madeira wine. This root comes to us in circular pieces, which are from half an inch or an inch to three inches in diameter; and divided into *frusta*, which measure from two inches to one quarter of an inch. The sides are covered with a thick corrugated bark, of a dark brown hue on its external surface, but internally of a light yellow colour. The surfaces of the transverse sections appear very unequal, highest at the edges, and forming a concavity towards the centre. On separating this surface, the root is observed to consist of three lamina, viz. the cortical, which in the larger roots, is a quarter of an inch thick; the ligneous, about half an inch; and the medullary, which forms the centre, and is near an inch in diameter. This last is much softer than the other parts, and, when chewed, seems mucilaginous; a number of small fibres run longitudinally through it, and appear on the surface. The cortical and ligneous parts are divided by a black circular line. All the thicker pieces have small holes drilled through them, for the convenience of drying. Columbo-root has an aromatic smell, but is disagreeably bitter, and slightly pungent to the taste, somewhat resembling mustard seed, when it has lost, by long keeping, part of its essential oil. Yet, though ungrateful to the taste, when received into the stomach, it appears to be corroborant, antiseptic, sedative, and powerfully antiemetic. In the cholera morbus it alleviates the violent *tormina*, checks the purging and vomiting, corrects the putrid tendency of the bile, quiets the inordinate motions of the bowels, and speedily recruits the exhausted strength of the patient. It was administered to a great number of patients, sometimes upwards of 20 in a day, afflicted with the cholera morbus, by Mr Johnson of Chester, in 1756. He generally found that it soon stopped the vomiting, which was the most fatal symptom, and that the purging and remaining complaints quickly yielded to the same remedy. The dose he gave was from half a drachm to two drachms of the powder, every three or four hours, more or less according to the urgency of the symptoms Though this medicine possesses little or no astringency, it has been observed to be of great service in diarrhœas, and even in the dysentery. In the first stage of these disorders, where astringents would be hurtful, Columbo-root may be prescribed with safety; as, by its antispasmodic powers, the irregular actions of the primæ viæ are corrected. But as a cordial, tonic, and antiseptic remedy, it answers better when given towards their decline. Its efficacy has also been observed in the vomitings which attend the bilious cholic; and in such cases, where an emetic is thought necessary, after administering a small dose of ipecacuan, the stomach may be washed with an infusion of Columbo-root. This will tend to prevent those violent and convulsive retchings which in irritable habits abounding with bile are sometimes excited by the mildest emetic. In bilious fevers, 15 or 20 grains of this root, with an equal or double quantity of vitriolated tartar, given every four, five, or six hours, produce very beneficial effects. From its efficacy in these bilious diseases of this country, it is probable that it may be useful in the yellow fever of the West Indies, which is always attended with great sickness, violent retchings, and a copious discharge of bile. The vomiting recurs at short intervals, often becomes almost incessant, and an incredible quantity of bile is sometimes evacuated in a few hours. Children during dentition are often subject to severe vomitings and diarrhœas. In these cases the Columbo-root is an useful remedy, and hath often procured almost instant relief, when other remedies often efficacious have been tried in vain. This root is also extremely beneficial in a languid state of the stomach, attended with want of appetite, indigestion, nausea, and flatulence. It may be given either in substance, with some grateful aromatic, or infused in Madeira wine. Habitual vomiting, when it proceeds from a weakness or irritability of the stomach, from an irregular gout, acidities, acrimonious bile, or an increased and depraved secretion of the pancreatic juice, is greatly relieved by the use of Columbo-root, in conjunction with aromatics, chalybeates, or the testaceous powders. In the nausea and vomiting

vomiting occasioned by pregnancy, an infusion of Columbo-root succeeds better than any other medicine that hath been tried.

From Dr Percival's experiments on this root, it appears, that rectified spirit of wine extracts its virtues in the greatest perfection. The watery infusion is more perishable than that of other bitters. In 24 hours a copious precipitation takes place; and in two days it becomes ropy, and even musty. The addition of orange peel renders the infusion of Columbo-root less ungrateful to the palate. An ounce of the powdered root, half an ounce of orange peel, two ounces of French brandy, and 14 ounces of water, macerated 12 hours without heat, and then filtrated through paper, afford a sufficiently strong and tolerably pleasant infusion. The extract made first by spirit and then with water, and reduced by evaporation to a pilular consistence, is found to be equal, if not superior, in efficacy to the powder. As an antiseptic, Columbo-root is inferior to the bark; but, as a corrector of putrid gall, it is much superior; whence also it is probable that it would be of service in the West India yellow fever. It also restrains alimentary fermentation, without impairing digestion, in which property it resembles mustard. Hence its great service in preventing acidities. It hath also a remarkable power of neutralizing acids already formed. It doth not appear to have the least heating quality; and therefore may be used with propriety and advantage in the phthisis pulmonalis and in hectical cases, to correct acrimony and strengthen digestion. It occasions no disturbance, and agrees very well with a milk diet, as it abates flatulence, and is indisposed to acidity.

COLUMBO, a maritime town of the island of Ceylon in the East Indies, seated on the south-west part of its coast, and subject to the Dutch. E. Long. 68. 10. N. Lat. 7. 5.

COLUMBUS, or *Congregation of St COLUMBUS*, a society of regular canons, who formerly had 100 abbeys or monasteries in the British isles.

COLUMBUS, *Christopher*, a Genoese, the celebrated navigator, and first discoverer of the islands of America, was a subject of the republic of Genoa. Neither the time nor the place of his birth, however, are known with certainty; only he was descended of an honourable family, who, by various misfortunes, had been reduced to indigence. His parents were seafaring people; and Columbus having discovered, in his early youth, a capacity and inclination for that way of life, was encouraged by them to follow the same profession. He went to sea at the age of 14: his first voyages were to those ports in the Mediterranean frequented by the Genoese, after which he took a voyage to Iceland; and proceeding still further north, advanced several degrees within the polar circle. After this, Columbus entered into the service of a famous sea captain of his own name and family. This man commanded a small squadron, fitted out at his own expence; and by cruising, sometimes against the Mahometans, and sometimes against the Venetians, the rivals of his country in trade, had acquired both wealth and reputation. With him Columbus continued for several years, no less distinguished for his courage than his experience as a sailor. At length, in an obstinate engagement off the coast of Portugal, with some Venetian caravals returning richly laden from the Low Countries, the vessel on board which he served took fire, together with one of the enemies ships to which it was fast grappled. Columbus threw himself into the sea, laid hold of a floating oar, and by the support of it, and his dexterity in swimming, he reached the shore, though above two leagues distant.

After this disaster, Columbus repaired to Lisbon, where he married a daughter of Bartholomew Perestrello, one of the captains employed by Prince Henry in his early navigations, and who had discovered and planted the islands of Porto Santo and Madeira. Having got possession of the journals and charts of this experienced navigator, Columbus was seized with an irresistible desire of visiting unknown countries. In order to indulge it, he made a voyage to Madeira, and continued during several years to trade with that island, the Canaries, Azores, the settlements in Guinea, and all the other places which the Portuguese had discovered on the continent of Africa.

By the experience acquired in such a number of voyages, Columbus now became one of the most skilful navigators in Europe. At this time the great object of discovery was a passage by sea to the East Indies. This was attempted, and at last accomplished, by the Portuguese, by doubling the Cape of Good Hope. The danger and tediousness of the passage, however, supposing it to be really accomplished, which as yet it was not, set Columbus on considering whether a shorter and more direct passage to these regions might not be found out; and, after long consideration, he became thoroughly convinced, that, by sailing across the Atlantic ocean, directly towards the west, new countries, which probably formed a part of the vast continent of India, must infallibly be discovered. His reasons for this were, in the first place, a knowledge he had acquired of the true figure of the earth. The continents of Europe, Asia, and Africa, as far as then known, form but a small part of the globe. It was suitable to our ideas, concerning the wisdom and beneficence of the Author of Nature, to believe, that the vast space, still unexplored, was not entirely covered by a waste and barren ocean, but occupied by countries fit for the habitation of man. It appeared likewise extremely probable, that the continent on this side the globe was balanced by a proportional quantity of land in the other hemisphere. These conjectures were confirmed by the observations of modern navigators. A Portuguese pilot having stretched farther to the west than was usual at that time, took up a piece of timber, artificially carved, floating upon the sea; and as it was driven towards him by a westerly wind, he concluded that it came from some unknown land situated in that quarter. Columbus's brother-in-law had found to the west of the Madeira isles a piece of timber fashioned in the same manner, and brought by the same wind; and had seen also canes of an enormous size floating upon the waves, which resembled those described by Ptolemy as productions peculiar to the East Indies. After a course of westerly winds, trees torn up by the roots were often driven upon the coast of the Azores; and at one time the dead bodies of two men, with singular features, which resembled neither the inhabitants of Europe nor Africa, were cast ashore there. The most cogent

Columbus. cogent reason, however, was a mistaken notion of the ancient geographers concerning the immense extent of the continent of India. Though hardly any of them had penetrated beyond the river Ganges, some Greek writers had ventured to describe the provinces beyond that river, which they represented as regions of an immense extent. Ctesias affirmed that India was as large as all the rest of Asia. Onesicritus, whom Pliny the naturalist follows, contended that it was equal to a third part of the habitable earth. Nearchus asserted that it would take four months to march from one extremity of it to the other in a straight line. The journal of Marco Polo, who travelled into Asia in the 13th century, and who had proceeded towards the east far beyond the limits to which any European had ever advanced, seemed also so much to confirm these accounts, that Columbus was persuaded that the distance from the most westerly part of Europe to the most easterly part of Asia was not very considerable; and that the shortest, as well as most direct course to the remote regions of the east, was to be found by sailing due west.

In 1474, Columbus communicated his ideas on this subject to one Paul a physician in Florence, a man eminent for his knowledge in cosmography. He approved of the plan, suggested several facts in confirmation of it, and warmly encouraged Columbus to persevere in an undertaking so laudable, and which must redound so much to the honour of this country and the benefit of Europe. Columbus, fully satisfied of the truth of his system, was impatient to set out on a voyage of discovery. The first step towards this was to secure the patronage of some of the considerable powers of Europe capable of undertaking such an enterprise. He applied first to the republic of Genoa; but his countrymen, strangers to his abilities, inconsiderately rejected his proposal as the dream of a chimerical projector, and thus lost for ever the opportunity of restoring their commonwealth to its ancient lustre. His next application was to the court of Portugal, where King John II. listened to him in the most gracious manner, and referred the consideration of his plan to Diego Ortiz, bishop of Ceuta, and two Jewish physicians, eminent cosmographers, whom he was accustomed to consult in matters of this kind. Unhappily these were the persons who had been the chief directors of the Portuguese navigations, and had advised to search for a passage to India by steering a course directly opposite to that which Columbus had recommended as shorter and more certain. They could not therefore approve of his proposal, without submitting to the double mortification of condemning their own theory, and of acknowledging his superiority. The result of their conferences was, that they advised the king to fit out a vessel privately, in order to attempt the proposed discovery, by following exactly the course which Columbus seemed to point out. John, forgetting on this occasion the sentiments of a monarch, meanly adopted this perfidious counsel. But the pilot chosen to execute Columbus's plan had neither the genius nor fortitude of its author. Contrary winds arose; no sign of approaching land appeared; his courage failed; and he returned to Lisbon, execrating the project as equally extravagant and dangerous.

On discovering this dishonourable transaction, Columbus immediately quitted Portugal, and applied to the king of Spain; but lest he should be here again disappointed, he sent his brother Bartholomew into England, to whom he had fully communicated his ideas, in order that he might negociate at the same time with Henry VII. who was reckoned one of the most sagacious as well as opulent princes of Europe. Bartholomew was very unfortunate in his voyage: he fell into the hands of pirates, who stripped him of every thing, and detained him a prisoner for several years. At last he made his escape, and arrived in London, but in such extreme indigence that he was obliged to employ himself, during a considerable time, in drawing and selling maps, in order to pick up as much money as would purchase a decent dress in which he might venture to appear at court. The proposals were received by Henry with more approbation than by any monarch to whom they had hitherto been presented.

Columbus himself made his proposals to the king of Spain, not without many doubts of success, which soon appeared to be well founded. True science had as yet made so little progress in the kingdom of Spain, that most of those to whom the consideration of his plan was referred were utterly ignorant of the first principles on which he founded his hopes. Some, from mistaken notions concerning the dimensions of the globe, contended that a voyage to those remote regions of the east which Columbus expected to discover, could not be performed in less than three years. Others concluded, that either he would find the ocean of infinite extent, according to the opinion of some ancient philosophers; or that if he should persist in steering westwards beyond a certain point, the convex figure of the globe must infallibly prevent his return; and he must perish in the vain attempt to unite the two opposite hemispheres, which nature had for ever disjoined. Even without deigning to enter into any particular discussion, some rejected the scheme in general, upon the credit of a maxim made use of by the ignorant in all ages, "That it is presumptuous in any person to suppose that he alone possesses knowledge superior to all the rest of mankind united." By continual disappointments and delays, he was at last wearied out, and resolved to repair to the court of England in person, in hopes of meeting with a favourable reception there. He had already made preparations for this purpose, and taken measures for the disposal of his children during his absence, when Juan Perez, the prior of the monastery of Rabida near Palos, in which they had been educated, earnestly solicited him to defer his journey for a short time. Perez was a man of considerable learning, and some credit with Queen Isabella. To her therefore he applied; and the consequence of his application was a gracious invitation to Columbus back to court, accompanied with the present of a small sum to equip him for the journey. Ferdinand, however, still regarded the project as chimerical; and had the address to employ, in this new negociation with him, some of the persons who had formerly pronounced his scheme to be impracticable. To their astonishment, Columbus appeared before them with the same confident hopes of success as formerly, and insisted

insisted on the same high recompense. He proposed that a small fleet should be fitted out, under his command, to attempt the discovery; and demanded to be appointed perpetual and hereditary admiral and viceroy of all the seas and lands which he should discover; and to have the tenth of the profits arising from them settled irrevocably upon him and his descendants for ever. At the same time he offered to advance the eighth part of the sum necessary for accomplishing his design, on condition that he should be entitled to a proportional share in the adventure. If the enterprise should totally miscarry, he made no stipulation for any reward or emolument whatever. These demands were thought unreasonable; Isabella broke off the treaty she had begun, and Columbus was once more disappointed. He now resolved finally to leave Spain; and had actually proceeded some leagues on his journey, when he was overtaken by a messenger from Isabella, who had been prevailed upon by the arguments of Quintanilla and Santangel, two of Columbus's patrons, again to favour his undertakings. The negociation now went forward with all manner of facility and dispatch; and a treaty with Columbus was signed on the 17th of April 1492. The chief articles of it were, that Columbus should be constituted high admiral in all the seas, islands, and continents he should discover, with the same powers and prerogatives that belonged to the high admiral of Castile within the limits of his jurisdiction. He was also appointed viceroy in all those countries to be discovered; and a tenth of the products accruing from their productions and commerce was granted to him for ever. All controversies or law-suits with respect to mercantile transactions were to be determined by the sole authority of Columbus, or of judges to be appointed by him. He was also permitted to advance one eighth part of the expence of the expedition, and of carrying on commerce with the new countries; and was entitled, in return, to an eighth part of the profit. But though the name of Ferdinand was joined with Isabella in this transaction, his distrust of Columbus was still so violent, that he refused to take any part in the enterprise as king of Arragon; and as the whole expence of the expedition was to be defrayed by the crown of Castile, Isabella reserved for her subjects of that kingdom an exclusive right to all the benefits which might accrue from its success.

At last our adventurer set sail with three small ships, the whole expence of which did not exceed 4000l. During his voyage he met with many difficulties from the mutinous and timid disposition of his men. He was the first who observed the variation of the compass, which threw the sailors into the utmost terror. For this phenomenon Columbus was obliged to invent a reason, which, though it did not satisfy himself, yet served to dispel their fears, or silence their murmurs. At last, however, the sailors lost all patience; and the admiral was obliged to promise solemnly, that in case land was not discovered in three days he should return to Europe. That very night, however, the island of San Salvador was discovered, which quickly put an end to all their fears. The sailors were then as extravagant in the praise of Columbus as they had before been insolent in reviling and threatening him. They threw themselves at his feet, implored his pardon, and pronounced him to be a person inspired by heaven with more than human sagacity and fortitude, in order to accomplish a design so far beyond the ideas and conception of all former ages. Having visited several of the West India islands, and settled a colony in Hispaniola *, he again set sail for Spain; and after escaping great dangers from violent tempests, arrived at the port of Palos on the 15th of March 1493.

* See *Hispaniola*.

As soon as Columbus's ship was discovered approaching, all the inhabitants of Palos ran eagerly to the shore, where they received the admiral with royal honours. The court was then at Barcelona, and Columbus took care immediately to acquaint the king and queen of his arrival. They were no less delighted than astonished with this unexpected event. They gave orders for conducting him into the city with all imaginable pomp. They received him clad in their royal robes, and seated on a throne under a magnificent canopy. When he approached, they stood up; and, raising him as he kneeled to kiss their hands, commanded him to take his seat upon a chair prepared for him, and give a circumstantial account of his voyage. When he had finished his oration, which he delivered with much modesty and simplicity, the king and queen, kneeling down, offered up solemn thanks to God for the discovery. Every possible mark of honour that could be suggested by gratitude or admiration was conferred on Columbus; the former capitulation was confirmed, his family was ennobled, and a fleet was ordered to be equipped, to enable him to go in quest of those more opulent countries which he still confidently expected to find.

Notwithstanding all this respect, however, Columbus was no longer regarded than he was successful. The colonists he carried over with him were to the last degree unreasonable and unmanageable; so that he was obliged to use some severities with them; and complaints were made to the court of Spain against him for cruelty. On this, Francis de Bovadilla, a knight of Calatrava, was appointed to inquire into the conduct of Columbus; with orders, in case he found the charge of maladministration proved, to supersede him, and assume the office of governor of Hispaniola. The consequence of this was, that Columbus was sent to Spain in chains. From these, however, he was freed immediately on his arrival, and had an opportunity granted him of vindicating his innocence. He was, however, deprived of all power; and notwithstanding his great services, and the solemnity of the agreement between him and Ferdinand, Columbus never could obtain the fulfilment of any part of that treaty. At last, disgusted with the ingratitude of a monarch whom he had served with such fidelity and success, and exhausted with fatigues, he ended his life on the 29th of May 1506.

COLUMBUS, *Bartholomew*, brother to Christopher, famous for his marine charts and spheres, which he presented to Henry VII. of England. He died in 1514.

COLUMBUS, *Don Ferdinand*, son of Christopher, and writer of his life. He entered into the ecclesiastical state; and founded a library, which he bequeathed to the church of Seville, to this day called the *Columbine library*. He died in 1560.

COLUMELLA, LUCIUS JUNIUS MODERATUS, a Roman

Roman philosopher, was a native of Cadiz, and lived under the emperor Claudius, about the year 42. He wrote a book on agriculture, entitled *De Re Rustica*, and another *De Arboribus*.

COLUMEY, a town of Red Russia in Poland, seated on the river Pruth, towards the confines of Moldavia, about 38 miles from Halicz, and 63 south of Leopol. This town has been very ill treated by the Cossacks, insomuch that it is now inconsiderable, though there are several mines of salt in its district. E. Long. 16. 25. N. Lat. 48. 45.

COLUMN, in *Architecture*, a round pillar made to support and adorn a building, and composed of a base, a shaft, and capital. See ARCHITECTURE, N° 33.

COLUMNS, *denominated from their use*.—Astronomical column is a kind of observatory, in form of a very high tower built hollow, and with a spiral ascent to an armillary sphere placed a-top for observing the motions of the heavenly bodies. Such is that of the Doric order erected at the Hotel de Soissons at Paris, by Catharine de Medicis, for the observations of Orontius Fineus, a celebrated astronomer of that time.

Chronological COLUMN, that which bears some historical inscription digested according to the order of time; as by lustres, olympiads, fasti, epochas, annals, &c. At Athens, there were columns of this kind, whereon was inscribed the whole history of Greece digested into olympiads.

Funeral COLUMN, that which bears an urn, wherein are supposed to be inclosed the ashes of some deceased hero; and whose shaft is sometimes overspread with tears and flames, which are symbols of grief and of immortality.

Gnomonic COLUMN, a cylinder whereon the hour of the day is represented by the shadow of a stile. See DIAL.

Historical COLUMN, is that whose shaft is adorned with a basso-relievo, running in a spiral line its whole length, and containing the history of some great personage: such are the Trajan and Antonine columns at Rome.

Hollow COLUMN, that which has a spiral staircase withinside for the convenience of ascending to the top; as the Trajan column, the staircase whereof consists of 185 steps, and is illuminated by 43 little windows, each of which is divided by tambours of white marble. The monument, or fire-column at London, has also a staircase; but it does not reach to the top. These kinds of columns are also called *columnæ, coclideæ*, or *cochlideæ*.

Indicative COLUMN, that which serves to show the tides, &c. along the sea-coasts. Of this kind there is one at Grand Cairo of marble, on which the overflowings of the Nile are expressed; by this they form a judgment of the succeeding seasons; when the water, for instance, ascends to 23 feet, it is a sign of great fertility in Egypt. See NILOMETER.

Instructive COLUMN, that raised, according to Josephus, lib. i. cap. 3. by the sons of Adam, whereon were engraven the principles of arts and sciences. Baudelot tells us, that the son of Pisistratus raised another of this kind, of stone, containing the rules and precepts of agriculture.

Itinerary COLUMN, a column with several faces, placed in the cross ways in large roads; serving to show the different routes by inscriptions thereon.

Lactary COLUMN, at Rome, according to Festus, was a column erected in the herb-market, now the place *Montanara*, which had a cavity in its pedestal, wherein young children abandoned by their parents, out of poverty or inhumanity, were exposed, to be brought up at the public expence.

Legal COLUMN. Among the Lacedæmonians there were columns raised in public places, whereon were engraven the fundamental laws of the state.

Limitrophous or *Boundary* COLUMN, that which shows the limits of a kingdom or country conquered. Such was that which Pliny says Alexander the Great erected at the extremity of the Indies.

Manubiary COLUMN, from the Latin *manubiæ*, "spoils of the enemy;" a column adorned with trophies built in imitation of trees, whereon the spoils of enemies were anciently hung. See TROPHY.

Memorial COLUMN, that raised on occasion of any remarkable event, as the monument of London, built to perpetuate the memory of the burning of that city in 1666. It is of the Doric order, fluted, hollow, with a winding staircase; and terminated a-top with waving flames. There is also another of the kind, in form of an obelisk, on the banks of the Rhine in the Palatinate, in memory of the famous passage of that river by the great Gustavus Adolphus and his army.

Menian COLUMN, any column which supports a balcony or meniana. The origin of this kind of column, Suetonius and Ascanius refer to one Menias; who having sold his house to Cato and Flaccus, consuls, to be converted into a public edifice, reserved to himself the right of raising a column withoutside, to bear a balcony, whence he might see the shows.

Military COLUMN, among the Romans, a column whereon was engraven a list of the forces in the Roman army, ranged by legions, in their proper order; with design to preserve the memory of the number of soldiers, and of the order preserved in any military expedition. They had another kind of military column, which they called *columna bellica*, standing before the temple of Janus; at the foot whereof the consul declared war by throwing a javelin towards the enemies countries.

Milliary COLUMN, was a column of marble raised by order of Augustus in the middle of the Roman forum; from whence, in the centre, the distances of the several cities, &c. of the empire were reckoned, by other milliary columns disposed at equal distances on all the grand roads. This column was of white marble, the same with that which is now seen on the ballustrade of the perron of the capitol at Rome. Its proportion is massive, being a short cylinder, the symbol of the globe of the earth. It was called *milliarium aureum*, as having been gilt, at least the ball, by order of Augustus. It was restored by the emperors Vespasian and Adrian, as appears by the inscriptions.

Sepulchral COLUMN, anciently was a column erected on a tomb or sepulchre, with an inscription on its base. Those over the tombs of persons of distinction were very large; those for the common people small; these last are called *stelæ* and *cippi*.

Statuary COLUMN, that which supports a statue. Such was that erected by Pope Paul V. on a pedestal before the

the church of St Maria at Rome; to ſupport a ſtatue of the Virgin, which is of gilt braſs. This column was dug up in the temple of Peace; its ſhaft is a ſingle block of white marble 49¼ feet high, and five feet eight inches diameter, of the Corinthian order.

The term *ſtatuary column* may likewiſe be applied to Caryatides, Perſians, termini, and other human figures, which do the office of columns; and which Vitruvius calls *telamones* and *atlantes*. See ARCHITECTURE, N° 54.

Triumphal COLUMN, a column erected among the ancients in honour of a hero; the joints of the ſtones, or courſes whereof, were covered with as many crowns as he had made different military expeditions. Each crown had its particular name, as *vallaris*, which was beſet with ſpikes, in memory of having forced a paliſade. *Muralis*, adorned with little turrets, or battlements, for having mounted an aſſault. *Navalis*, of prows and beaks of veſſels; for having overcome at ſea. *Obſidionalis*, or *graminalis*, of graſs; for having raiſed a ſiege. *Ovans*, of myrtle; which expreſſed an ovation, or little triumph; and *triumphalis*, of laurel, for a grand triumph. See CROWN.

COLUMNARIUM, in Roman antiquity, a heavy tribute demanded for every pillar of a houſe. It was firſt laid on by Julius Cæſar, in order to put a ſtop to the extravagant expences laid out on ſumptuous buildings.

COLUMNEA. See BOTANY *Index*.

COLUMNIFERI, in *Botany*, an order of plants in the *fragmenta methodi naturalis* of Linnæus. See BOTANY *Index*.

COLURES, in *Aſtronomy* and *Geography*, two great circles ſuppoſed to interſect each other at right angles in the poles of the world, and to paſs through the ſolſtitial and equinoctial points of the ecliptic. See GEOGRAPHY.

COLURI, a little iſland in the gulf of Engia, in the Archipelago, formerly called *Salamis*. The principal town is of the ſame name, and ſeated to the ſouth ſide, at the bottom of the harbour, which is one of the fineſt in the world. The famous Grecian hero, Ajax, who makes ſuch a figure in Homer's Iliad, was king of this iſland. It is now, however, but a poor place; its commodities conſiſt of wheat, barley, tar, roſin, pit-coal, ſponges, and pot-aſhes, which they carry to Athens. It is ſeven miles ſouth from Athens, and is ſeparated from the continent by a ſtrait about a mile over.

COLUTEA, BASTARD-SENA. See BOTANY *Index*.

COLYBA, or COLYBUS; a term in the Greek liturgy, ſignifying an offering of corn and boiled pulſe, made in honour of the ſaints, and for the ſake of the dead.

Balſamon, P. Goar, Leo Allatius, and others, have written on the ſubject of *colybæ*; the ſubſtance of what they have ſaid is as follows: The Greeks boil a quantity of wheat, and lay it in little heaps on a plate; adding beaten peas, nuts cut ſmall, and grape-ſtones, which they divide into ſeveral compartments, ſeparated from each other by leaves of parſley. A little heap of wheat, thus ſeaſoned, they call κολυϐα. They have a particular formula for the benediction of the *colybæ*, wherein, praying that the children of Babylon may be fed with pulſe, and that they may be in better condition than other people, they deſire God to bleſs thoſe fruits, and thoſe who eat them, becauſe offered to his glory, to the honour of ſuch a ſaint, and in memory of the faithful deceaſed. Balſamon refers the inſtitution of this ceremony to St Athanaſius; but the Greek Synaxary to the time of Julian the apoſtate.

COLYMBUS, a genus of birds belonging to the order of anſeres. See ORNITHOLOGY *Index*.

COM, a town of Aſia in the empire of Perſia, and province of Irac-agemi. It is a large populous place, but has ſuffered greatly by the civil wars. E. Long. 51. 56. N. Lat. 34. 5.

COMA, or COMA-VIGIL, a preternatural propenſity to ſleep, when, nevertheleſs, the patient does not ſleep, or if he does, awakes immediately without any relief. See MEDICINE *Index*.

COMA *Berenices*, Berenice's hair, in *Aſtronomy*, a modern conſtellation of the northern hemiſphere, compoſed of unformed ſtars between the Lion's tail and Bootes. This conſtellation is ſaid to have been formed by Conon, an aſtronomer, in order to conſole the queen of Ptolemy Euergetes for the loſs of a lock of her hair, which was ſtolen out of the temple of Venus, where ſhe had dedicated it on account of a victory obtained by her huſband. The ſtars of this conſtellation, in Tycho's Catalogue, are fourteen; in Hevelius's, twenty-one; and in the Britannic Catalogue, forty-three.

COMA *Somnolentum*, is when the patient continues in a profound ſleep; and, when awakened, immediately relapſes, without being able to keep open his eyes.

COMARUM, MARSH-CINQUEFOIL. See BOTANY *Index*.

COMB, an inſtrument to clean, untangle, and dreſs flax, wool, hair, &c.

Combs for wool are prohibited to be imported into England.

COMB is alſo the creſt, or red fleſhy tuft, growing upon a cock's head.

COMBAT, in a general ſenſe, denotes an engagement, or a difference decided by arms. See BATTLE.

COMBAT, in our ancient law, was a formal trial of ſome doubtful cauſe or quarrel, by the ſwords or baſtons of two champions. This form of proceeding was very frequent, not only in criminal but in civil cauſes; being built on a ſuppoſition that God would never grant the victory but to him who had the beſt right. The laſt trial of this kind in England was between Donald Lord Reay appellant, and David Ramſay, Eſq. defendant, when, after many formalities, the matter was referred to the king's pleaſure. See the article BATTLE.

COMBINATION, properly denotes an aſſemblage of ſeveral things, two by two.

COMBINATION, in *Mathematics*, is the variation or alteration of any number of quantities, letters, or the like, in all the different manners poſſible. See CHANGES.

Aphoriſms. I. In all combinations, if from an arithmetic decreaſing ſeries, whoſe firſt term is the number out of which the combinations are to be formed, and whoſe common difference is 1, there be taken as many terms as there are quantities to be combined, and theſe

terms

Combination.

terms be multiplied into each other; and if from the series, 1, 2, 3, 4, &c. there may be taken the same number of terms, and they be multiplied into each other; and the first product be divided by the second; the quotient will be the number of combinations required. Therefore, if you would know how many ways four quantities can be combined in seven, multiply the first four terms of the series, 7, 6, 5, 4, &c. together, and divide the product, which will be 840, by the product of the first four terms of the series, 1, 2, 3, 4, &c. which is 24, and the quotient 35 will be the combination of 4 in 7. II. In all permutations, if the series 1, 2, 3, 4, &c. be continued to as many terms as there are quantities to be changed, and those terms be multiplied into each other; the product will be the number of permutations sought. Thus, if you would know how many permutations can be formed with five quantities, multiply the terms 1, 2, 3, 4, 5, together, and the product 120 will be the number of all the permutations.

Problems. I. To find the number of changes that may be rung on 12 bells. It appears by the second aphorism, that nothing more is necessary here than to multiply the numbers from 1 to 12 continually into each other, in the following manner, and the last product will be the number sought.

```
        1
        2
        2
        3
        6
        4
       24
        5
      120
        6
      720
        7
     5040
        8
    40320
        9
   362880
       10
  3628800
       11
 39916800
       12
479,001,600
```

II. Suppose the letters of the alphabet to be wrote so small that no one of them shall take up more space than the hundredth part of a square inch: to find how many square yards it would require to write all the permutations of the 24 letters in that size. By following the same method as in the last problem, the number of permutations of the 24 letters will be found to be 62,044,840,173,323,943,936,000. Now the inches in a square yard being 1296, that number multiplied by 100 gives 129,600, which is the number of letters each square yard will contain; therefore if we divide 62,044,840,173,323,943,936,000 by 129600, the quotient, which is 478,741,050,720,092,160, will be the number of yards required, to contain the above-mentioned number of permutations. But as all the 24 letters are contained in every permutation, it will require a space 24 times as large; that is, 11,489,785,217,282,211,840. Now the number of square yards contained on the surface of the whole earth is but 617,197,435,008,000, therefore it would require a surface 18620 times as large as that of the earth to write all the permutations of the 24 letters in the size above mentioned.

III. To find how many different ways the eldest hand at picquet may take in his five cards. The eldest hand having 12 cards dealt him, there remain 20 cards, any five of which may be in those he takes in; consequently we are here to find how many ways five cards may be taken out of 20. Therefore, by aphorism I. if we multiply 20, 19, 18, 17, 16, into each other, which will make 1860480, and that number be divided by 1, 2, 3, 4, 5, multiplied into each other, will make 120, the quotient, which is 15504, will be the number of ways five cards may be taken out of 20. From hence it follows, that it is 15503 to 1, that the eldest hand does not take in any five certain cards.

IV. To find the number of deals a person may play at the game of whist, without ever holding the same cards twice. The number of cards played with at whist being 52, and the number dealt to each person being 13, it follows, that by taking the same method as in the last experiment, that is, by multiplying 52 by 51, 50, &c, so on to 41, which will make 3,954,242,643,911,239,680,000, and then dividing that sum by 1, 2, 3, &c. to 13, which will make 6,227,020,800, the quotient, which is 635,013,559,600 will be the number of different ways 13 cards may be taken out of 52, and consequently the number sought.

The ARITHMETIC TRIANGLE;

or TABLE *for* COMBINATIONS.

Rank												
	A	B										
1	1											
2	2.	1										
3	3.	3.	1									
4	4.	6.	4.	1								
5	5.	10.	10.	5.	1							
6	6.	15.	20.	15.	6.	1						
7	7.	21.	35.	35.	21.	7.	1					
8	8.	28.	56.	70.	56.	28.	8.	1				
9	9.	36.	84.	126.	126.	84.	36.	9.	1			
10	10.	45.	120.	210.	252.	210.	120.	45.	10.	1		
11	11.	55.	165.	330.	462.	462.	330.	165.	55.	11.	1	
12 *a*	12.	66.	220.	495.	792.	924.	792.	495.	220.	66.	12.	1 *b*
			c									

The

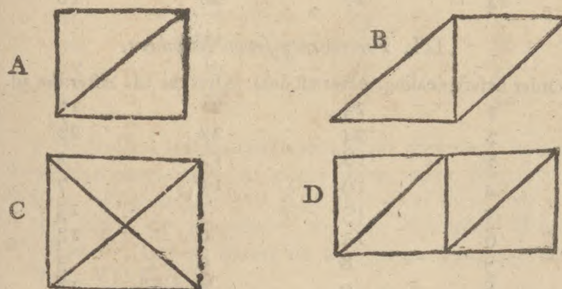
The construction of this table is very simple. The line A *a* consists of the first 12 numbers. The line A *b* consists everywhere of units; the second term 3, of the line B *c*, is composed of the two terms 1 and 2 in the preceding rank: the third term 7, in that line, is formed of the two terms 3 and 3 in the preceding rank: and so of the rest; every term, after the first, being composed of the two next terms in the preceding rank: and by the same method it may be continued to any number of ranks. To find by this table how often any number of things can be combined in another number, under 13, as suppose five cards out of 8: in the eighth rank look for the fifth term, which is 56, and that is the number required.

Though we have shown in the foregoing problems the manner of finding the combination of all numbers whatever, yet as this table answers the same purpose, for small numbers, by inspection only, it will be found useful on many occasions; as will appear by the following examples.

V. To find how many different sounds may be produced by striking on a harpsichord two or more of the seven natural notes at the same time. 1. The combinations of two in seven, by the foregoing triangle are, - - - - 21
2. The combinations of 3 in 7, are - - 35
3. The combinations of 4 in 7, are - - 35
4. The combinations of 5, are - - - 21
5. The combinations of 6, are - - - 7
6. The seven notes altogether once, - - 1

Therefore the number of all the sounds will be 120

VI. Take four square pieces of pasteboard, of the same dimensions, and divide them diagonally, that is, by drawing a line from two opposite angles, as in the figures, into 8 triangles; paint 7 of these triangles with the primitive colours, red, orange, yellow, green, blue, indigo, violet, and let the eighth be white. To find how many chequers or regular four-sided figures, different either in form or colour, may be made out of those eight triangles. First, by combining two of these triangles, there may be formed either the triangular square A, or the inclined square B called a *rhomb*. Secondly, by combining four of the triangles, the large square C may be formed; or the long square D, called a *parallelogram*.



Now the first two squares, consisting of two parts out of 8, they may each of them, by the eighth rank of the triangle, be taken 28 different ways, which makes 56. And the last two squares, consisting of four parts, may each be taken by the same rank of the triangle 70 times, which makes - - 140
To which add the foregoing number - - 56

And the number of the different squares that may be formed of the 8 triangles will be } 196

VII. A man has 12 different sorts of flowers, and a large number of each sort. He is desirous of setting them in beds or flourishes in his parterre: Six flowers in some, 7 in others, and 8 in others; so as to have the greatest variety possible; the flowers in no two beds to be the same. To find how many beds he must have. 1. The combinations of 6 in 12 by the last rank of the triangle, are - - - 924
2. The combinations of 7 in 12, are - 792
3. The combinations of 8 in 12, are - 495

Therefore the number of beds must be - 2211

VIII. To find the number of chances that may be thrown on two dice. As each die has six faces, and as each face of one die may be combined with all the faces of the others, it follows that 6 multiplied by 6, that is, 36, will be the number of all the chances; as is also evident from the following table:

Points.							Numb. of chances.	Numb. of points.
2	1.1						1	2
3	2.1	1.2					2	6
4	2.2	3.1	1.3				3	12
5	4.1	1.4	3.2	2.3			4	20
6	3.3	5.1	1.5	4.2	2.4		5	30
7	6.1	1.6	5.2	2.5	4.3	3.4	6	42
8	4.4	6.2	2.6	5.3	3.5		5	40
9	6.3	3.6	5.4	4.5			4	36
10	5.5	6.4	4.6				3	30
11	6.5	5.6					2	22
12	6.6						1	12
							36	252

It appears by this table, 1. That the number of chances for each point continually increases to the point of seven, and then continually decreases till 12: therefore if two points are proposed to be thrown, the equality, or the advantage of one over the other, is clearly visible (A). 2. The whole number of chances on the dice being 252, if that number be divided by 36, the number of different throws on the dice, the quotient is 7: it follows therefore, that at every throw there is an equal chance of bringing seven points. 3. As there are 36 chances on the dice, and only 6 of them doublets, it is 5 to 1, at any one throw, against throwing a doublet.

By

(A) It is easy from hence to determine whether a bet proposed at hazard, or any other game with the dice, be advantageous or not; if the dice be true (which, by the way, is rarely the case for any long time together, as it is so easy for those that are possessed of a dexterity of hand to change the true dice for false).

Combination.

By the same method the number of chances upon any number of dice may be found: for if 36 be multiplied by 6, that product, which is 216, will be the chances on 3 dice; and if that number be multiplied by 6, the product will be the chances of 4 dice, &c.

COMBINATIONS of the Cards. The following experiments, founded on the doctrine of combinations, may possibly amuse a number of our readers. The tables given are the basis of many experiments, as well on numbers, letters, and other subjects, as on the cards; but the effect produced by them with the last is the most surprising, as that which should seem to prevent any collusion, that is, the shuffling of the cards, is on the contrary the cause from whence it proceeds.

It is a matter of indifference what numbers are made use of in forming these tables. We shall here confine ourselves to such as are applicable to the subsequent experiments. Any one may construct them in such manner as is agreeable to the purposes he intends they shall answer.

To make them, for example, correspond to the nine digits and a cipher, there must be ten cards, and at the top of nine of them must be written one of the digits, and on the tenth a cipher. These cards must be placed upon each other in the regular order, the number 1 being on the first, and the cipher at bottom. You then take the cards in your left hand, as is commonly done in shuffling, and taking off the two top cards 1 and 2, you place the two following, 3 and 4, upon them; and under those four cards the three following 5, 6, and 7; at the top you put the cards 8 and 9, and at the bottom the card marked 0; constantly placing in succession 2 at top and 3 at bottom: And they will then be in the following order:

8.9..3.4..1.2...5.6.7..0

If you shuffle them a second time, in the same manner, they will then stand in this order:

6.7..3.4..8.9..1.2.5.7..0

Thus, at every new shuffle they will have a different order, as is expressed in the following lines:

1 shuffle	8.9.3.4.1.2.5.6.7.0
2	6.7.3.4.8.9.1.2.5.0
3	2.5.3.4.6.7.8.9.1.0
4	9.1.3.4.2.5.6.7.8.0
5	7.8.3.4.9.1.2.5.6.0
6	5.6.3.4.7.8.9.1.2.0
7	1.2.3.4.5.6.7.8.9.0

It is a remarkable property of this number, that the cards return to the order in which they were first placed, after a number of shuffles, which added to the number of columns that never change the order, is equal to the number of cards. Thus the number of shuffles is 7, and the number of columns in which the cards marked 3, 4, &c. never change their places is 3, which are equal to 10, the number of the cards. This property is not common to all numbers; the cards sometimes returning to the first order in a less number, and sometimes in a greater number of shuffles than that of the cards.

Combination.

TABLES of COMBINATIONS,

Constructed on the foregoing principles.

I. *For ten Numbers.*

Order before dealing.	After 1st deal.	After the 2d.	After the 3d.
1	8	6	2
2	9	7	5
3	3	3	3
4	4	4	4
5	1	8	6
6	2	9	7
7	5	1	8
8	6	2	9
9	7	5	1
0	0	0	0

These tables, and the following examples at piquet, except the 36th, appear to have been composed by M. Guyot.

II. *For twenty-four Numbers.*

Order before dealing.	After 1st deal.	After the 2d.	After the 3d.
1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	15
11	1	23	21
12	2	24	22
13	5	13	5
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16

III. *For twenty-seven Numbers.*

Order before dealing.	After 1st deal.	After the 2d.	After the 3d.
1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	16
11	1	13	21
12	2	24	22
13	5	13	5

Order before dealing.	After 1ſt deal.	After the 2d.	After the 3d.
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16
25	25	25	25
26	26	26	26
27	27	27	27

IV. *For Thirty-two Numbers.*

Order before dealing.	After 1ſt deal.	After the 2d.	After the 3d.
1	28	26	22
2	29	27	25
3	23	17	7
4	24	20	12
5	18	10	9
6	19	11	3
7	13	1	28
8	14	2	29
9	8	14	2
10	9	8	14
11	3	23	17
12	4	24	20
13	1	28	26
14	2	29	27
15	5	18	10
16	6	19	11
17	7	13	1
18	10	9	8
19	11	3	23
20	12	4	24
21	15	5	18
22	16	6	19
23	17	7	13
24	20	12	4
25	21	15	5
26	22	16	6
27	25	21	15
28	26	22	16
29	27	25	21
30	30	30	30
31	31	31	31
32	32	32	32

I. " Several letters that contain no meaning, being " written upon cards, to make them, after they have " been twice ſhuffled, to give an anſwer to a queſtion " that ſhall be propoſed; as, for example, *What* " *is love?*" Let 24 letters be written on as many cards

which, after they have been twice ſhuffled, ſhall give the following anſwer :

A dream of joy that ſoon is oe'r.

Firſt write one of the letters in that line on each of the cards (B). Then write the anſwer on a paper, and aſſign one of the 24 firſt numbers to each card, in the following order :

A D R E A M O F J O Y T H A T S O O N
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
I S O'E R.
20 21 22 23 24

Next write on another paper a line of numbers from 1 to 24, and looking in the table for 24 combinations, you will ſee that the firſt number after the ſecond ſhuffle is 21; therefore the card that has the firſt letter of the anſwer, which is A, muſt be placed againſt that number, in the line of numbers you have juſt made (C). In like manner the number 22 being the ſecond of the ſame column, indicates that the card which anſwers to the ſecond letter D of the anſwer, muſt be placed againſt that number; and ſo of the reſt. The cards will then ſtand in the following order :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 18 19
O O F S A M N T O I S R H A E O'E J

20 21 22 23 24
R A D Y T

From whence it follows, that after theſe cards have been twice ſhuffled, they muſt infallibly ſtand in the order of the letters in the anſwer.

Obſerve. 1. You ſhould have ſeveral queſtions, with their anſwers, conſiſting of 24 letters, written on cards; theſe cards ſhould be put in caſes and numbered, that you may know to which queſtion each anſwer belongs. You then preſent the queſtions; and when any one of them is choſen, you pull out the caſe that contains the anſwer, and ſhowing that the letters written on them make no ſenſe, you then ſhuffle them, and the anſwer becomes obvious.

2. To make this experiment the more extraordinary, you may have three cards, on each of which an anſwer is written; one of which cards muſt be a little wider, and another a little longer, than the others. You give theſe three cards to any one, and when he has privately choſen one of them, he gives you the other two, which you put in your pocket without looking at them, having diſcovered by feeling which he has choſen. You then pull out the caſe that contains the cards that anſwer to his queſtion, and perform as before.

3. You may alſo contrive to have a long card at the bottom after the ſecond ſhuffle. The cards may be then cut ſeveral times, till you perceive by the touch that the long card is at bottom, and then give the anſwer;

(B) Theſe letters ſhould be written in capitals on one of the corners of each card, that the words may be eaſily legible when the cards are ſpread open.

(C) For the ſame reaſon, if you would have the anſwer after one ſhuffle, the cards muſt be placed according to the firſt column of the table; or if after three ſhuffles, according to the third column.

ſwer; for the repeated cuttings, however often, will make no alteration in the order of the cards.

The ſecond of theſe obſervations is applicable to ſome of the ſubſequent experiments, and the third may be practiſed in almoſt all experiments with the cards. You ſhould take care to put up the cards as ſoon as the anſwer has been ſhewn; ſo that if any one ſhould deſire the experiment to be repeated, you may offer another queſtion, and pull out thoſe cards that contain the anſwer.

Though this experiment cannot fail of exciting at all times pleaſure and ſurpriſe, yet it muſt be owned that a great part of the applauſe it receives ariſes from the addreſs with which it is performed.

II. "The 24 letters of the alphabet being written "upon ſo many cards, to ſhuffle them, and pronounce "the letters ſhall then be in their natural order; but "that not ſucceeding, to ſhuffle them a ſecond time, "and then ſhow them in proper order." Write the 24 letters on the cards in the following order:

1 2 3 4 5 6 7 8 9 10 11 12
R S H Q E F T P G U X C

13 14 15 16 17 18 19 20 21 22 23 24
N O D Y Z I K & A B L M

The cards being diſpoſed in this manner, ſhow them upon the table, that it may appear they are promiſcuouſly marked. Then ſhuffle and lay them again on the table, pronouncing that they will be then in alphabetical order. Appear to be ſurpriſed that you have failed; take them up again, and give them a ſecond ſhuffle, and then counting them down on the table they will all be in their natural order.

III. "Several letters being written promiſcuouſly "upon 32 cards, after they have been once ſhuffled, "to find in a part of them a queſtion; and then ſhuf"fling the remainder a ſecond time, to ſhow the an"ſwer. Suppoſe the queſtion to be, *What is each Bri-* "*ton's boaſt?* and the anſwer, *His liberty;* which "taken together contain 32 letters."

After you have written thoſe letters on 32 cards, write on a paper the words, *his liberty*, and annex to the letters the firſt ten numbers thus:

H I S L I B E R T Y.
1 2 3 4 5 6 7 8 9 10

Then have recourſe to the table of combinations for ten numbers, and apply the reſpective numbers to them in the ſame manner as in experiment I. taking the firſt column, as theſe are to be ſhuffled only once according to that order.

1 2 3 4 5 6 7 8 9 10
I B S L E R T H I Y

This is the order in which theſe cards muſt ſtand after the whole number 32 has been once ſhuffled, ſo that after a ſecond ſhuffle they may ſtand in their proper order. Next diſpoſe the whole number of letters according to the firſt column for 32 letters; the laſt ten are to be here placed in the order above; as follows:

W H A T I S E A C H B R I T O N'S
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

B O A S T?
18 19 20 21 22

I B S L E R T H I Y
23 24 25 26 27 28 29 30 31 32

Therefore, by the firſt column of the table, they will next ſtand thus:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
I T B R O N S C H B O A E A S T *long card.*

17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
I I S B S L I B E R T W H H I Y

You muſt obſerve, that the card here placed the 16th in order, being the laſt of the queſtion, is a long card; that you may cut them, or have them cut, after the firſt ſhuffle, at that part, and by that means ſeparate them from the other ten cards that contain the anſwer.

Your cards being thus diſpoſed, you ſhow that they make no meaning; then ſhuffle them once, and cutting them at the long card, you give the firſt part to any one, who reads the queſtion, but can find no anſwer in the other, which you open before him; you then ſhuffle them a ſecond time, and ſhow the anſwer as above.

IV. "To write 32 letters on ſo many cards, then "ſhuffle and deal them by twos to two perſons, in "ſuch manner, that the cards of one ſhall contain a "queſtion, and thoſe of the other an anſwer. Sup"poſe the queſtion to be, *Is nothing certain?* and the "anſwer, *Yes, diſappointment.*"

Over the letters of this queſtion and anſwer, write the following numbers, which correſpond to the order in which the cards are to be dealt by two and two.

I S N O T H I N G C E R T A I N?
31 32 27 28 23 24 19 20 15 16 11 12 7 8 3 4

Y E S, D I S A P O I N T M E N T.
29 30 25 26 21 22 17 18 13 14 9 10 5 6 1 2

Then have recourſe to the firſt column of the table for 32 numbers, and diſpoſe theſe 32 cards in the following order, by that column.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
O I E R G C A N T P I N T A I S

17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
T M E H S D I N N O Y N T E I S

The cards being thus diſpoſed, ſhuffle them once, and deal them two and two: when one of the parties will neceſſarily have the queſtion, and the other the anſwer.

Inſtead of letters you may write words upon the 32 cards, 16 of which may contain a queſtion, and the remainder the anſwer; or what other matter you pleaſe. If there be found difficulty in accommodating the words to the number of cards, there may be two or more letters or ſyllables written upon one card.

V. "The five beatitudes." The five bleſſings we will ſuppoſe to be, 1. Science. 2. Courage. 3. Health. 4. Riches, and 5. Virtue. Theſe are to be found upon cards that you deal, one by one, to five perſons. Firſt, write the letters of theſe words ſucceſſively, in the

the order they ſtand, and then add the numbers here annexed to them.

S	C	I	E	N	C	E	C	O	U	R	A	G	E
31	26	21	16	11	6	1	32	27	22	17	12	7	2

H	E	A	L	T	H	R	I	C	H	E	S
28	23	18	13	8	3	29	24	19	14	9	4

V	I	R	T	U	E
30	25	20	15	10	5

Then range them in order agreeable to the firſt column of the table for 32 numbers, as in the experiment. Thus,

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L	H	N	A	T	E	R	E	U	A	C	R	G	T	I	U
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
E	E	C	I	I	C	H	S	O	H	R	E	E	V	S	C

Next take a pack of cards and write on the four firſt the word Science; on the four next, the word Courage; and ſo of the reſt.

Matters being thus prepared, you ſhow that the cards on which the letters are written convey no meaning. Then take the pack on which the words are written, and ſpreading open the firſt four cards, with their backs upward, you deſire the firſt perſon to chooſe one. Then cloſe thoſe cards, and ſpread the next four to the ſecond perſon; and ſo to all the five; telling them to hold up their cards leſt you ſhould have a confederate in the room.

You then ſhuffle the cards, and deal them one by one, in the common order, beginning with the perſon who choſe the firſt card, and each one will find in his hand the ſame word as is written on his card. You will obſerve, that after the ſixth round of dealing, there will be two cards left, which you give to the firſt and ſecond perſons, as their words contain a letter more than the others.

VI. "The cards of the game of piquet being mixed together, after ſhuffling them, to bring, by cutting them, all the cards of each ſuit together." The order in which the cards muſt be placed to produce the effect deſired being eſtabliſhed on the ſame principle as that explained in experiment II. except that the ſhuffling is here to be repeated three times, we think it will be ſufficient to give the order in which they are to be placed before the firſt ſhuffle.

Order of the Cards.

1 Ace } clubs
2 Knave }
3 Eight } diamonds
4 Seven }
wide card
5 Ten clubs
6 Eight } ſpades
7 Seven }
wide card
8 Ten } diamonds
9 Nine }
10 Queen }
11 Knave }
12 Queen clubs
13 Eight } hearts
14 Seven }
wide card
15 Ten } ſpades
16 Nine }
17 King clubs
18 Ten } hearts
19 Nine }
20 Seven clubs
21 Ace diamonds
22 Knave ſpades
23 Queen hearts
24 Knave hearts
25 Ace ſpades
26 King diamonds
27 Nine clubs
28 Ace } hearts
29 King }
30 Eight clubs
31 King } ſpades
32 Queen }

You then ſhuffle the cards, and cutting at the wide card, which will be the ſeven of hearts, you lay the eight cards that are cut, which will be the ſuit of hearts, down on the table. Then ſhuffling the remaining cards a ſecond time, you cut at the ſecond wide card, which will be the ſeven of ſpades, and lay, in like manner, the eight ſpades down on the table. You ſhuffle the cards a third time, and offering them to any one to cut, he will naturally cut them at the wide card (D), which is the ſeven of diamonds, and conſequently divide the remaining cards into two equal parts, one of which will be diamonds and the other clubs.

VII. "The cards at piquet being all mixed together, to divide the pack into two equal parts, and name the number of points contained in each part." You are firſt to agree that each king, queen, and knave, ſhall count, as uſual, 10, the ace 1, and the other cards according to the number of the points. Then diſpoſe the cards, by the table for 32 numbers, in the following order, and obſerve that the laſt card of the firſt diviſion muſt be a wide card.

Order of the Cards before ſhuffling.

1 Seven hearts
2 Nine clubs
3 Eight hearts
4 Eight } ſpades
5 Knave }
6 Ten }
7 Queen } clubs
8 Ace }
9 Ace hearts
wide card
10 Nine hearts
11 Queen ſpades
12 Knave clubs
13 Ten diamonds
14 Ten } hearts
15 King }
16 Queen }
17 Nine diamonds
18 Ace ſpades
19 Ten clubs
20 Knave } diamonds
21 Eight }
22 King }
23 Seven ſpades
24 Seven } diamonds
25 Queen }
26 Knave hearts
27 King clubs
28 Nine } ſpades
29 King }
30 Ace diamonds
31 Seven } clubs
32 Eight }

You then ſhuffle them carefully, according to the method before deſcribed, and they will ſtand in the following order.

(D) You muſt take particular notice whether they be cut at the wide card, and if they are not, you muſt have hem cut, or cut them again yourſelf.

Combination.

Cards.	Numbers.	Cards.	Numbers.
		brought up	34
1 Nine } spades	9	6 Ten clubs	10
2 King } spades	10	7 Ten diamonds	10
3 Seven } spades	7	8 Ten hearts	10
4 Seven diamonds	7	9 Ace clubs	1
5 Ace spades	1	10 Ace hearts (wide card)	1
carried up	34	total	66

Cards.	Numbers.	Cards.	Numbers.
		brought up	101
11 Eight hearts	8	22 Queen hearts	10
12 Eight spades	8	23 Nine } diamonds	9
13 Seven hearts	7	24 Knave } diamonds	10
14 Nine clubs	9	25 Eight } diamonds	8
15 Knave } spades	10	26 King } diamonds	10
16 Ten } spades	10	27 Queen } diamonds	10
17 Queen clubs	10	28 Knave hearts	10
18 Nine hearts	9	29 King clubs	10
19 Queen spades	10	30 Ace diamonds	1
20 Knave clubs	10	31 Seven } clubs	7
21 King hearts	10	32 Eight } clubs	8
carried up	101	total	194

When the cards are by shuffling disposed in this order, you cut them at the wide card, and pronounce that the cards you have cut off contain 66 points, and consequently the remaining part 194.

VIII. "The Inconceivable Repique (E)." When you would perform this experiment with the cards used in the last, you must observe not to disorder the first 10 cards in laying them down on the table. Putting those cards together, in their proper order therefore, you shuffle them a second time in the same manner, and offer them to any one to cut, observing carefully if he cut them at the wide card, which will be the ace of hearts, and will then be at top; if not, you must make him, under some pretence or other, cut them till it is; and the cards will then be ranged in such order that you will repique the person against whom you play, though you let him choose (even after he has cut) in what suit you shall make the repique.

Order of the cards after they have been shuffled and cut.

1 Eight hearts	13 Seven } clubs
2 Eight } spades	14 Eight } clubs
3 Knave } spades	15 Knave hearts
4 Ten } spades	16 King clubs
5 Queen } clubs	17 Nine } diamonds
6 Knave } clubs	18 Knave } diamonds
7 King } hearts	19 Nine hearts
8 Queen } hearts	20 Queen spades
9 Eight } diamonds	21 Seven hearts
10 King } diamonds	22 Nine clubs
11 Queen } diamonds	23 Ten hearts
12 Ace } diamonds	24 Ace clubs
25 Seven spades	30 Ten clubs
26 Seven diamonds	31 Ten diamonds
27 Nine spades	32 Ace hearts wide card.
28 King } spades	
29 Ace } spades	

The cards being thus disposed, you ask your adversary in what suit you shall repique him? If he say in clubs or diamonds, you must deal the cards by threes, and the hands will be as follows:

Elder.	Younger.
Hearts, king	Clubs, ace
—— queen	—— king
—— knave	—— queen
—— nine	—— knave
—— eight	—— nine
—— seven	Diamonds, ace
Spades, queen	—— king
—— knave	—— queen
—— eight	—— knave
Diamonds, eight	—— nine
Clubs, eight	Spades, ten
—— seven	Hearts, ten
Rentrée, or take in of the elder.	Rentrée of the younger.
Seven spades	Ten clubs
Seven diamonds	Ten diamonds
Nine } spades	Ace hearts
King } spades	
Ace } spades	

If he against whom you play, who is supposed to be elder hand, has named clubs for the repique, and has taken in five cards, you must then lay out the queen, knave, and nine of diamonds, and you will have, with the three cards you take in, a sixiem major in clubs, and quatorze tens. If he leave one or two cards, you must discard all the diamonds.

If he require to be repiqued in diamonds, then discard the queen, knave, and nine of clubs: or all the clubs, if he leave two cards; and will then have a hand of the same strength as before.

Note. If the adversary should discard five of his hearts, you will not repique him, as he will then have a septiem in spades: or if he only take one card: but neither of these any one can do, who has the least knowledge of the game. If the person against whom you play would be repiqued in hearts or spades, you must deal the cards by twos, and the game will stand thus:

Elder hand.	Younger hand.
King } diamonds	Ace } clubs
Knave } diamonds	King } clubs
Nine } diamonds	Ace } diamonds
Eight } diamonds	Queen } diamonds

Queen-

(E) This manœuvre of piquet was invented by the countess of L—— (a French lady), and communicated by her to M. Guyot.

Combination.

Elder hand.		Younger hand.	
Queen	clubs	Queen	ſpades
Knave		Knave	
Nine		Ten	
Eight		King	hearts
Seven		Queen	
Eight	hearts	Knave	
Seven		Ten	
Eight ſpades		Nine	
Rentrée		Rentrée.	
Seven ſpades		Ten clubs	
Seven diamonds		Ten diamonds	
Nine	ſpades	Ace hearts	
King			
Ace			

If he require to be repiqued in hearts, you keep the quint to a king in hearts, and the ten of ſpades, and lay out which of the reſt you pleaſe; then, even if he ſhould leave two cards, you will have a ſixiem major in hearts, and quatorze tens, which will make a repique.

But if he demand to be repiqued in ſpades; at the end of the deal you muſt dexterouſly paſs the three cards that are at the bottom of the ſtock (that is, the ten of clubs, ten of diamonds, and ace of hearts) to the top (F), and by that means you reſerve the nine, king, and ace of ſpades for yourſelf; ſo that by keeping the quint in hearts, though you ſhould be obliged to lay out four cards, you will have a ſixiem to a king in ſpades, with which and the quint in hearts you muſt make a repique.

Obſerve here likewiſe, that if the adverſary lay out only three cards, you will not make the repique; but that he will never do, unleſs he be quite ignorant of the game, or has ſome knowledge of your intention.

This laſt ſtroke of piquet has gained great applauſe, when thoſe that have publicly performed it have known how to conduct it dexterouſly. Many perſons who underſtand the nature of combining the cards, have gone as far as the paſſing the three cards from the bottom of the ſtock, and have then been forced to confeſs their ignorance of the manner in which it was performed.

IX. "The Metamorphoſed Cards." Provide 32 cards that are differently coloured, on which ſeveral different words are written, and different objects painted. Theſe cards are to be dealt two and two to four perſons, and at three different times, ſhuffling them each time. After the firſt deal, every one's cards are to be of the ſame colour; after the ſecond deal they are all to have objects that are ſimilar: and after the third, words that convey a ſentiment.

Diſpoſe of the cards in the following order.

Cards.	Colours.	Objects.	Words.
1	Yellow	Bird	I find
2	Yellow	Bird	In you
3	Green	Flower	Charming
4	Green	Flower	Flowers
5	White	Bird	To hear
6	White	Orange	Beauty
7	Red	Butterfly	My
8	Red	Flower	Notes
9	Red	Flower	In
10	Red	Butterfly	Shepherdeſs
11	Green	Butterfly	Lover
12	Green	Butterfly	Your
13	White	Flower	Of
14	White	Flower	An inconſtant
15	Yellow	Orange	Image
16	Yellow	Flower	Enchanting
17	White	Orange	Adorn
18	Yellow	Butterfly	My
19	Yellow	Butterfly	Phyllis
20	White	Bird	Birds
21	Red	Orange	Sing
22	Red	Orange	Dear
23	Green	Orange	And ſweetneſs
24	Green	Orange	The
25	Green	Bird	Of
26	Green	Bird	Preſent
27	Yellow	Flower	As
28	Red	Bird	Changes
29	Red	Bird	Boſom
30	Yellow	Orange	Me
31	White	Butterfly	Your
32	White	Butterfly	I long

The cards thus coloured, figured, and tranſcribed, are to be put in a caſe, in the order they here ſtand.

When you would perform this experiment, you take the cards out of the caſe, and ſhow, without changing the order in which they were put, that the colours, objects, and words, are all placed promiſcuouſly. You then ſhuffle them in the ſame manner as before, and deal them, two and two, to four perſons, obſerving that they do not take up their cards till all are dealt, nor mix them together: and the eight cards dealt to each perſon will be found all of one colour. You then take each perſon's cards, and put thoſe of the ſecond perſon under thoſe of the firſt, and thoſe of the fourth perſon under thoſe of the third. After which you ſhuffle them a ſecond time; and having dealt them in the ſame manner, on the firſt perſon's cards will be painted all the birds; on the ſecond perſon's cards all the butterflies; on thoſe of the third, the oranges; and on thoſe of the fourth, the flowers. You take the cards a ſecond time, and obſerving the ſame precautions, ſhuffle and deal them as before; and then the firſt perſon, who had the laſt time the birds in his hand, will have the words that compoſe this ſentence:

Sing, dear birds; I long to hear your enchanting notes.

The ſecond perſon, who the laſt deal had the butterflies, will now have theſe words:

Of an inconſtant lover your changes preſent me the image.

The third, who had the oranges, will have this ſentence:

As

(F) The manner of doing this is explained in the article LEGERDEMAIN.

As in my Phyllis, I find in you beauty and ſweetneſs.

The fourth, who had the flowers, will have theſe words:

Charming flowers, adorn the boſom of my ſhepherdeſs.

It ſeems quite unneceſſary to give any further detail, as they who underſtand the foregoing experiments will eaſily perform this.

Among the different purpoſes to which the doctrine of combinations may be applied, thoſe of writing in cipher, and deciphering, hold a principal place. See the article CIPHER.

COMBINATION, in *Chemiſtry*, ſignifies the union of two bodies of different natures, from which a new compound body reſults. For example, when an acid is united with an alkali, we ſay that a combination betwixt theſe two ſaline ſubſtances takes place; becauſe from this union a neutral ſalt reſults, which is compoſed of an acid and an alkali.

COMBUST, in *Aſtronomy*. When a planet is in conjunction with the ſun, or not diſtant from it above half its diſk, it is ſaid to be combuſt, or in combuſtion.

According to Argol, a planet is combuſt, or in combuſtion, when not above eight degrees and thirty minutes diſtant from the ſun, either before or after him.

COMBUSTIO PECUNIÆ, the ancient way of trying mixed and corrupt money, by melting it down, upon payments into the exchequer. In the time of King Henry II. a conſtitution was made, called the trial by *combuſtion;* the practice of which differed little or nothing from the preſent method of aſſaying ſilver. But whether this examination of money by combuſtion was to reduce an equation of money only to ſterling, viz. a due proportion of alloy with copper, or to reduce it to pure fine ſilver, does not appear. On making the conſtitution of trial it was conſidered, that though the money did anſwer *numero et pondere*, it might be deficient in value; becauſe mixed with copper or braſs, &c.

COMBUSTION, a term denoting the operation of fire upon any inflammable ſubſtance, by which it ſmokes, flames, and is reduced to aſhes.

There is not a phenomenon in nature by which the attention of philoſophers has been more engaged, or which has puzzled them more to account for, than this very common operation. To explain it, theories have been invented, the moſt oppoſite and contradictory to one another that can be imagined; and, till very lately, the ſtate of ſcience did not afford data ſufficient to explain it in a rational manner. See CHEMISTRY *Index*.

COMEDY, a ſort of dramatic poetry, which gives a view of common and private life, recommends virtue, and corrects the vices and follies of mankind by means of ridicule. See the article POETRY.

This laſt kind alone was received among the Romans, who nevertheleſs made a new ſubdiviſion of it into ancient, middle, and new, according to the various periods of the commonwealth. Among the ancient comedies were reckoned thoſe of Livius Andronicus; among the middle thoſe of Pacuvius; and among the new ones, thoſe of Terence. They likewiſe diſtinguiſhed comedy according to the quality of the perſons repreſented, and the dreſs they wore, into togatæ, prætextatæ, trabeatæ, and tabernariæ, which laſt agrees pretty nearly with our farces. Among us, comedy is diſtinguiſhed from farce, as the former repreſents nature as ſhe is; the other diſtorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous.

COMENIUS, JOHN AMOS, a grammarian and Proteſtant divine, born in Moravia in 1592. He was eminent for his deſign to introduce a new method of teaching languages; for which purpoſe he publiſhed ſome eſſays in 1616, and had prepared ſome others, when the Spaniards pillaged his library, after having taken the city of Fulnec, where he was miniſter and maſter of the ſchool. Comenius fled to Leſna, a city of Poland, and taught Latin there. The book he publiſhed in 1631, under the title of *Janua Linguarum reſerata*, gained him a prodigious reputation, inſomuch that he was offered a commiſſion for regulating all the ſchools in Poland. The parliament of England deſired his aſſiſtance to regulate the ſchools in that kingdom. He arrived at London in 1641; and would have been received by a committee to hear his plan, had not the parliament been taken up with other matters. He therefore went to Sweden, being invited by a generous patron, who ſettled a ſtipend upon him that delivered him from the fatigues of teaching; and now he employed himſelf wholly in diſcovering general methods for thoſe who inſtructed youth. In 1657 he publiſhed the different parts of his new method of teaching. He was not only taken up with the reformation of ſchools; but he alſo filled his brain with prophecies, the fall of Antichriſt, Millennium, &c. At laſt Comenius took it into his head to addreſs Louis XIV. of France, and to ſend him a copy of the prophecies of Drabicius; inſinuating, that it was to this monarch God promiſed the empire of the world. He became ſenſible at laſt of the vanity of his labours, and died in 1671.

COMET, an opaque, ſpherical, and ſolid body like a planet, performing revolutions about the ſun in elliptical orbits, which have the ſun in one of their foci.

There is a popular diviſion of comets into *tailed*, *bearded*, and *hairy* comets; though this diviſion rather relates to the different circumſtances of the ſame comet, than to the phenomena of ſeveral. Thus, when the light is weſtward of the ſun, and ſets after it, the comet is ſaid to be *tailed*, becauſe the train follows it in the manner of a tail: when the comet is eaſtward of the ſun, and moves from it, the comet is ſaid to be *bearded*, becauſe the light marches before it in the manner of a beard. Laſtly, when the comet and the ſun are diametrically oppoſite (the earth between them), the train is hid behind the body of the comet, except a little that appears round it in form of a border of *hair:* and from this laſt appearance the word comet is derived; as κομητης, *cometa*, comes from κομη, *coma*, hair. But there have been comets whoſe diſk was as clear, as round, and as well defined, as that of Jupiter, without either tail, beard, or coma. See ASTRONOMY *Index*.

COMETARIUM, a curious machine, exhibiting an idea of the revolution of a comet about the ſun. See ASTRONOMY *Index*.

COMETEAN, a town of Bohemia in the circle of Saltz, with a handſome town-houſe. It was taken by ſtorm in 1421, and all the inhabitants, men, women, and children, put to the ſword. It is ſeated in a fertile plain, in E. Long. 13. 35. N. Lat. 50. 30.

COMETES. See BOTANY *Index*.

COMFREY. See SYMPHYTUM, BOTANY *Index*.

COMINES, PHILIP DE, an excellent hiſtorian, born of a noble family in Flanders in 1446. He lived in a kind of intimacy with Charles the Bold, duke of Burgundy, for about eight years; but being ſeduced to the court of France by Louis XI. he was highly promoted by him, and executed ſeveral ſucceſsful negociations. After this king's death he experienced many troubles on account of being a foreigner, by the envy of other courtiers, and lay long in priſon before he was diſcharged: he died in 1509. Comines was a man of more natural abilities than learning; he ſpoke ſeveral living, but knew nothing of the dead languages; he has left behind him ſome memoirs of his own times, that are admired by all true judges of hiſtory. Catherine de Medicis uſed to ſay, that Comines made as many heretics in politics as Luther had done in religion.

COMINES, a town of French Flanders on the lines which the French have made to defend their country againſt the Auſtrian Netherlands. It is ſituated on the river Lis, in E. Long. 3. 1. N. Lat. 50. 30.

COMITATUS, in *Law*, a county. Ingulphus tells us, that England was firſt divided into counties by King Alfred; and the counties into hundreds, and theſe again into tythings: and Forteſcue writes, that, *regnum Angliæ per comitatus, ut regnum Franciæ per ballivatus diſtinguitur*. Sometimes it is taken for a territory or juriſdiction of a particular place; as in Mat. Paris, anno 1234. See COUNTY.

COMITIA, in Roman antiquity, were general aſſemblies of the people, lawfully called by ſome magiſtrate for the enjoinment or prohibition of any thing by their votes.

The proper comitia were of three ſorts; *curiata*, *centuriata*, and *tributa*; with reference to the three grand diviſions of the city and people into *curiæ*, *centuriæ*, and *tribes*: For, by comitia *calata*, which we ſometimes meet with in authors, in earlier times were meant all the comitia in general; the word *calata* from καλεω, or *calo*, being their common epithet; though it was at laſt reſtrained to two ſorts of aſſemblies, thoſe for the creation of prieſts, and thoſe for the regulation of laſt wills and teſtaments.

The *comitia curiata* owe their origin to the diviſion which Romulus made of the people into 30 curiæ; ten being contained in every tribe. They anſwered in moſt reſpects to the pariſhes in our cities, being not only ſeparated by proper bounds and limits, but diſtinguiſhed too by their different places ſet apart for the celebration of divine ſervice, which was performed by particular prieſts (one to every curia), with the name of *curiones*.

Before the inſtitution of the comitia centuriata, all the grand concerns of the ſtate were tranſacted in the aſſembly of the curiæ; as the election of kings and other chief officers, the making and abrogating of laws, and the judging of capital cauſes. After the expulſion of the kings, when the commons had obtained the privilege to have tribunes and ædiles, they elected them for ſome time at theſe aſſemblies; but that ceremony being at length transferred to the comitia tributa, the curiæ were never convened to give their votes, except now and then upon account of making ſome particular law relating to adoptions, wills, and teſtaments, or the creation of officers for an expedition; or for electing ſome of the prieſts, as the *flamines*, and the *curio maximus*, or ſuperintendant of the curiones, who were themſelves choſen by every particular curia.

The power of calling theſe aſſemblies belonged at firſt only to the kings; but upon the eſtabliſhment of the democracy, the ſame privilege was allowed to moſt of the chief magiſtrates, and ſometimes to the pontifices.

The perſons who had the liberty of voting here were ſuch Roman citizens as belonged to the curiæ; or ſuch as actually lived in the city, and conformed to the cuſtoms and rites of their proper curiæ; all thoſe being excluded who dwelt without the bounds of the city, retaining the ceremonies of their own country, though they had been honoured with the *jus civitatis*, or admitted free citizens of Rome. The place where the curiæ met was the *comitium*, a part of the forum: No ſet time was appointed for the holding theſe, or any other of the comitia, but only as buſineſs required.

The people being met together, and confirmed by the report of good omens from the augurs (which was neceſſary in all the aſſemblies), the rogatio, or buſineſs to be propoſed to them was publicly read. After this (if none of the magiſtrates interpoſed), upon the order of him that preſided in the comitia, the people divided into their proper curias, and conſulted of the matter; and then the curias being called out, as it happened by lot, gave their votes man by man, in ancient times *viva voce*, and afterwards by tablets; the moſt votes in every curia going for the voice of the whole curia, and the moſt curiæ for the general conſent of the people.

In the time of Cicero, the comitia curiata were ſo much out of faſhion, that they were formed only by 30 lictors repreſenting the 30 curiæ; whence, in his ſecond oration againſt Rullus, he calls them *comitia adumbrata*.

The *comitia centuriata* were inſtituted by Servius Tullius; who, obliging every one to give a true account of what he was worth, according to thoſe accounts, divided the people into ſix ranks or claſſes, which he ſubdivided into 193 centuries. The firſt claſſis, containing the equites and richeſt citizens, conſiſted of 98 centuries. The ſecond, taking in the tradeſmen and mechanics, conſiſted of 22 centuries. The third, 20. The fourth, 22. The fifth, 30. The ſixth, filled up with the poorer ſort, but one century: and this though it had the ſame name with the reſt, yet was ſeldom regarded, or allowed any power in public matters. Hence it is a common thing with the Roman authors, when they ſpeak of the claſſes, to reckon no more than five, the ſixth not being worth their notice. This laſt claſſis or order was divided

Comitia. vided into two parts or orders; the *proletarii* and the *capite censi*. The former, as their name implies, were designed purely to stock the republic with men, since they could supply it with so little money: and the latter, who paid the lowest tax of all, were rather counted and marshalled by their heads than by their estates.

Persons of the first rank, by reason of their pre-eminence, had the name of *classici*; whence came the name of *classici auctores* for the most approved writers. All others, of what classis soever, were said to be *infra classem*. The assembly of the people by centuries was held for the electing of consuls, censors, and prætors; as also for the judging of persons accused of what they called *crimen perduellionis*, or actions by which the party had showed himself an enemy to the state, and for the confirmation of all such laws as were proposed by the chief magistrates, who had the privilege of calling these assemblies.

The place appointed for their meeting was the *campus martius*; because in the primitive times of the commonwealth, when they were under continual apprehensions of enemies, the people, to prevent any sudden assault, went armed, in martial order, to hold these assemblies; and were for that reason forbidden by the laws to meet in the city, because an army was upon no account to be marshalled within the walls; yet, in later ages, it was thought sufficient to place a body of soldiers as a guard in the janiculum, where an imperial standard was erected, the taking down of which denoted the conclusion of the comitia.

Though the time of holding these comitia for other matters was undetermined; yet the magistrates, after the year of the city 601, when they began to enter on their place, on the kalends of January, were constantly *designed* about the end of July and the beginning of August.

All the time between their election and confirmation they continued as private persons, that inquisition might be made into the election, and the other candidates might have time to enter objections, if they met with any suspicion of unfair dealing. Yet, at the election of the censors, this custom did not hold; but as soon as they were elected, they were immediately invested with the honour.

By the institution of these comitia, Servius Tullius secretly conveyed the whole of the power from the commons; for the centuries of the first and richest class being called out first, who were three more in number than all the rest put together, if they all agreed, as generally they did, the business was already decided, and the other classes were needless and insignificant. However, the three last scarce ever came to vote.

The commons, in the time of the free state, to remedy this disadvantage, obtained, that before they proceeded to voting any matter at these comitia, that century should give their suffrages first upon whom it fell by lot, with the name of *centuria prerogativa*; the rest being to follow according to the order of their classes. After the constitution of the 35 tribes into which the classes and their centuries were divided, in the first place, the tribes cast lots which should be the *prerogative tribe*; and then the centuries of the tribes for the honour of being a prerogative century. All the other tribes and centuries had the appellation of *jure vocatæ*, because they were called out according to their proper places.

The prerogative century being chosen by lot, the chief magistrate, sitting in a tent in the middle of the campus martius, ordered that century to come out and give their voices; upon which they presently separated from the rest of the multitude, and came into an inclosed apartment, which they termed *septa* or *ovilia*, passing over the *pontes* or narrow boards laid there for the occasion; on which account *de pontibus dejici* signifies to be denied the privilege of voting, and persons thus dealt with are called *depontani*.

At the higher end of the pontes stood the *diribitores* (a sort of under officers so called from their marshalling the people), and delivered to every man, in the election of magistrates, as many tablets as there appeared candidates, one of whose names was written upon every tablet. A proper number of great chests were set ready in the *septa*, and every body threw in which tablet he pleased.

By the chests were placed some of the public servants, who taking out the tablets of every century, for every tablet, made a prick or a point in another tablet which they kept by them. Thus, the business being decided by most points gave occasion to the phrase *omne tulit punctum*, and the like.

The same method was observed in the justiciary process at these comitia, and in the confirmation of laws; except that, in both these cases, only two tablets were offered to every person; on one of which was written U. R. and on the other A, in capital letters; the two first standing for *uti rogas*, "be it as you desire," relating to the magistrate who proposed the question; and the last for *antiquo*, or "I forbid it."

It is remarkable, that though in the election of magistrates, and in the ratification of laws, the votes of that century, whose tablets were equally divided, signified nothing; yet in the trials of life and death, if the tablets *pro* and *con* were the same in number, the person was actually acquitted.

The division of people into *tribes* was an invention of Romulus, after he had admitted the Sabines into Rome; and though he constituted at that time only three, yet as the state increased in power, and the city in number of inhabitants, they rose by degrees to 35. For a long time after this institution, a *tribe* signified no more than such a space of ground with its inhabitants. But at last the matter was quite altered, and a tribe was no longer *pars urbis*, but *pars civitatis*; not a quarter of the city, but a company of citizens living where they pleased. This change was chiefly occasioned by the original difference between the tribes in point of honour. For Romulus having committed all sordid and mechanic arts to the care of strangers, slaves, and libertines; and reserved the more honest labour of agriculture to the freemen and citizens, who by this active course of life might be prepared for martial service; the *tribus rusticæ* were for this reason esteemed more honourable than the *tribus urbanæ*. And now all persons being desirous of getting into the more creditable division; and there being several ways of accomplishing their wishes, as by adoption, by the power of censors, or the like; that rustic tribe which had the most worthy names in its roll had the prefe-
rence

rence to all others, though of the same general denomination. Hence all of the same great family bringing themselves by degrees into the same tribe, gave the name of their family to the tribe they honoured; whereas at first the generality of the tribes did not borrow their names from persons but from places.

The first assembly of the tribes we meet with is about the year of Rome 263, convened by Sp. Sicinius, tribune of the commons, upon account of the trial of Coriolanus. Soon after, the tribunes of the commons were ordered to be elected here; and at last all the inferior magistrates, and the collegiate priests. The same comitia served for the enacting of laws relating to war and peace, and all others proposed by the tribunes and plebeian officers, though they had not properly the name of *leges*, but *plebiscita*. They were generally convened by the tribunes of the commons; but the same privilege was allowed to all the chief magistrates. They were confined to no place; and therefore sometimes we find them held in the comitium; sometimes in the campus martius, and now and then in the capitol. The proceedings were in most respects answerable to those already described in the account of the other comitia, and therefore need not be insisted on. Only we may farther observe of the comitia in general, that when any candidate was found to have most tablets for a magistracy, he was declared to be *designed* or elected by the president of the assembly; and this they termed *renunciari consul*, *prætor*, or the like; and that the last sort of the comitia only could be held without the consent or approbation of the senate, which was necessary to the convening of the other two.

COMITIALIS MORBUS, an appellation given to the EPILEPSY, by reason the comitia of ancient Rome were dissolved if any person in the assembly happened to be taken with this distemper.

COMITIUM, in Roman antiquity, a large hall in the forum, where the COMITIA were ordinarily held.

COMMA, among grammarians, a point or character marked thus (,), serving to denote a short stop, and to divide the members of a period. Different authors define and use it differently. According to F. Buffier, the comma serves to distinguish the members of a period, in each of which is a verb and the nominative case of the verb: thus, "That so many people are pleased with trifles, is owing to a weakness of mind, which makes them love things easy to be comprehended." Besides this, the comma is used to distinguish, in the same manner of a period, several nouns-substantive, or nouns-adjective, or verbs not united by a conjunction: thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without studying constantly, methodically, with a gust, application," &c. If those words are united in the same phrase with a conjunction, the comma is omitted: thus, "the imagination and the judgment do not always agree."

The ingenious author of the tract *De ratione interpungendi*, printed with Vossius's Element. Rhetor. Lond. 1734, lays down the use of a comma to be, to distinguish the simple members of a period or sentence; i. e. such as only consist of one subject, and one definite verb. But this rule does not go throughout; the same author instancing many particular cases not yet included herein, where yet the comma is advisable. See PUNCTUATION.

It is a general rule that a comma ought not to come between a nominative and a verb, or an adjective and substantive, when these are not otherwise disjoined: thus, in the sentence, *God ruleth with infinite wisdom*, a comma between *God* and *ruleth*, or between *infinite* and *wisdom*, would be absurd. But to this exceptions may occur; as when not a single word, but a sentence, happens to be the nominative; thus, in the example first above given, where the sentence *that so many people are pleased with trifles*, forms the nominative to the verb *is*, a comma at *trifles* is proper, both for the sake of perspicuity, and as coinciding with a slight natural pause.

COMMA, in *Music*. See INTERVAL.

COMMANDINUS, FREDERIC, born at Urbino in Italy, and descended from a very noble family, in the 16th century. To a vast skill in the mathematics, he had added a great knowledge in the Greek tongue, by which he was well qualified to translate the Greek mathematicians into Latin: accordingly he translated and published several, which no writer till then had attempted; as Archimedes, Apollonius, Euclid, &c.

COMMANDRY, a kind of benefice or fixed revenue belonging to a military order, and conferred on ancient knights who had done considerable services to the order.

There are strict or regular commandries, obtained in order, and by merit; there are others of grace and favour, conferred at the pleasure of the grand master; there are also commandries for the religious in the orders of St Bernard and St Anthony. The kings of France have converted several of the hospitals for lepers into commandries of the order of St Lazarus.

The commandries of Malta are of different kinds; for as the order consists of knights, chaplains, and brothers servitors, there are peculiar commandries or revenues attached to each. The knight to whom one of these benefices or commandries is given is called *commander*, which agrees pretty nearly with the præpositus set over the monks in places at a distance from the monastery, whose administration was called *obedientia*; because depending entirely upon the abbot who gave him his commission. Thus it is with the simple commanders of Malta, who are rather farmers of the order than beneficiaries; paying a certain tribute or rent, called *responsio*, to the common treasury of the order.

COMMELINA. See BOTANY *Index*.

COMMEMORATION, in a general sense, the remembrance of any person or thing, or the doing any thing to the honour of a person's memory, or in remembrance of any past event. Thus, the eucharist is a commemoration of the sufferings of Jesus Christ.

COMMENDAM, in the ecclesiastical law, the trust or administration of the revenues of a benefice, given either to a layman, to hold by way of depositum for six months, in order to repairs, &c. or to an ecclesiastic or beneficed person, to perform the pastoral duties thereof, till once the benefice is provided with a regular incumbent.

Anciently the administration of vacant bishoprics belonged to the nearest neighbouring bishop; which is still practised between the archbishopric of Lyons and the bishopric of Autun: on this account they were called *commendatory bishops*.

This custom appears to be very ancient. St Athanasius says of himself, according to Nicephorus, that there had been given him *in commendam*, i. e. in administration, another church besides that of Alexandria whereof he was stated bishop.

The care of churches, it seems, which had no pastor, was committed to a bishop, till they were provided with an ordinary: the register of Pope Gregory I. is full of these commissions, or commendams, granted during the absence or sickness of a bishop, or the vacancy of the see.

Some say, that Pope Leo IV. first established the modern commendams, in favour of ecclesiastics who had been expelled their benefices by the Saracens; to whom the administration of the vacant churches was committed for a time, in expectation of their being restored; though St Gregory is said to have used the same while the Lombards desolated Italy.

In a little time the practice of commendams was exceedingly abused; and the revenues of monasteries given to laymen for their subsistence. The bishops also procured several benefices, or even bishoprics, *in commendam*, which served as a pretext for holding them all without directly violating the canons. Part of the abuse has been retrenched; but the use of commendams is still retained as an expedient to take off the incompatibility of the person by the nature of the benefice.

When a parson is made bishop, his parsonage becomes vacant; but if the king give him power he may still hold it *in commendam*.

COMMENDATUS, one who lives under the protection of a great man. *Commendati homines*, were persons who, by voluntary homage, put themselves under the protection of any superior lord: for ancient homage was either *predial*, due for some tenure; or *personal*, which was by compulsion, as a sign of necessary subjection; or voluntary, with a desire of protection; and those who, by voluntary homage, put themselves under the protection of any man of power, were sometimes called *homines ejus commendati*, as often occurs in Doomsday. *Commendati dimidii* were those who depended on two several lords, and paid one half of their homage to each; and *sub-commendati* were like under-tenants under the command of persons that were themselves under the command of some superior lord: also there were *dimidii sub-commendati*, who bore a double relation to such depending lords. This phrase seems to be still in use in the usual compliment, "Commend me to such a friend," &c. which is to let him know, "I am his humble servant."

COMMENSURABLE, among geometricians, an appellation given to such quantities as are measured by one and the same common measure.

COMMENSURABLE Numbers, whether integers or fractions, are such as can be measured or divided by some other number without any remainder; such are 12 and 18, as being measured by 6 and 3.

COMMENSURABLE in Power, is said of right lines, when their squares are measured by one and the same space or superfices.

COMMENSURABLE Surds, those that being reduced to their least terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational one.

COMMENTARY, or COMMENT, in matters of literature, an illustration of the difficult or obscure passages of an author.

COMMENTARY, or *Commentaries*, likewise denotes a kind of history, or memoirs of certain transactions, wherein the author had a considerable hand: such are the Commentaries of Cæsar.

COMMERCE,

IS an operation by which the wealth, or work, either of individuals or of societies, may be exchanged by a set of men called *merchants*, for an equivalent, proper for supplying every want, without any interruption to industry, or any check upon consumption.

CHAP. I. HISTORY *of* COMMERCE.

§ 1. *General History*.

It is a point as yet undecided by the learned, to what nation the invention and first use of commerce belonged: some attribute it to one people, some to another, for reasons that are too long to be discussed here. But it seems most probable that the inhabitants of Arabia were those that first made long voyages. It must be allowed, that no country was so happily situated for this purpose as that which they inhabited, being a peninsula washed on three sides by three famous seas, the Arabian, Indian, and Persian. It is also certain, that it was very early inhabited; and the first notice we have of any considerable trade refers it to the Ishmaelites, who were settled in the hither part of Arabia. To them Joseph was sold by his brethren, when they were going down with their camels to Egypt with spicery, balm, and myrrh. It may seem strange to infer from hence, that commerce was already practised by this nation, since mention is here made of camels, or a caravan, which certainly implies an inland trade; and it must be likewise allowed, that balm and myrrh were the commodities of their country. But whence had they the spicery? Or how came Arabia to be so famous in ancient times for spices? Or whence proceeded that mistake of many great authors of antiquity, that spices actually grew there? Most certainly, because these people dealt in them; and that they dealt in them the first of any nation that we know of, appears from this very instance. Strabo and many other good authors assure us, that in succeeding times they were very great traders: they tell us particularly what ports they had; what prodigious magazines they kept of the richest kinds

kinds of goods; what wonderful wealth they obtained; in what prodigious magnificence they lived, and into what exceſſes they fell in reſpect to their expences for carving, building, and ſtatues. All this ſhows that they were very great traders; and it alſo ſhows, that they traded to the Eaſt Indies; and from thence only they could have their ſpices, their rich gums, their ſweet-ſcented woods, and their ivory, all which it is expreſsly ſaid they had in the greateſt abundance. This therefore proves, that they had an extenſive and flouriſhing commerce; and that they had it earlier than any other nation, ſeems evident from their dealing at that time in ſpices. Beſides, there is much leſs difficulty in ſuppoſing that they firſt diſcovered the route to the Indies, than if we aſcribe that diſcovery to any other nation; for, in the firſt place, they lay neareſt, and in the next they lay moſt conveniently; to which we may add, thirdly, that as the ſituation of their country naturally inclined them to navigation, ſo by the help of the monſoons they might make regular voyages to and from the Indies with great facility; nor is it at all unlikely that this diſcovery might be at firſt owing to chance, and to ſome of their veſſels being blown by a ſtrong gale to the oppoſite coaſt, from whence they might take the courage to return, by obſerving the regularity of the winds at certain ſeaſons. All theſe reaſons taken together ſeem to favour this opinion, that commerce flouriſhed firſt among them; and as to its conſequences in making them rich and happy, there is no diſpute about them.

We find in the records of antiquity no nation celebrated more early for carrying all arts to perfection than the inhabitants of Egypt: and it is certain alſo, that no art was there cultivated more early, with more aſſiduity, or with greater ſucceſs, than trade. It appears from the foregoing inſtance, that the richeſt commodities were carried there by land; and it is no leſs certain, that the moſt valuable manufactures were invented and brought to perfection there many ages before they were thought of in other countries; for, as the learned Dr Warburton very juſtly obſerves, at the time that Joſeph came into Egypt, the people were not only poſſeſſed of all the conveniences of life, but were remarkable alſo for their magnificence, their politeneſs, and even for their luxury; which argues, that traffic had been of long ſtanding amongſt them. To ſay the truth, the great advantages derived from their country's lying along the Red ſea, and the many benefits that accrued to them from the Nile, which they very emphatically called *The River*, or *The River of Egypt*, and of which they knew how to make all the uſes that can be imagined, gave them an opportunity of carrying their inland trade not only to a greater height than in any country at that time, but even higher than it has been carried anywhere, China only excepted; and ſome people have thought it no trivial argument to prove the deſcent of the Chineſe from the Egyptians, that they have exactly the ſame ſort of genius, and with wonderful induſtry and care have drawn ſo many cuts and canals, that their country is almoſt in every part of it navigable. It was by ſuch methods, by a wiſe and well-regulated government, and by promoting a ſpirit of induſtry amongſt the people, that the ancient Egyptians became ſo numerous, ſo rich, ſo powerful; and that their country, for large cities, magnificent ſtructures, and perpetual abundance, became the glory and wonder of the world.

The Phœnicians, though they poſſeſſed only a narrow ſlip of the coaſt of Aſia, and were ſurrounded by nations ſo powerful and ſo warlike that they were never able to extend themſelves on that ſide, became famous, by erecting the firſt naval power that makes any figure in hiſtory, and for the raiſing of which they took the moſt prudent and effectual meaſures. In order to this, they not only availed themſelves of all the creeks, harbours, and ports, which nature had beſtowed very liberally on their narrow territory, but improved them in ſuch a manner, that they were no leſs remarkable for their ſtrength than conſiderable for their conveniency; and ſo attentive were they to whatever might contribute to the increaſe of their power, that they were not more admired for the vaſt advantages they derived from their commerce, than they were formidable by their fleets and armies. They were likewiſe celebrated by antiquity as the inventors of arithmetic and aſtronomy; and in the laſt-mentioned ſcience they muſt have been very conſiderable proficients, ſince they had the courage to undertake long voyages at a time when no other nation (the Arabians and Egyptians excepted) durſt venture farther than their own coaſts. By theſe arts Tyre and Sidon became the moſt famous marts in the univerſe, and were reſorted to by all their neighbours, and even by people at a conſiderable diſtance, as the great ſtorehouſes of the world. We learn from the Scriptures how advantageous their friendſhip and alliance became to the two great kings of Iſrael, David and Solomon; and we ſee, by the application of the latter for architects and artiſts to Hiram king of Tyre, to what a prodigious height they had carried manufactures of every kind.

It is very certain that Solomon made uſe of their aſſiſtance in equipping his fleets at Elath and Eziongeber; and it is very probable that they put him upon acquiring thoſe ports, and gave him the firſt hints of the amazing advantages that might be derived from the poſſeſſion of them, and from the commerce he might from thence be able to carry on. Theſe ports were moſt commodiouſly ſituated on the Arabian gulf; and from thence his veſſels, manned chiefly by Phœnicians, ſailed to Ophir and Tharſis, wherever thoſe places were. Some writers will needs have them to be Mexico and Peru, which is certainly a wild and extravagant ſuppoſition; others believe that we are to look for Ophir on the coaſt of Africa, and Tharſis in Spain; but the moſt probable opinion is, that they were both ſeated in the Eaſt Indies. By this adventurous navigation, he brought into his country curioſities not only unſeen, but unheard of before, and riches in ſuch abundance, that, as the Scripture finely expreſſes it, "He made ſilver in Jeruſalem as ſtones, and cedar-trees as ſycamores that grow in the plains." The metaphor is very bold and emphatical; but when we conſider that it is recorded in this Hiſtory, that the return of one voyage only to Ophir produced 450 talents of gold, which makes 51,328 pounds of our Troy weight, about 2,463,744l. ſterling, we cannot doubt of the immenſe profit that accrued from this commerce. It is alſo obſervable that the queen of

Sheba, or Saba, which lies in that part of Arabia before mentioned, furprifed at the reports that were fpread of the magnificence of this prince, made a journey to his court on purpofe to fatisfy herfelf, whether fame had not exaggerated the fact; and from the prefents fhe made him of 120 talents of gold (656,640l.), of fpices in great abundance, and precious ftones, we may difcern the true reafon of her curiofity, which proceeded from an opinion that no country could be fo rich as her own. And there is another circumftance very remarkable, and which feems ftrongly to fortify what we have advanced in the beginning of this fection; it is added, "neither were there any fuch fpices as the queen of Sheba gave to King Solomon;" which feems to intimate, that the Arabians had penetrated farther into the Indies than even the fleets of this famous prince, and brought from thence other fpices (perhaps nutmegs and cloves) than had ever been feen before. It was by his wifdom, and by his fteady application to the arts of peace, all of which mutually fupport each other, as they are all driven on by the wheel of commerce, which fupplies every want, and converts every fuperfluity into merchandife, that this monarch raifed his fubjects to a condition much fuperior to that of any of their neighbours, and rendered the land of Ifrael, while he governed it, the glory and wonder of the Eaft. He made great acquifitions without making wars; and his fucceffor, by making wars, loft thofe acquifitions. It was his policy to keep all his people employed; and, by employing them, he provided equally for the extenfion of their happinefs, and his own power; but the following kings purfued other meafures, and other confequences attended them. The trade of Judea funk almoft as fuddenly as it rofe, and in procefs of time they loft thofe ports on the Red fea, upon which their Indian commerce depended.

The whole trade of the univerfe became then, as it were, the patrimony of the Phœnicians and the Egyptians. The latter monopolized that of the Indies, and, together with her corn and manufactures, brought fuch a prodigious balance of wealth continually into the country, as enabled the ancient monarchs of Egypt to compafs all thofe memorable works that in fpite of time and barbarous conquerors remain the monuments of their wifdom and power, and are like to remain fo as long as the world fubfifts. The Phœnicians drew from Egypt a great part of thofe rich commodities and valuable manufactures which they exported into all the countries between their own and the Mediterranean fea; they drew likewife a vaft refort to their own cities, even from countries at a great diftance; and we need only look into the prophets Ifaiah and Ezekiel in order to be convinced that thefe governments, founded on trade, were infinitely more glorious and more ftable than thofe that were erected by force. All this we find likewife confirmed by profane hiftories; and by comparing thefe, it is evident, that the induftry of the inhabitants of this fmall country triumphed over all obftacles, procured the greateft plenty in a barren foil, and immenfe riches, where, without induftry, there muft have been the greateft indigence. It is true, that old Tyre was deftroyed by Nebuchadnezzar, but not till fhe had flourifhed for ages; and even then fhe fell with dignity, and after a refiftance that ruined the army of the great conqueror of Afia. Out of the afhes of this proud city the great fpirit of its inhabitants produced a phœnix, little, if at all, inferior in beauty to its parent. New Tyre was fituated on an ifland; and though her bounds were very narrow, yet fhe became quickly the miftrefs of the fea, and held that fupreme dominion till fubdued by Alexander the Great, whom no power could refift. The ftruggle fhe made, however, though unfuccefsful, was great, and very much to the honour of her inhabitants: it muft be owned, that the Greek hero found it more difficult to mafter this fingle place, than to overcome the whole power of Perfia.

The views of the Macedonian prince were beyond comparifon more extenfive than his conquefts; and whoever confiders Alexander's plan of power, and enters into it thoroughly, will think him more a politician than he was a conqueror. He framed in his own mind an idea of univerfal monarchy, which it was indeed impoffible to accomplifh; but the very notion of it does him far greater honour than all his victories. He thought of placing his capital in Arabia; and of difpofing things in fuch a manner, as to have commanded the moft remote part of the Indies, at the fame time that he maintained a connexion with the moft diftant countries in Europe. He was for making ufe of force to acquire, but he very well knew, that commerce only could preferve, an empire, that was to have no other limits than thofe which nature had affigned the world. He defired to be mafter of all; but at the fame time he was willing to be a wife and gracious mafter, and to place his happinefs in that of his people, or rather in making all the nations of the earth but one people. A vaft, an extravagant, an impracticable fcheme it was, of which he lived not long enough to draw the outlines; but the fample he left in his new city of Alexandria fufficiently fhows how juft and how correct his notions were, and how true a judgment he had formed of what might be effected by thofe methods upon which he depended. That city, which he might be faid to defign with his own hand, and which was built, as it were, under his eye, became in fucceeding times all that he expected, the glory of Egypt, and the centre of commerce for feveral ages.

While Tyre was in the height of her glory, and had no rival in the empire of the fea, fhe founded her noble colony of Carthage on the coaft of Africa. The fituation of the city was everywhere admirable, whether confidered in the light of a capital, of a ftrong fortrefs, or of a commodious port. It was equally diftant from all the extremities of the Mediterranean fea, had a very fine country behind it, and was not in the neighbourhood of any power capable of reftraining its commerce or its growth. It is almoft inexpreffible how foon its inhabitants became not only numerous and wealthy, but potent and formidable. By degrees they extended themfelves on all fides, conquered the beft part of Spain, and erected there a new Carthage; the iflands of Sicily and Sardinia, or at leaft the beft part of them, fubmitted likewife to their yoke. Their conquefts, however, were inconfiderable in extent, when compared with their navigation. On one fide they ftretched as far weftward as Britain; and the

the Scilly iſlands, which are now ſo inconſiderable, were to them an Indies, the route to which they uſed the utmoſt induſtry to conceal. On the other hand, they diſcovered a great part of the coaſt of Africa, the Canary iſlands; and ſome there are who believe they firſt found the way to America. While they conſigned themſelves to trade, and the arts which belonged thereto, their power was continually increaſing; but when induſtry gave way to luxury, and a ſpirit of ambition baniſhed their old maxims of frugality and labour, their acquiſitions remained at a ſtand. The Romans began to grow jealous of their naval power, which it coſt them two obſtinate wars of 40 years continuance to humble. When ſhe was at length deſtroyed, her very ruins were majeſtic; for at the beginning of the third fatal Punic war, this city contained 700,000 inhabitants alone, and had 300 cities in Africa under her dominion. Such was the empire of Carthage, raiſed entirely by commerce: and to which, if ſhe had been content to have applied herſelf with the ſame ſteadineſs in her higheſt proſperity as in her early beginnings, there is no doubt ſhe had preſerved her freedom much longer than ſhe did; for as economy, diligence, and good faith, are the pillars of a commercial ſtate; ſo when theſe are once ſhaken, it is not only natural that ſhe ſhould decline, but alſo unavoidable.

The Ptolemies, who were the ſucceſſors of Alexander in Egypt, entered deeply into that hero's ſcheme, and reaped the benefit of his wiſe eſtabliſhment. Ptolemy Philadelphus, by encouraging trade, made his ſubjects immenſely rich, and himſelf inexpreſſibly powerful. We are told by an ancient author, that he had 120 galleys of war of an enormous ſize, and upwards of 4000 other veſſels, ſmall and great. This would appear incredible, if other wonders were not related of him, which ſeem to explain and confirm theſe. He raiſed a new city on the coaſt of the Red ſea; he was at an immenſe expence in opening harbours, conſtructing quays, in raiſing inns at proper diſtances on the road, and in cutting a canal from ſea to ſea. A prince who comprehended the importance of commerce to a degree that induced him to dare ſuch expences as theſe, might have what treaſures, what armies, what fleets he pleaſed. In his time, Alexandria appeared in pomp and ſplendour. She owed her birth to Alexander; but it was Ptolemy, who caught a double portion of his maſter's ſpirit, which raiſed her to that magnificence that ages could not deface. We may gueſs at what ſhe was in her glory, by what we are told was the produce of her cuſtoms, which fell little ſhort of two millions of our money annually; and yet we cannot ſuppoſe that Ptolemy, who underſtood trade ſo well, would cramp it by high duties, or extravagant impoſitions. When the revenue of the prince from a ſingle port was ſo great, what muſt have been the riches of his ſubjects?

But what ſhows us Alexandria in the higheſt point of light, is the credit ſhe maintained after Egypt ſunk from an empire into a province. The Romans themſelves were ſtruck with the majeſty of her appearance; and though till then they had little regarded traffic, yet they were not long before they comprehended the advantages of ſuch a port, and ſuch a mart as Alexandria: they confirmed her privileges, they protected her inhabitants, they took every meaſure poſſible to preſerve her commerce; and this with ſo good an effect, that ſhe actually preſerved it longer than Rome herſelf could preſerve her power. She followed, indeed, the fortune of the empire, and became at laſt dependent upon Conſtantinople, when its founder removed thither the capital of the empire; and his ſucceſſor found means to transfer alſo a part of the trade of Alexandria to the ſame place. Yet this city continued ſtill to hold up her head, and though ſhe ſunk under the barbarous power of the Arabs, yet they grew poliſhed by degrees; by degrees ſhe recovered ſomewhat of her ancient pre-eminence; and though ſhe never roſe to any thing like her former luſtre, yet ſhe remained the centre of what little trade there was in the world; which is more than can be ſaid of almoſt any place that has fallen under the Mohammedan power.

When the Roman empire was overrun by barbarians, and arts and ſciences ſunk with that power which had cultivated and protected them, commerce alſo viſibly declined; or, to ſpeak with greater propriety, was overwhelmed and loſt. When that irruption of various nations had driven the Roman policy out of the greateſt part of Europe, ſome ſtraggling people, either forced by neceſſity, or led by inclination, took ſhelter in a few ſtraggling iſlands that lay near the coaſt of Italy, and which would never have been thought worth inhabiting in a time of peace. This was in the 6th century; and at their firſt fixing there they had certainly nothing more in view than living in a tolerable ſtate of freedom, and acquiring a ſubſiſtence as well as they could. Theſe iſlands being divided from each other by narrow channels, and thoſe channels ſo encumbered by ſhallows that it was impoſſible for ſtrangers to navigate them, theſe refugees found themſelves tolerably ſafe; and uniting amongſt themſelves for the ſake of improving their condition, and augmenting their ſecurity, they became in the 8th century a well-ſettled government, and aſſumed the form of a republic.

Simple and mean as this relation may appear, yet it is a plain and true account of the riſe, progreſs, and eſtabliſhment of the famous and potent republic of Venice. Her beginnings were indeed weak and ſlow; but when the foundation was once well laid, her growth was quick, and the increaſe of her power amazing. She extended her commerce on all ſides; and taking advantage of the barbarous maxims of the Mohammedan monarchies, ſhe drew to herſelf the profits of the Indian trade, and might, in ſome ſenſe, be ſaid to make Egypt a province, and the Saracens her ſubjects. By this means her traffic ſwelled beyond conception; ſhe became the common mart of all nations; her naval power arrived at a prodigious height; and making uſe of every favourable conjuncture, ſhe ſtretched her conqueſt not only over the adjacent terra firma of Italy, but through the iſlands of the Archipelago, ſo as to be at once miſtreſs of the ſea, of many fair and fruitful countries, and of part of the great city of Conſtantinople itſelf. But ambition, and the deſire of lording it over her neighbours, brought upon her thoſe evils which firſt produced a decay of trade and then a declenſion of power. General hiſtories indeed aſcribe this to the league of Cambray, when

History.

when all the great powers in Europe combined againſt this republic: and in truth, from that period the ſinking of her power is truly dated: but the Venetian writers very juſtly obſerve, that though this effect followed the league, yet there was another more latent, but at the ſame time a more effectual cauſe, which was, the falling off of their commerce; and they have ever ſince been more indebted to their wiſdom than their power; to the prudent concealing of their own weakneſs, and taking advantage of the errors of their enemies, than to any other cauſe, for their keeping up that part which they ſtill bear, and which had been loſt long ago by any other nation but themſelves.

At the ſame time that Venice roſe, as it were, out of the ſea, another republic was erected on the coaſt of Italy. There could not well be a worſe ſituation than the narrow, marſhy, unprofitable, and unwholeſome iſlands in the Adriatic, except the rocky, barren, and inhoſpitable ſhores of Liguria; and yet as commerce raiſed Venice the Rich on the one, ſo ſhe erected Genoa the Proud on the other. In ſpite of ambitious and warlike neighbours, in ſpite of a confined and unproducing country, and, which were ſtill greater impediments, in ſpite of perpetual factions and ſucceſſive revolutions, the trade of Genoa made her rich and great. Her merchants traded to all countries, and throve by carrying the commodities of the one to the other. Her fleets became formidable; and, beſides the adjacent iſland of Corſica, ſhe made larger and important conqueſts. She fixed a colony at Caffa, and was for ſome time in poſſeſſion of the coaſts on both ſides of the Black ſea. That emulation which is natural to neighbouring nations, and that jealouſy which riſes from the purſuit of the ſame miſtreſs, commerce, begat continual wars between theſe rival republics; which, after many obſtinate and bloody battles, were at laſt terminated in favour of Venice, by that famous victory of Chiozzo gained by her doge Andrew Contarini, from which time Genoa never pretended to be miſtreſs of the ſea. Theſe quarrels were fatal to both; but what proved more immediately deſtructive to the Genoeſe, was their avarice, which induced them to abandon the fair profits of trade for the ſake of that vile method of acquiring wealth by uſury. All Italy is now ſubject to France.

But we muſt now look to another part of the world. In the middle age of the German empire, that is, about the middle of the 13th century, there was formed a confederacy of many maritime cities, or at leaſt of cities not far from the ſea. This confederacy ſolely regarded commerce, which they endeavoured to promote and extend, by intereſting therein a great number of perſons, and endeavouring to profit by their different views and different lights. Though the cities of Germany held the principal rank in the Teutonic Hanſe, they did not however forbear aſſociating many other cities, as well in France as in England and in the Low Countries; the whole, however, without hurting the authority, without prejudice to the rights of the ſovereign on whom they depended. This confederacy had its laws, its ordinances, and its judgments, which were obſerved with the ſame reſpect as the maritime code of the Rhodians, who paſſing for the ableſt ſeamen in all antiquity, their conſtitutions were obſerved by the Greeks and Romans. The Teutonic Hanſe grew in a ſhort time to ſo high a rank in power and authority by the immenſe riches it acquired, that princes themſelves rendered it a ſincere homage from principles of eſteem and admiration. Thoſe of the north principally had frequent occaſion for their credit, and borrowed of them conſiderable ſums. The grand maſters of the Teutonic order, who were at that time ſovereigns of Livonia, declared themſelves conſervators of the rights and privileges of the Hanſe: all ſucceeded, not only to, but beyond their wiſhes; and Germany, charmed with their progreſs, looked on them with the ſame eyes as a curious gardener does on certain rare plants, though not of his own raiſing and culture. The kings of France and England granted alſo various privileges to the Teutonic confederacy; they exempted their veſſels in caſe of ſhipwreck from all demands whatſoever from the admiralty, or from private perſons; they forbade any diſturbance to their navigation at all times, and even when France was at war with the emperor, or the princes of the north. In fine, during the courſe of theſe unhappy wars which were ſtyled *Croiſades*, the Hanſe was ſignally conſulted, and gave always puiſſant ſuccours in money and in ſhips to the Chriſtians oppreſſed by infidels. It is aſtoniſhing that cities at ſo great a diſtance from each other, ſubject to different kings, ſometimes in open war, but always jealous of their rights, ſhould be able to confederate and live together in ſo ſtrict an union. But when this union had rendered them very rich and powerful, it cannot ſeem at all ſtrange, that on the one hand they grew arrogant and overbearing, took upon them not only to treat with ſovereigns on the foot of equality, but even to make war with them, and more than once with ſucceſs. It will, on the other hand, appear ſtill leſs ſtrange, that ſuch behaviour as this awakened various princes to a more particular view of the dangers that ſuch a league might produce, and the advantages that would naturally flow to their reſpective ſtates, by recovering their trade thus made over, at leaſt in ſome part to others, entirely to themſelves; and theſe, in few words, were the cauſes of the gradual declenſion of the Hanſeatic alliance, which is now totally diſſolved, although the cities of Lubeck, Hamburgh, and Bremen, maintain ſufficient marks of that ſplendour and dignity with which this confederacy was once adorned.

We muſt now turn our eyes to Portugal and Spain, where in the ſpace of about 50 years there happened a train of events which gradually led on to ſuch diſcoveries as changed the whole face of affairs in the commercial world, and gave to the knowledge of later ages what for ſome thouſand years had been kept ſecret from all mankind; we mean a perfect and diſtinct notion of that terraqueous globe which they inhabit. The kingdom of Portugal was ſmall, but well cultivated, very populous, and bleſſed with a variety of good ports; all which, however, had ſtood them in little ſtead, if they had not had a ſucceſſion of wiſe princes who, inſtead of involving themſelves in war with their neighbours to gratify their ambition, endeavoured to extend the happineſs and wealth of their ſubjects, and conſequently their own power, in the ſofter and more ſucceſsful method of protecting arts and ſciences, encouraging

History.

encouraging induſtry, and favouring trade. This, with the convenient ſituation of their country, in the beginning of the 15th century, prompted ſome lively ſpirits to attempt diſcoveries; and theſe, countenanced by a heroic young prince, puſhed on their endeavours with ſuch ſucceſs, that ſtep by ſtep the coaſt of Africa was ſurveyed as far as the Cape of Good Hope, to which they gave that name. The point they had in view was a new route to the Eaſt Indies, which Vaſquez de Gama happily diſcovered; and in a ſhort ſpace of time Portugal, from one of the leaſt conſiderable, grew to be one of the richeſt powers in Europe, gained prodigious dominions in Aſia and Africa, and raiſed a naval power ſuperior to any thing that had been ſeen for many ages before.

See *Columbus (Chriſtopher)*

But while this was doing, Chriſtopher Columbus, a Genoeſe of great capacity, though of almoſt unknown original, who had been bred to the ſea from his youth, and who had carefully ſtudied what others made a trade, formed in his mind the amazing project of counteracting experience, and ſailing to the Indies by a weſtern courſe. He offered this project to the Portugueſe, by whom it was conſidered and rejected as a chimera. He propoſed it afterwards to other ſtates, but with no better fortune; and at laſt owed the diſcovery of the New World to the high ſpirit of a heroine, the famous Iſabella, queen of Caſtile, who almoſt at her own expence, and with very little countenance from her huſband, who yet was ſtyled *Ferdinand the Wiſe*, furniſhed the adventurous Columbus with that poor ſquadron, with which, at once, in ſpite of all the difficulties that the envy of his officers, and the obſtinacy of his mutinous crew, threw in his way, he perfected his deſign, and laid open a new Indies, though in reality he aimed at the diſcovery of the old. Neither was this noble effort of his matchleſs underſtanding defeated; for after his deceaſe, Ferdinand Magellan, a Portugueſe, propoſed to the emperor Charles V. the diſcovery of a paſſage to the ſpice iſlands by the South ſeas, which was what Columbus aimed at; and though Magellan lived not to return, yet in one voyage the diſcovery was perfected. It is inconceivable almoſt how many and how great benefits accrued to Europe from theſe diſcoveries; of which, however, it is certain, that the Portugueſe made a very indifferent, and the Spaniards a much worſe, uſe; the former making ſlaves of, and the latter rooting out the natives. This, as it was a moſt ungrateful return to divine Providence for ſo high a bleſſing; ſo it might have been eaſily foreſeen it would prove, as experience has ſhown it did prove, highly prejudicial to their own intereſts, by depopulating very fine countries, which have been thereby turned into deſerts: and though on their firſt diſcovery infinite treaſures were returned from them, which were coined in the mints of Spain; yet by an obſtinate purſuit of this falſe policy, the Spaniſh iſlands in the Weſt Indies are now brought ſo low as to be ſcarce worth keeping. The conſequences that naturally followed on the diſcovery of a paſſage by the Cape of Good Hope, and of a fourth part of the globe in the weſtern hemiſphere, were, as it has been already hinted, the cauſe of an entire change in the ſtate of Europe, and produced, not only in Portugal and Spain, but in moſt other nations, a deſire of viſiting theſe remote parts; of eſtabliſhing colonies and manufactures; of exporting and importing commodities, and of raiſing, ſettling, and protecting new manufactures. By this means, as the reader cannot but perceive, not only particular nations brought about ſignal advantages to themſelves, but Europe in general received a laſting and invaluable benefit; for its potentates made themſelves formidable, and even terrible in thoſe diſtant parts of the earth, where their fame had hardly reached before. It is however true, that this has not been carried on as high as it might have been; for though there was room enough for every nation to have had its ſhare, and though it might be demonſtrated that the good of the whole would have contributed ſufficiently to the profit of every ſtate, the ſubjects of which had engaged in this traffic; yet inſtead of proſecuting ſo natural and ſo equitable a meaſure, they have taken a quite contrary courſe; and by decrying, attacking, and deſtroying each other, have very much leſſened that prodigious reverence which the Aſiatics, Africans, and Americans, at firſt had for the inhabitants of Europe.

The naval power of the Portugueſe received an incurable wound by falling under the power of the Spaniards; and though human policy would have ſuggeſted, that this alone muſt have raiſed the latter to the monopoly of commerce, and the univerſal dominion of the ſea; yet the very purſuit of a deſign ſo viſibly detrimental to the intereſt of mankind, proved very quickly their ruin alſo. For the Spaniards, from the natural haughtineſs of their temper, miſled by the boundleſs ambition of their princes, and endeavouring to become the lords of Europe, forced other nations in their own defence to make a much quicker progreſs in navigation than otherwiſe they could have done. For the Engliſh and Dutch, who till this time ſeemed blind to the advantages of their ſituation, had their eyes opened by the injuries they received; and by degrees the paſſion of revenge inſpired them with deſigns that poſſibly public ſpirit would never have excited. In ſhort, the pains taken by Spain to keep all the riches that flowed from theſe diſcoveries to herſelf, and the dangerous, deteſtable, and deſtructive purpoſes to which ſhe applied the immenſe wealth that flowed in upon her from them, produced effects directly oppoſite to thoſe which ſhe propoſed, and made her enemies rich, great, powerful, and happy, in proportion as her commerce dwindled away, and as her naval power ſunk and crumbled to pieces, merely by an improper diſplay, an ill-managed exertion, and a wrong application of it.

It was from hence that the inhabitants of the Seven Provinces, whom her oppreſſion had made poor, and her ſeverities driven mad, became firſt free, then potent, and by degrees rich. Their diſtreſſes taught them the neceſſity of eſtabliſhing a moderate and equal government; the mildneſs of that government, and the bleſſings which it procured to its ſubjects, raiſed their number and elevated their hopes. The conſequences became quickly viſible, and in a ſhort time amazing both to friends and enemies; every fiſhing village improved into a trading town; their little towns grew up into large and magnificent cities; their inland boroughs were filled with manufactures; and in leſs than half a century the diſtreſſed States of Holland

Holland became high and mighty; nay, in ſpite of the dangers and expences which attended a war made all that time againſt a ſuperior force, theſe people, ſurrounded with enemies, loaded with taxes, expoſed to perſonal ſervice, and to a thouſand other diſadvantages, grew up to ſuch a ſtrength as not only made the Spaniards deſpair of reducing them any more under their dominion, but inclined them to wiſh, and at laſt forced them to ſolicit, their friendſhip.

This, at leaſt as far as ancient or modern hiſtories inform us, was the quickeſt and ſtrongeſt of all the productions of commerce that the world has ever ſeen. For it is beyond diſpute that the republic of the United Provinces owes her freedom, her power, and her wealth, entirely to induſtry and trade. The greateſt part of the country is far from being fertile: and what is ſo, produces not enough to ſuffice the tenth part of the inhabitants for the tenth part of the year: the climate is rather tolerable than wholſome; and its havens are rather advantageous from the difficulty of entering them, than from their commodiouſneſs in any other reſpect. Of native commodities they have few or none; timber and maritime ſtores are entirely wanting; their country cannot boaſt ſo much as of a coal-mine; and yet theſe provinces upon whom nature has beſtowed ſo little, in conſequence of an extenſive trade, are enriched with all things. Their ſtore-houſes are full of corn, even when the harveſt in corn-countries fails; there is no commodity, however bulky, or ſcarce and hard to be come at, which may not be had from their magazines. The ſhipping of Holland is prodigious; and to ſee the quantities of naval ſtores with which their yards and ports abound, aſtoniſhes thoſe who are unacquainted with the vigour of that cauſe which produces this abundance. But above all, the populouſneſs of this country is the greateſt miracle. That men ſhould reſort to a Canaan, and deſire to live in a land flowing with milk and honey, is nothing ſtrange; but that they ſhould make it their choice to force nature, to raiſe palaces, lay out gardens, dig canals, plant woods, and ranſack all the quarters of the earth for fruits and flowers, to produce an artificial paradiſe in a dead plain, or upon an ungrateful heath in the midſt of fogs and ſtanding lakes, would in ſo critical an age as this paſs for a fable, if the country did not lie ſo near us as to put the truth of it out of queſtion. It is now ſubject to France.

§ 2. *Britiſh Hiſtory.*

We may eaſily conceive, that foreign commerce by the natives of this iſland muſt have been a work of time; for men firſt think of neceſſaries, then of conveniences, and laſt of ſuperfluities. Thoſe who came originally from the continent might have better notions of things; but as it muſt be preſumed that either fear of indigence drove them hither, ſo it is eaſy to apprehend that ſucceeding generations muſt for ſome time ſink much below their anceſtors in their notions of the commodities of life; and, deriving their manners from their circumſtances, become quite another ſort of people. But thoſe on the oppoſite continent, knowing that this iſland was inhabited, and having the uſe, though in ever ſo imperfect a degree, of veſſels and of foreign traffic, came over hither, and bartered their goods for the raw commodities of the Britons, till by degrees perhaps they taught the latter to make ſome improvements in thoſe ſlight leather and wicker boats, which they uſed for paſſing their own rivers, and creeping along their coaſts, till at laſt they ventured themſelves over to Gaul, and entered upon ſome kind of correſpondence with their neighbours. All this is ſo deducible from the laws of nature, that we might have conceived thus much by the light of reaſon, if we had not the Commentaries of Cæſar to guide us, and to ſtrengthen by the authority of hiſtory, the facts that might have been found out by the force of rational conjecture.

Things were preciſely in this ſituation when the Romans invaded Britain; and there is no doubt that our anceſtors falling under the power of that empire, and under its power at a time when, with reſpect to arts and ſciences, it was in a moſt flouriſhing condition, was a great advantage to them; and though from their love of civil liberty, which, when under the direction of reaſon, is the moſt natural and laudable of all paſſions, they made a long and vigorous, and in ſome ſenſe a noble and glorious, reſiſtance; yet by degrees they caught the manners and cuſtoms of their conquerors, and grew content to be happy rather than free. With learning and politeneſs the Romans introduced foreign commerce; and according to the nature of their policy, as they made high roads through the iſland, eſtabliſhed colonies in proper places, and fixed ſtanding camps, which were a kind of fortreſſes, where they thought proper; ſo they were no leſs careful with regard to marts or emporiums for the conveniency of traders, and of which what they found was uncertain; but that they left many, is without queſtion; and among the reſt London, which is not more famous for her preſent extenſive trade, than venerable for her unrecorded antiquity.

When the Romans unwillingly left Britain, and the Britons as unwillingly made way for the Saxons, a new deluge of barbarity overflowed this iſland; almoſt all the improvements of our civilized conquerors were effaced; and upon the eſtabliſhment as it were of a new people, things were all to begin again. This neceſſarily took up a great deal of time; and before they were in any tolerable poſture, the Saxons found themſelves diſtreſſed by freſh ſwarms of barbarians. Yet there ſtill remain ſome evidences of their having been acquainted with, inclined to, and, if their circumſtances would have permitted, moſt certainly would have entered upon and carried foreign commerce to a great height. We have authentic teſtimonies, that Alfred the Great formed projects of vaſt diſcoveries to the North, as he actually ſent perſons of great prudence and abilities into the Eaſt; and the curioſities which they brought home were for many ages preſerved in the treaſury of the church of Saliſbury.

As for the Danes, they were not long our maſters; but as they became ſo by a maritime force, and as their countrymen had eſtabliſhed themſelves not only on the oppoſite ſhore of France, but in other parts of Europe, it is reaſonable to believe that they held ſome correſpondence with them from thence; and that, if their dominion had laſted longer, this might have been better regulated, and productive of many advantages. But they had ſoon to do with their brethren in

in another way; for the Normans, men of the ſame race, but better eſtabliſhed in another country, diſpoſſeſſed them here; and partly under colour of right, partly by force, erected that monarchy, which, not without various alterations and changes, ſubſiſts even to our times, and to the ſubſiſtence of which, with the help of thoſe changes and alterations, we owe that happy conſtitution under which we live; that univerſal improvement which adorns the face of our country; that domeſtic trade which nouriſhes ſo numerous a people, by plentifully rewarding their induſtry; and that extenſive commerce which is at once the ſource of our wealth and the ſupport of our liberty.

It cannot be expected, that in a work like this we ſhould attempt to trace the progreſs of trade through every reign; ſhow how it was encouraged and protected, or diſcountenanced and checked; what occaſions were luckily ſeized, or what opportunities unfortunately loſt. It may be ſufficient for us, after what has been already ſaid, to obſerve, that the opinion commonly entertained, of our having little or no trade before the reign of Queen Elizabeth, is very far from being well founded.

In fact, the reign of that princeſs was great and glorious in whatever light we conſider it; but it was moſt ſo in this, that under Providence, it became great and glorious by the wiſdom and prudence of the queen and her miniſters. The Engliſh nation never was in ſo deſperate a condition as at her acceſſion. The crown was in debt, the treaſury empty, the nation involved in a foreign war directly againſt her own intereſts, her coaſts naked; in a word, without credit abroad, and without concord at home, no ſettled religion, the great men ſplit into factions, and the common people diſtracted and dejected. Sad circumſtances theſe! and yet from hence aroſe the grandeur of that reign, and the eſtabliſhment of our commerce. The queen found herſelf obliged to act with great caution, to derive aſſiſtance from every quarter, to employ it faithfully, and to promote to the utmoſt of her power the welfare of her ſubjects, whom nothing but the public-ſpiritedneſs of her government could enable to grow rich enough to ſupport the neceſſary expences of the crown. It was this gave a popular turn to her councils. She encouraged her ſubjects to arm againſt the Spaniards, that they might be accuſtomed to the ſea, and acquire that knowledge in navigation, with which, till then, they had been unacquainted. She paſſed many laws for the public good, erected ſeveral companies, and ſaw that thoſe companies purſued the ends for which they were erected; in ſhort, ſhe did every thing that could be expected, during the whole courſe of her reign, to excite and encourage induſtry at home, and to enable us to make a proper figure abroad. In a word, ſhe furniſhed us with ſtock and credit, put us upon improving our commodities and manufactures, brought the art of ſhip-building amongſt us, filled our ports with able ſeamen, ſhowed a juſt reſpect to Engliſh merchants, reduced Ireland ſo as to render it beneficial to Britain, and approved our ſending colonies into America; and thus the ſeeds of Britiſh wealth were ſown in her time, though the harveſt was reaped in the days of her ſucceſſors. See the articles COALERY, COLONY, FISHERIES, MANUFACTURES, SHIPPING, and TRADE.

CHAP. II. PRINCIPLES *of* COMMERCE.

SECT. I. *Origin of Trade.*

THE moſt ſimple of all trade is that which is carried on by bartering the neceſſary articles of ſubſiſtence. If we ſuppoſe the earth free to the firſt poſſeſſor, this perſon who cultivates it will firſt draw from it his food, and the ſurplus will be the object of barter: he will give this in exchange to any one who will ſupply his other wants. This naturally ſuppoſes both a ſurplus quantity of food produced by labour, and alſo free hands; for he who makes a trade of agriculture cannot ſupply himſelf with all other neceſſaries, as well as food; and he who makes a trade of ſupplying the farmers with ſuch neceſſaries, in exchange for his ſurplus of food, cannot be employed in producing that food. The more the neceſſities of man increaſe, the more free hands are required to ſupply them; and the more free hands are required, the more ſurplus food muſt be produced by additional labour, to ſupply their demand.

This is the leaſt complex kind of trade, and may be carried on to a greater or leſs extent, in different countries, according to the different degrees of the wants to be ſupplied. In a country where there is no money, nor any thing equivalent to it, the wants of mankind will be confined to few objects; to wit, the removing the inconveniences of hunger, thirſt, cold, heat, danger, and the like. A free man, who by his induſtry can procure all the comforts of a ſimple life, will enjoy his reſt, and work no more; and, in general, all increaſe of work will ceaſe, ſo ſoon as the demand for the purpoſes mentioned comes to be ſatisfied. There is a plain reaſon for this. When the free hands have procured, by their labour, wherewithal to ſupply their wants, their ambition is ſatisfied: ſo ſoon as the huſbandmen have produced the neceſſary ſurplus for relieving theirs, they work no more. Here then is a natural ſtop put to induſtry, conſequently to bartering.

The next thing to be examined is, how bartering grows into trade, properly ſo called, and underſtood, according to the definition given of it above; how trade becomes to be extended among men; how manufactures, more ornamental than uſeful, come to be eſtabliſhed; and how men come to ſubmit to labour, in order to acquire what is not abſolutely neceſſary for them.

This, in a free ſociety, is chiefly owing to the introduction of money, and a taſte for ſuperfluities in thoſe who poſſeſs it.

In ancient times money was not wanting; but the taſte for ſuperfluities not being in proportion to it, the ſpecie was locked up. This was the caſe in Europe four hundred years ago. A new taſte for ſuperfluity has drawn, perhaps, more money into circulation, from our own treaſures, than from the mines of the new world. The poor opinion we entertain of the riches of our forefathers, is founded upon the modern way of eſtimating wealth, by the quantity of coin in circulation, from which we conclude, that the greateſt part of the ſpecie now in our hands muſt have come from America.

Principles.

It is more, therefore, through the taste of superfluity, than in consequence of the quantity of coin, that trade comes to be established; and it is only in consequence of trade that we see industry carry things in our days to so high a pitch of refinement and delicacy. Let us illustrate this, by comparing together the different operations of barter, sale, and commerce.

When reciprocal wants are supplied by barter, there is not the smallest occasion for money: this is the most simple of all combinations.

When wants are multiplied, bartering becomes more difficult: upon this money is introduced. This is the common price of all things: it is a proper equivalent in the hands of those who want, perfectly calculated to supply the occasions of those who, by industry, can relieve them. This operation of buying and selling is a little more complex than the former; but still we have here no idea of trade, because we have not introduced the merchant, by whose industry it is carried on.

Let this third person be introduced, and the whole operation becomes clear. What before we called *wants*, is here represented by the consumer; what we called *industry*, by the manufacturer; what we called *money*, by the merchant. The merchant here represents the money, by substituting credit in its place; and as the money was invented to facilitate barter, so the merchant, with his credit, is a new refinement upon the use of money. This renders it still more effectual in performing the operations of buying and selling. This operation is trade: it relieves both parties of the whole trouble of transportation, and adjusting wants to wants, or wants to money; the merchant represents by turns both the consumer, the manufacturer, and the money. To the consumer he appears as the whole body of manufacturers; to the manufacturers as the whole body of consumers; and to the one and the other class his credit supplies the use of money. This is sufficient at present for an illustration. We now return to the simple operations of money in the hands of the two contracting parties, the buyer and the seller, in order to show how men come to submit to labour in order to acquire superfluities.

So soon as money is introduced into a country, it becomes an universal object of want to all the inhabitants.

The consequence is, that the free hands of the state who before stopt working, because all their wants were provided for, having this new object of ambition before their eyes, endeavour, by refinements upon their labour, to remove the smaller inconveniences which result from a simplicity of manners. People, who formerly knew but one sort of clothing for all seasons, willingly part with a little money to procure for themselves different sorts of apparel properly adapted to summer and winter, which the ingenuity of manufacturers, and their desire of getting money, may have suggested to their invention.

Indeed these refinements seem more generally owing to the industry and invention of the manufacturers (who by their ingenuity daily contrive means of softening or relieving inconveniencies which mankind seldom perceive to be such, till the way of removing them is contrived), than to the taste for luxury in the rich, who, to indulge their ease, engage the poor to become industrious.

Let any man make an experiment of this nature upon himself, by entering into the first shop. He will nowhere discover so quickly his wants as there. Every thing he sees appears either necessary, or at least highly convenient; and he begins to wonder how he could have been so long without that which the ingenuity of the workman alone had invented, in order that from the novelty it might incite his desire; for perhaps when it is bought, he will never once think of it more, nor ever apply it to the use for which at first it appeared so necessary.

Here then is a reason why mankind labour though not in want. They become desirous of possessing the very instruments of luxury, which their avarice or ambition prompted them to invent for the use of others.

What has been said represents trade in its infancy, or rather the materials with which that great fabric is built.

We have formed an idea of the wants of mankind multiplied even to luxury, and abundantly supplied by the employment of all the free hands set apart for that purpose. But if we suppose the workman himself disposing of his work, and purchasing with it food from the farmer, clothes from the clothier; and, in general, seeking for the supply of every want from the hands of the person directly employed for the purpose of relieving it; this will not convey an idea of trade according to our definition.

Trade and commerce are an abbreviation of this long process; a scheme invented and set on foot by merchants, from a principle of gain, supported and extended among men, from a principle of general utility to every individual, rich or poor; to every society, great or small.

Instead of a pin-maker exchanging his pins with 50 different persons, for whose labour he has occasion, he sells all to the merchant for money or for credit; and as occasion offers, he purchases all his wants, either directly from those who supply them, or from other merchants, who deal with manufacturers in the same way his merchant dealt with him.

Another advantage of trade is, that industrious people in one part of the country may supply customers in another, though distant. They may establish themselves in the most commodious places for their respective business, and help one another reciprocally, without making the distant parts of the country suffer for want of their labour. They are likewise exposed to no avocation from their work, by seeking for customers.

Trade produces many excellent advantages; it marks out to the manufacturers when their branch is under or overstocked with hands. If it is understocked, they will find more demand than they can answer; if it is overstocked, the sale will be slow.

Intelligent men, in every profession, will easily discover when these appearances are accidental, and when they proceed from the real principles of trade.

Posts, and correspondence by letters, are a consequence of trade; by the means of which merchants are regularly informed of every augmentation or diminution

nution of induſtry in every branch, in every part of the country. From this knowledge they regulate the prices they offer; and as they are many, they ſerve as a check upon one another, from the principles of competition.

From the current prices, the manufacturers are as well informed, as if they kept the correſpondence themſelves: the ſtateſman feels perfectly where hands are wanting, and young people deſtined to induſtry, obey, in a manner, the call of the public, and fall naturally in to ſupply the demand.

Two great aſſiſtances to merchants, eſpecially in the infancy of trade, are public markets for collecting the work of ſmall dealers, and large undertakings in the manufacturing way by private hands. By theſe means the merchants come at the knowledge of the quantity of work in the market, as on the other hand the manufacturers learn, by the ſale of the goods, the extent of the demand for them. Theſe two things being juſtly known, the price of goods is eaſily fixed.

Public ſales ſerve to correct the ſmall inconveniences which proceed from the operations of trade. A ſet of manufacturers got all together into one town, and entirely taken up with their induſtry, are thereby as well informed of the rate of the market as if every one of them carried thither his work; and upon the arrival of the merchant, who readily takes it off their hands, he has not the leaſt advantage over them from his knowledge of the ſtate of demand. This man both buys and ſells in what is called *wholeſale*; and from him retailers purchaſe, who diſtribute the goods to every conſumer throughout the country. Theſe laſt buy from wholeſale merchants in every branch, that proportion of every kind of merchandiſe which is ſuitable to the demand of their borough, city, or province.

Thus all inconveniences are prevented, at ſome additional coſt to the conſumer, who muſt naturally reimburſe the whole expence. The diſtance of the manufacturer, the obſcurity of his dwelling, the caprice in ſelling his work, are quite removed; the retailer has all in his ſhop, and the public buys at a current price.

§ 2. *How the price of Goods is determined by Trade.*

In the price of goods, two things muſt be conſidered as really exiſting, and quite different from one another; to wit, the real value of the commodity, and the profit upon alienation.

I. The firſt thing to be known of any manufacture, when it comes to be ſold, is how much of it a perſon can perform in a day, a week, a month, according to the nature of the work, which may require more or leſs time to bring it to perfection. In making ſuch eſtimates, regard is to be had only to what, upon an average, a workman of the country in general may perform, without ſuppoſing him the beſt or the worſt in his profeſſion, or having any peculiar advantage or diſadvantage as to the place where he works.

Hence the reaſon why ſome people proſper by their induſtry, and others not; why ſome manufactures flouriſh in one place and not in another.

II. The ſecond thing to be known is, the value of the workman's ſubſiſtence, and neceſſary expence, both for ſupplying his perſonal wants and providing the inſtruments belonging to his profeſſion, which muſt be taken upon an average as above, except when the nature of the work requires the preſence of the workman in the place of conſumption; for although ſome trades, and almoſt every manufacture, may be carried on in places at a diſtance, and therefore may fall under one general regulation as to prices; yet others there are, which, by their nature, require the preſence of the workman in the place of conſumption; and in that caſe the prices muſt be regulated by circumſtances relative to every particular place.

III. The third and laſt thing to be known, is the value of the materials, that is, the firſt matter employed by the workman; and if the object of his induſtry be the manufacture of another, the ſame proceſs of inquiry muſt be gone through with regard to the firſt as the ſecond; and thus the moſt complex manufactures may be at laſt reduced to the greateſt ſimplicity.

Theſe three articles being known, the price of manufacture is determined. It cannot be lower than the amount of all the three, that is, than the real value; whatever it is higher, is the manufacturer's profit. This will ever be in proportion to demand, and therefore will fluctuate according to circumſtances.

Hence appears the neceſſity of a great demand, in order to promote flouriſhing manufactures.

By the extenſive dealings of merchants, and their conſtant application to the ſtudy of the balance of work and demand, all the above circumſtances are known to them, and are made known to the induſtrious, who regulate their living and expence according to their certain profit.

Employ a workman in a country where there is little trade or induſtry, he proportions his price always to the urgency of your want, or your capacity to pay, but ſeldom to his own labour. Employ another in a country of trade, he will not impoſe upon you, unleſs perhaps you be a ſtranger, which ſuppoſes your being ignorant of the value; but employ the ſame workman in a work not uſual in the country, conſequently not demanded, and therefore not regulated as to the value, he will proportion his price as in the firſt ſuppoſition.

We may therefore conclude, from what has been ſaid, that in a country where trade has been eſtabliſhed, manufactures muſt flouriſh, from the ready ſale, the regulated price of work, and the certain profit reſulting from induſtry. Let us next inquire into the conſequences of ſuch a ſituation.

§ 3. *How foreign Trade opens to an induſtrious People, and the conſequences of it to the Merchants who ſet it on foot.*

The firſt conſequence of the ſituation deſcribed in the preceding ſection is, that wants are eaſily ſupplied for the adequate value of the thing wanted.

The next conſequence is, the opening of foreign trade, under its two denominations of paſſive and active. Strangers and people of diſtant countries, finding the difficulty of having their wants ſupplied at home, and the eaſe of having them ſupplied from this country, immediately have recourſe to it. This is paſſive trade. The active is when merchants, who have executed this plan at home with ſucceſs, begin to tranſport

Principles

port the labour of their countrymen into other regions, which either produce, or are capable of producing such articles of consumption, proper to be manufactured, as are most demanded at home; and consequently will meet with the readiest sale, and fetch the largest profits.

Here then is the opening of foreign trade, under its two denominations of active and passive.

What then are the consequences of this new commerce to our merchants, who have left their homes in quest of gain abroad?

The first is, that, arriving in any new country, they find themselves in the same situation with regard to the inhabitants, as the workman in the country of no trade, with regard to those who employ him; that is, they proportion the price of their goods to the eagerness of acquiring, or the capacity of paying, in the inhabitants, but never to their real value.

The first profits then, upon this trade, must be very considerable; and the demand from such a country will be *high* or *low*, *great* or *small*, according to the spirit, not the real wants of the people; for these in all countries must first be supplied by the inhabitants themselves, before they cease to labour.

If the people of this not-trading country be abundantly furnished with commodities useful to the traders, they will easily part with them, at first, for the instruments of luxury and ease; but the great profit of the traders will insensibly increase the demand for the production of their new correspondents: this will have the effect of producing a competition between themselves, and thereby throwing the demand on their side. This is perpetually a disadvantage in traffic; the most unpolished nations in the world quickly perceive the effects of it, and are taught to profit by the discovery, in spite of the address of those who are the most expert in commerce.

The traders will therefore be very fond of falling upon every method and contrivance to inspire this people with a taste of refinement and delicacy. Abundance of fine presents, consisting of every instrument of luxury and superfluity, the best adapted to the genius of the people, will be given to the prince and leading men among them. Workmen will even be employed at home, to study the taste of the strangers, and to captivate their desires by every possible means. The more eager they are of presents, the more lavish the traders will be in bestowing and diversifying them. It is an animal put up to fatten; the more he eats, the sooner he is fit for slaughter. When their taste for superfluity is fully formed, when the relish for their former simplicity is sophisticated, poisoned, and obliterated, then they are surely in the fetters of the traders, and the deeper they go, the less possibility there is of being extricated. The presents then will die away, having served their purpose; and if afterwards they are found to be continued, it will probably be to support the competition against other nations, who will incline to share of the profits.

If, on the contrary, this not-trading nation does not abound with commodities useful to the traders, these will make little account of trading with them, whatever their turn may be; but, if we suppose this country inhabited by a laborious people, who, having taken a taste for refinement from the traders, apply themselves to agriculture, in order to produce articles of subsistence, they will solicit the merchants to give them part of their manufactures in exchange for those; and this trade will undoubtedly have the effect of multiplying numbers in the trading nation. But if food cannot be furnished, nor any other branch of production found out to support the correspondence, the taste for refinement will soon die away, and trade will stop in this quarter.

Had it not been for the furs in those countries adjacent to Hudson's bay, and in Canada, the Europeans never would have thought of supplying instruments of luxury to those nations; and if the inhabitants of those regions had not taken a taste for the instruments of luxury furnished to them by the Europeans, they never would have become so indefatigable nor so dexterous hunters. At the same time we are not to suppose that ever these Americans would have come to Europe in quest of our manufactures. It is, therefore, owing to our merchants, that these nations are become in any degree fond of refinement; and this taste, in all probability, will not soon exceed the proportion of the productions of their country. From these beginnings of foreign trade it is easy to trace its increase.

One step towards this, is the establishing correspondences in foreign countries; and these are more or less necessary in proportion as the country where they are established is more or less polished, or acquainted with trade. They supply the want of posts, and point out to the merchants what proportion the productions of the country bear to the demand of the inhabitants for manufactures. This communicates an idea of commerce to the not-trading nation, and they insensibly begin to fix a determined value upon their own productions, which perhaps bore no determined value at all before.

Let us trace a little the progress of this refinement in the savages, in order to show how it has the effect of throwing the demand upon the traders, and of creating a competition among them for the productions of the new country.

Experience shows, that, in a new discovered country, merchants constantly find some article or other o its productions, which runs out to a great account in commerce; and we see that the longer such a trade subsists, and the more the inhabitants take a taste for European manufactures, the more their own productions rise in their value, and the less profit is made by trading with them, even in cases where the trade is carried on by companies; which is a very wise institution for one reason, that it cuts off a competition between our merchants.

This is the best means of keeping prices low in favour of the nation; however, it may work a contrary effect with respect to individuals who must buy from these monopolies.

When companies are not established, and when trade is open, our merchants, by their eagerness to profit by the new trade, betray the secrets of it; they enter into competition for the purchase of the foreign produce; and this raises prices, and favours the commerce of the most ignorant savages.

§ 4.

Principles.

§ 4. *Consequences of the Introduction of a passive Foreign Trade among a People who live in Simplicity and Idleness.*

We now suppose the arrival of traders, all in one interest, with instruments of luxury and refinement, at a port in a country of great simplicity of manners, abundantly provided by nature with great advantages for commerce, and peopled by a nation capable of adopting a taste for superfluities.

The first thing the merchants do is, to expose their goods, and point out the advantages of many things, either agreeable or useful to mankind in general, such as wines, spirits, instruments of agriculture, arms and ammunition for hunting, nets for fishing, manufactures for clothing, and the like. The advantages of these are presently perceived, and such commodities are eagerly sought after.

The natives, on their side, produce what they most esteem, generally something superfluous or ornamental. The traders, after examining all circumstances, determine the object of their demand, giving the least quantity possible in return for this superfluity, in order to impress the inhabitants with a high notion of the value of their own commodities; but as this parsimony may do more hurt than good to their interest, they are very generous in making presents, from the principles mentioned above.

When the exchange is completed, and the traders depart, regret is commonly mutual; the one and the other are sorry that the superfluities of the country fall short. A return is promised by the traders, and assurances are given by the natives of a better provision another time.

What are the first consequences of this revolution?

It is evident, that, in order to supply an equivalent for this new want, more hands must be set to work than formerly. And it is evident also, that this augmentation of industry will not essentially increase numbers: Why? Because the produce of the industry is, in this case, intended to be exported. But, if we can find out any additional consumption at home, even implied by this new trade, it will have the effect of augmenting numbers. An example will make this plain.

Let us suppose the superfluity of this country to be the skins of wild beasts, not proper for food; the manufacture sought for, brandy. The brandy is sold for furs. He who has furs, or he who can spare time to hunt for them, will drink brandy in proportion; but there is no reason to conclude from this simple operation, that one man more in the country must necessarily be fed, or that any augmentation of agriculture must of consequence ensue from this new traffic.

But let us throw in a circumstance which may imply an additional consumption at home, and then examine the consequences.

A poor creature who has no equivalent to offer for food, who is miserable, and ready to perish for want of subsistence, goes a hunting, and kills a wolf; he comes to a farmer with the skin, and says, You are well fed, but you have no brandy; if you will give me a loaf, I will give you this skin, which the strangers are so fond of, and they will give you brandy. But, says the farmer, I have no more bread than what is sufficient for my own family. As for that, replies the other, I will come and dig in your ground, and you and I will settle our account as to the small quantity I desire of you. The bargain is made: the poor fellow gets his loaf, and lives at least; perhaps he marries, and the farmer gets a dram. But had it not been for this dram, that is, this new want, which was purchased by the industry of this poor fellow, by what argument could he have induced the farmer to part with a loaf?

Here the sentiment of charity is excluded. This alone is a principle of multiplication; but as true it is, on the other hand, that could the poor fellow have got bread by begging, he would not probably have gone a hunting.

Here then it appears that the very dawning of trade, in the most unpolished countries, implies a multiplication. This is sufficient to point out the first step, and to connect the subject of our present inquiries with what has already been discussed in relation to other circumstances.

So soon as all the furs are disposed of, and a taste for superfluity is introduced, both the traders and the natives will be equally interested in the advancement of industry in this country. Many new objects of profit for the first will be discovered, which the proper employment of the inhabitants, in reaping the natural advantages of their soil and climate, will make effectual. The traders will therefore endeavour to set on foot many branches of industry among the savages, and the allurements of brandy, arms, and clothing, will animate these in the pursuit of them.

When once this revolution is brought about; when those who formerly lived in simplicity become industrious; matters put on a new face.

That is to say, we now find two trading nations instead of one; with this difference, however, that as hitherto we have supposed the merchants all in one interest, the compound demand, that is, the competition of the buyers, has been, and must still continue on the side of the natives. This is a great prejudice to their interest: but as it is not supposed sufficient to check their industry, nor to restrain their consumption of the manufactures, let us here examine a little more particularly the consequences of the principle of demand in such a situation; for although we allow, that it can never change sides, yet it may admit of different modifications, and produce different effects, as we shall presently perceive.

The merchants we suppose all in one interest, consequently there can be no competition among them; no check can be put upon their raising their prices, as long as the prices they demand are complied with. So soon as they are raised to the full extent of the abilities of the natives, or of their inclination to buy, the merchants have the choice of three things, which are all perfectly in their option; and the preference to be given to the one or the other, depends entirely upon themselves, and upon the circumstances we are going to point out.

First, they may support their *high* demand; that is, not lower their price, which will preserve a high estimation of the manufactures in the opinion of the inhabitants, and render the profits upon their trade the greatest possible. This part they may possibly take, if they perceive the natives doubling their diligence,

Principles.

gence, in order to become able, in time, to purchase confiderable cargoes at a high value; from which suppofition is inferred a ftrong difpofition in the people to become luxurious, fince nothing but want of ability prevents them from complying with the higheft demand: but ftill another circumftance muft concur, to engage the merchants not to lower their price. The great proportion of the goods they feek for in return, muft be found in the hands of a few. This will be the cafe if flavery be eftablifhed; for then there muft be many poor and few rich; and they are commonly the rich confumers who proportion the price they offer, rather to their defires, than to the value of the thing.

The fecond thing which may be done is, to encourage a great demand; that is, to lower their prices. This will fink the value of the manufactures in the opinion of the inhabitants, and render profits lefs in proportion, although indeed, upon the voyage, the profits may be greater.

This part they will take, if they perceive the inhabitants do not incline to confume great quantities of the merchandife at a high value, either for want of abilities or inclination; and alfo, if the profits upon the trade depend upon a large confumption, as is the cafe in merchandife of a low value, and fuited chiefly to the occafions of the lower fort. Such motives of expediency will be fufficient to make them relinquifh a high demand, and prefer a great one; and the more, when there is a likelihood that the confumption of low-priced goods in the beginning may beget a tafte for others of a higher value, and thus extend in general the tafte of fuperfluity.

A third part to be taken is the leaft politic, and perhaps the moft familiar. It is to profit by the competition between the buyers, and encourage the rifing of demand as long as poffible: when this comes to a ftop, to make a kind of auction, by firft bringing down the prices to the level of the higheft bidders, and fo to defcend by degrees, in proportion as demand finks. Thus we may fay with propriety, that demand commonly becomes great, in proportion as prices fink. By this operation, the traders will profit as much as poffible, and fell off as much of their goods as the profits will permit.

But this plan, in a new difcovered country, is not politic, as it both difcovers a covetoufnefs and a want of faith in the merchants, and alfo throws open the fecrets of their trade to thofe who ought to be kept ignorant of them.

Let us next fuppofe, that the large profits of our merchants fhall be difcovered by others, who arrive at the fame ports in a feparate intereft, and who enter into no combination which might prevent the natural effects of competition.

Let the ftates of demand among the natives be fuppofed the fame as formerly, both as to height and greatnefs, in confequence of the operation of the different principles, which might have induced our merchants to follow one or other of the plans we have been defcribing: we muft, however, ftill fuppofe, that they have been careful to preferve confiderable profits upon every branch.

If we fuppofe the inhabitants to have increafed in numbers, wealth, and tafte for fuperfluity, fince the laft voyage, demand will be found rather on the rifing hand. Upon the arrival of the merchants in competition with the former, both will offer to fale; but if both ftand at the fame prices, it is very natural to fuppofe, that the former dealers will obtain a preference; as *cæteris paribus* it is always an advantage to know and to be known. The laft comers, therefore, have no other way left to counterbalance this advantage, but to lower their prices.

Principles.

This is a new phenomenon: here the fall of prices is not voluntary as formerly, nor confented to from expediency; not owing to a failure of demand, but to the influence of a new principle of commerce, to wit, a double competition, which we fhall now examine.

§ 5. *Of double Competition.*

When competition is much ftronger on one fide of the contract than on the other, it is called *fimple*. This is the fpecies of competition which is implied in the terms *high demand*, or when it is faid that *demand raifes prices*.

Double competition is, when, in a certain degree, it takes place on both fides of the contract at once, or vibrates alternately from one to the other. This is what reftrains prices to the adequate value of merchandife.

The great difficulty is to diftinguifh clearly between the principles of *demand* and thofe of *competition*: here then follow the principal differences between the two relatively to the effects they produce feverally in the mercantile contract of buying and felling, which we here exprefs fhortly by the word *contract*.

Simple demand is what brings the quantity of commodity to market. Many demand, who do not buy; many offer, who do not fell. This demand is called *great* or *fmall*; it is faid to increafe, to augment, to fwell; and is expreffed by thefe and other fynonymous terms, which mark an augmentation or diminution of quantity. In this fpecies, two people never demand the fame thing, but a part of the fame thing, or things quite alike.

Compound demand is the principle which raifes prices, and can never make them fink; becaufe in this cafe more than one demands the very fame thing. It is folely applicable to the buyers, in relation to the price they offer. This demand is called *high* or *low*, and is faid to rife, to fall, to mount, to fink, and is expreffed by thefe and other fynonymous terms.

Simple competition, when between buyers, is the fame as *compound* or *high demand*; but differs from it in fo far, as this may equally take place among fellers, which compound demand cannot; and then it works a contrary effect: it makes prices fink, and is fynonymous with low demand; it is this competition which overturns the balance of work and demand.

Double competition is what is underftood to take place in almoft every operation of trade; it is this which prevents the exceffive rife of prices; it is this which prevents their exceffive fall. While double competition prevails, the balance is perfect, trade and induftry flourifh.

The capital diftinction, therefore, between the terms *demand* and *competition* is, that *demand* is conftantly relative to the buyers; and when money is not the price, as

as in barter, then it is relative to that ſide upon which the greateſt *competition* is found.

We therefore ſay, with regard to *prices*, demand is *high* or *low*. With regard *to the quantity of merchandiſe*, demand is *great* or *ſmall*. With regard to *competition*, it is always called *great* or *ſmall*, *ſtrong* or *weak*.

Competition is, with equal propriety, applicable to both parties in the contract. A *competition* among buyers is a proper expreſſion; a *competition* among ſellers, who have the merchandiſe, is fully as eaſily underſtood, though it be not quite ſo ſtriking, for reaſons which an example will make plain.

You come to a fair, where you find a great variety of every kind of merchandiſe, in the poſſeſſion of different merchants. Theſe, by offering their goods to ſale, conſtitute a tacit competition; every one of them wiſhes to ſell in preference to another, and at the ſame time with the beſt advantage to himſelf.

The buyer begins by cheapening at every ſhop. The firſt price aſked marks the covetouſneſs of the ſeller; the firſt price offered, the avarice of the buyer. From this operation competition begins to work its effects on both ſides, and ſo becomes double. The principles which influence this operation are now to be deduced.

It is impoſſible to ſuppoſe the ſame degree of eagerneſs either to buy or ſell, among ſeveral merchants; becauſe the degree of eagerneſs is exactly in proportion to their views of profit; and as theſe muſt neceſſarily be influenced and regulated by different circumſtances, that buyer, who has the beſt proſpect of ſelling again with profit, obliges him, whoſe proſpect is not ſo good, to content himſelf with leſs; and that ſeller, who has bought to the beſt advantage, obliges him, who has paid dearer for the merchandiſe, to moderate his deſire of gain.

It is from theſe principles that competition among buyers and ſellers muſt originate. This is what confines the fluctuation of prices within limits which are compatible with the reaſonable profits of both buyers and ſellers; for we muſt conſtantly ſuppoſe the whole operation of buying and ſelling to be performed by merchants; the buyer cannot be ſuppoſed to give ſo high a price as that which he expects to receive when he diſtributes to the conſumers, nor can the ſeller be ſuppoſed to accept of a lower than that which he paid to the manufacturer. This competition is properly called *double*, becauſe of the difficulty to determine upon which ſide it ſtands; the ſame merchant may have it in his favour upon certain articles, and againſt him upon others; it is continually in vibration, and the arrival of every poſt may leſs or more pull down the heavy ſcale.

In every tranſaction between merchants, the profit reſulting from the ſale muſt be exactly diſtinguiſhed from the value of the merchandiſe. The firſt may vary, the laſt never can. It is this profit alone which can be influenced by competition; and it is for that reaſon we find ſuch uniformity everywhere in the prices of goods of the ſame quality.

The competition between ſellers does not appear ſo ſtriking as that between buyers; becauſe he who offers to ſale, appears only paſſive in the firſt operation; whereas the buyers preſent themſelves one after another; they make a demand when the merchandiſe is refuſed to one at a certain price; a ſecond either offers more, or does not offer at all; but ſo ſoon as another ſeller finds his account in accepting the price the firſt had refuſed, then the firſt enters into competition, providing his profits will admit his lowering the firſt price; and thus competition takes place among the ſellers, until the profits upon their trade prevent prices from falling lower.

In all markets this competition is varying, though inſenſibly, on many occaſions; but in others the vibrations are very perceptible. Sometimes it is found ſtrongeſt on the ſide of the buyers; and in proportion as this grows, the competition between the ſellers diminiſhes. When the competition between the former has raiſed prices to a certain ſtandard, it comes to a ſtop; then the competition changes ſides, and takes place among the ſellers, eager to profit by the higheſt price. This makes prices fall; and according as they fall, the competition among the buyers diminiſhes. They ſtill wait for the loweſt period. At laſt it comes, and then perhaps ſome new circumſtance, by giving the balance a kick, diſappoints their hopes. If therefore it ever happens, that there is but one intereſt upon one ſide of the contract, as in the example in the former ſection, where we ſuppoſed the ſellers united, you perceive, that the riſe of the price, occaſioned by the competition of the buyers, and even its coming to a ſtop, could not poſſibly have the effect of producing any competition on the other ſide; and therefore, if prices come afterwards to ſink, the fall muſt have proceeded from the prudential conſiderations of adapting the price to the faculties of thoſe who, from the height of it, had withdrawn their demand.

From theſe principles of competition, the foreſtalling of markets is made a crime, becauſe it diminiſhes the competition which ought to take place between different people, who have the ſame merchandiſe to offer to ſale. The foreſtaller buys all up, with an intention to ſell with more profit, as he has by that means taken other competitors out of his way, and appears with a ſingle intereſt on one ſide of the contract, in the face of many competitors on the other. This perſon is puniſhed by the ſtate, becauſe he has prevented the price of the merchandiſe from becoming juſtly proportioned to the real value; he has robbed the public and enriched himſelf; and in the puniſhment he makes reſtitution. Here occur two queſtions to be reſolved, for the ſake of illuſtration.

Can competition among buyers poſſibly take place, when the proviſion made is more than ſufficient to ſupply the quantity demanded? On the other hand, can competition take place among the ſellers, when the quantity demanded exceeds the total proviſion made for it?

We think it may in both caſes; becauſe in the one and the other, there is a competition implied on one ſide of the contract, and the very nature of this competition preſuppoſes a poſſibility of its coming on the other, provided ſeparate intereſts be found upon both ſides. But to be more particular:

1. Experience ſhows, that however juſtly the proportion between the demand and the ſupply may be determined in fact, it is ſtill next to impoſſible to diſcover it exactly, and therefore the buyers can only regulate the prices they offer, by what they may reaſonably

ably expect to ſell for gain. The ſellers, on the other hand, can only regulate the prices they expect, by what the merchandiſe has coſt them when brought to market. We have already ſhown, how, under ſuch circumſtances, the ſeveral intereſts of individuals affect each other, and make the balance vibrate.

2. The proportion between the ſupply and the demand is ſeldom other than *relative* among merchants, who are ſuppoſed to buy and ſell, not from neceſſity, but from a view to profit. What we mean by *relative* is, that their demand is *great* or *ſmall* according to prices; there may be a great demand for grain at 35s. per quarter, and no demand at all for it at 40s.; that is, among merchants.

It is eſſential to attend to the ſmalleſt circumſtance in matters of this kind. The circumſtance we mean, is the difference we find in the effect of competition, when it takes place purely among merchants on both ſides of the contract, and when it happens, that either the conſumers mingle themſelves with the merchant-buyers, or the manufacturers, that is, the furniſhers, mingle themſelves with the merchant ſellers. This combination we ſhall illuſtrate by the ſolution of another queſtion, and then conclude with a few reflections upon the whole.

Can there be no caſe formed where the competition upon one ſide may ſubſiſt, without a poſſibility of its taking place on the other, although there ſhould be ſeparate intereſts upon both?

The caſe is hardly ſuppoſable among merchants, who buy and ſell with a view to profit; but it is abſolutely ſuppoſable, and that is all, when the direct conſumers are the buyers; when the circumſtances of one of the parties is perfectly known; and when the competition is ſo ſtrong upon one ſide, as to prevent a poſſibility of its becoming double, before the whole proviſion is ſold off, or the demand ſatisfied. Let us have recourſe to examples.

Grain arriving in a ſmall quantity, at a port where the inhabitants are ſtarving, producing ſo great a competition among the conſumers who are the buyers, that their neceſſity becomes evident; all the grain is generally bought up before prices can riſe ſo high as to come to a ſtop; becauſe nothing but want of money, that is, an impoſſibility of complying with the prices demanded by the merchants can reſtrain them: but if you ſuppoſe, even here, that prices come naturally to a ſtop; or that, after ſome time, they fall lower, from prudential conſiderations; then there is a poſſibility of a competition taking place among the ſellers, from the principles above deduced. If, on the contrary, the ſtop is not natural, but occaſioned by the interpoſition of the magiſtrate, from humanity, or the like, there will be no competition, becauſe then the principles of commerce are ſuſpended; the ſellers are reſtrained on one ſide, and they reſtrain the buyers on the other. Or rather indeed, it is the magiſtrate, or compaſſion, who in a manner fixes the price, and performs the office of both buyer and ſeller.

A better example ſtill may be found, in a competition among ſellers, where it may be ſo ſtrong as to render a commodity in a manner of no value at all, as in the caſe of an uncommon and unexpected draught of fiſh, in a place of ſmall conſumption, when no preparations have been made for ſalting them. There can be then no competition among the buyers, becauſe the market cannot laſt, and they find themſelves entirely maſters, to give what price they pleaſe, being ſure the ſellers muſt accept of it, or loſe their merchandiſe. In the firſt example, humanity commonly ſtops the activity of the principle of competition; in the other, it is ſtopped by a certain degree of fair dealing, which forbids the accepting of a merchandiſe for nothing.

In proportion therefore as the riſing of prices can ſtop demand, or the ſinking of prices can increaſe it, in the ſame proportion will competition prevent either the riſe or the fall from being carried beyond a certain length; and if ſuch a caſe can be put, where the riſing of prices cannot ſtop demand, nor the lowering of prices augment it, in ſuch caſes double competition has no effect; becauſe theſe circumſtances unite the moſt ſeparate intereſts of buyers and ſellers in the mercantile contract; and when upon one ſide there is no ſeparate intereſt, there can then be no competition.

From what has been ſaid, we may form a judgment of the various degree of competition. A book not worth a ſhilling, a fiſh of a few pounds weight, are often ſold for conſiderable ſums. The buyers here are not merchants. When an ambaſſador leaves a court in a hurry, things are ſold for leſs than the half of their value; he is no merchant, and his ſituation is known. When, at a public market, there are found conſumers, who make their proviſion, or manufacturers, who diſpoſe of their goods for preſent ſubſiſtence; the merchants, who are reſpectively upon the oppoſite ſide of the contract to theſe, profit of their competition; and thoſe who are reſpectively upon the ſame ſide with them, ſtand by with patience until they have finiſhed their buſineſs. Then matters come to be carried on between merchant and merchant, and then profits may riſe and fall in the proportion of quantity to demand; that is to ſay, if the proviſion is leſs than the demand, the competition among the demanders, or the riſe of the price, will be in the compound proportion of the falling ſhort of the commodity, and of the proſpect of ſelling again with profit. It is this combination which regulates the competition, and keeps it within bounds. It can affect but the profits upon the tranſaction; the intrinſic value of the commodity ſtands immoveable; nothing is ever ſold below the real value; nothing is ever bought for more than it may probably bring. We mean in general. Whereas, ſo ſoon as conſumers and needy manufacturers mingle in the operation, all proportion is loſt. The competition between them is too ſtrong for the merchants; the balance vibrates by jerks. In ſuch markets merchants ſeldom appear; the principal objects there, are the fruits and productions of the earth, and articles of the firſt neceſſity for life, not manufactures ſtrictly ſo called. A poor fellow often ſells to purchaſe bread to eat; not to pay what he did eat while he was employed in the work he diſpoſes of. The conſumer often meaſures the value of what he is about to purchaſe, by the weight of his purſe, and his deſire to conſume.

§ 6. *Of what is called Expence, Profit, and Loſs.*

The term *expence*, when ſimply expreſſed, without any particular relation, is always underſtood to be relative

lative to money. This kind is diſtinguiſhed under the three heads of *private*, *public*, and *national*.

1. *Private expence* is what a private perſon, or private ſociety, lays out, either to provide articles of conſumption, or ſomething more permanent, which may be conducive to their eaſe, convenience, or advantage. Thus we ſay, *a large domeſtic expence*, relative to one who ſpends a great income. We ſay, a merchant has been at *great expence* for magazines, for living, for clerks, &c. but never that he has been at any in buying goods. In the ſame way a manufacturer may expend for building, machines, horſes, and carriages, but never for the matter he manufactures. When a thing is bought in order to be ſold again, the ſum employed is called money *advanced;* when it is bought not to be ſold, it may be ſaid to be *expended.*

2. *Public expence* is the employment of that money which has been contributed by individuals for the current ſervice of the ſtate. The contribution, or the gathering it together, repreſents the effects of many articles of *private expence;* the laying it out when collected is *public expence.*

3. *National expence* is what is expended out of the country, this is what diminiſhes national wealth. The principal diſtinction to be here attended to is between public expence, or the laying out of public money, and national expence, which is the alienating the nation's wealth in favour of ſtrangers. Thus the greateſt public expence imaginable may be no national expence; becauſe the money may remain at home. On the other hand, the ſmalleſt public, or even private expence, may be a national expence; becauſe the money may go abroad.

Profit and *loſs* is divided into *poſitive*, *relative*, and *compound*. *Poſitive profit* implies no loſs to any body; it reſults from an augmentation of labour, induſtry, or ingenuity, and has the effect of ſwelling or augmenting the public good.

Poſitive loſs implies no profit to any body; it is what reſults from the ceſſation of the former, or of the effects reſulting from it, and may be ſaid to diminiſh the public good.

Relative profit is what implies a loſs to ſomebody; it marks a vibration of the balance of wealth between parties, but implies no addition to the general ſtock.

Relative loſs is what, on the contrary, implies a profit to ſomebody; it alſo marks a vibration of the balance, but takes nothing from the general ſtock.

The *compound* is eaſily underſtood; it is that ſpecies of profit and loſs which is partly relative and partly poſitive.

§ 7. *The general conſequences reſulting to a trading Nation, upon the opening of an active foreign Commerce.*

A nation which remains paſſive in her commerce is at the mercy of thoſe who are active, and muſt be greatly favoured indeed by natural advantages, or by a conſtant flux of gold and ſilver from her mines, to be able to ſupport a correſpondence not entirely hurtful to the augmentation of her wealth.

When we look upon the wide field which here opens to our view, we are perplexed with too great a variety of objects. In one part, we ſee a decent and eomely beginning of induſtry; wealth flowing gently in to recompenſe ingenuity; numbers both augmenting, and every one becoming daily more uſeful to another; agriculture proportionally extending itſelf; no violent revolution; no exorbitant profits; no inſolence among the rich; no exceſſive miſery among the poor; multitudes employed in producing; great economy upon conſumption; and all the inſtruments of luxury, daily produced by the hands of the diligent, going out of the country for the ſervice of ſtrangers; not remaining at home for the gratification of ſenſuality. At laſt the augmentations come inſenſibly to a ſtop. Then theſe rivers of wealth, which were in briſk circulation through the whole world, and which returned to this trading nation as blood returns to the heart, only to be thrown out again by new pulſations, begin to be obſtructed in their courſe; and flowing abroad more ſlowly than before, come to form ſtagnations at home. Theſe, impatient of reſtraint, ſoon burſt out into domeſtic circulation. Upon this cities ſwell in magnificence of buildings; the face of the country is adorned with palaces, and becomes covered with groves; luxury ſhines triumphant in every part; inequality becomes more ſtriking to the eye; and want and miſery appear more deformed from the contraſt; even fortune grows more whimſical in her inconſtancy; the beggar of the other day now rides in his coach; and he who was born in a bed of ſtate, is ſeen to die in a gaol, or in an alms-houſe. Such are the effects of great domeſtic circulations.

The ſtateſman looks about with amazement; he who was wont to conſider himſelf as the firſt man in the ſociety in every reſpect, perceives himſelf, perhaps, eclipſed by the luſtre of private wealth, which avoids his graſp when he attempts to ſeize it. This makes his government more complex and more difficult to be carried on; he muſt now avail himſelf of art and addreſs, as well as of power and force. By the help of cajoling and intrigues he gets a little into debt; this lays a foundation for public credit, which growing by degrees, and in its progreſs aſſuming many new forms, becomes, from the moſt tender beginnings, a moſt formidable monſter, ſtriking terror into thoſe who cheriſhed it in its infancy. Upon this, as upon a triumphant war-horſe, the ſtateſman gets aſtride; he then appears formidable anew; his head turns giddy; he is choked with the duſt he has raiſed; and at the moment he is ready to fall, to his utter aſtoniſhment and ſurpriſe, he finds a ſtrong monied intereſt of his own creating, which, inſtead of ſwallowing him up, as he apprehended, flies to his ſupport. Through this he gets the better of all oppoſition, he eſtabliſhes taxes, multiplies them, mortgages his fund of ſubſiſtence; either becomes a bankrupt, and riſes again from his aſhes; or if he be leſs audacious, he ſtands trembling and tottering for a while on the brink of the political precipice. From the one or the other of theſe perilous ſituations, he begins to diſcover an endleſs path, which after a multitude of windings ſtill returns into itſelf, and continues an equal courſe through this vaſt labyrinth.

It is now full time to leave off rhapſody, and return to reaſoning and cool inquiry, concerning the more

Principles.

more immediate and more general effects and revolutions produced by the opening of a foreign trade in a nation of induftry.

The firft and moft fenfible alteration will be an increafe of demand for manufacturers, becaufe by fupplying the wants of ftrangers, the number of confumers will now be confiderably augmented. What again will follow upon this, muft depend upon circumftances.

If this revolution in the ftate of demand fhould prove too violent, the confequence of it will be to raife demand; if it fhould prove gradual, it will increafe it. This diftinction is well underftood, and the confequence appears juft; for, if the fupply do not increafe in proportion to the demand, a competition will enfue among the demanders; which is the common effect of fuch fudden revolutions. If, on the other hand, a gentle increafe of demand fhould be accompanied with a proportional fupply, the whole induftrious fociety will grow in vigour, and in wholefome ftature, without being fenfible of any great advantage or inconveniency; the change of their circumftances will even be imperceptible.

The immediate effects of the violent revolution will, in this example, be flattering to fome and difagreeable to others. Wealth will be found daily to augment, from the rifing of prices, in many branches of induftry. This will encourage the induftrious claffes, and the idle confumers at home will complain. We have already dwelt abundantly long upon the effect refulting from this to the lower claffes of the people, in providing them with a certain means of fubfiftence. Let us now examine in what refpect even the higher claffes will be made likewife to feel the good effects of this general change, although at firft they may fuffer a temporary inconvenience from it.

Farmers, as has been obferved, will have a greater difficulty in finding fervants, who, inftead of labouring the ground, will choofe to turn themfelves to manufactures. This we have confidered in the light of purging the lands of fuperfluous mouths; but every confequence in this great chain of politics draws other confequences after it; and as they follow one another, things put on different faces, which affect claffes differently. The purging of the land is but one of the firft; here follows another.

The defertion of the hands employed in a trifling agriculture will at firft, no doubt, embarrafs the farmers; but in a little time every thing becomes balanced in a trading nation, becaufe here every induftrious man muft advance in profperity, in fpite of all general combinations of circumftances.

In the cafe before us, the relative profits upon farming muft foon become greater than formerly, becaufe of this additional expence which muft affect the whole clafs of farmers; confequently, this additional expence, inftead of turning out to be a lofs to either landlord or farmer, will, after fome little time, turn out to the advantage of both, becaufe the produce of the ground, being indifpenfably neceffary to every body, muft in every article increafe in its value. Thus, in a fhort time, accounts will be nearly balanced on all hands; that is to fay, the fame proportion of wealth will, *cæteris paribus*, continue the fame among the induftrious. We fay among the induftrious; for thofe who are either idle, or even negligent, will be great lofers.

A proprietor of land, inattentive to the caufes of his farmer's additional expence, may very imprudently fuffer his rents to fall, inftead of affifting him on a proper occafion, in order to make them afterwards rife the higher.

Thofe who live upon a determined income in money, and who are nowife employed in traffic, nor in any fcheme of induftry, will, by the augmentation of prices, be found in worfe circumftances than before.

In a trading nation every man muft turn his talents to account, or he will undoubtedly be left behind in this univerfal emulation, in which the moft induftrious, the moft ingenious, and the moft frugal, will conftantly carry off the prize.

This confideration ought to be a fpur to every man. The richeft men in a trading nation have no fecurity againft poverty; we mean proportional poverty; for though they diminifh nothing of their income, yet, by not increafing it in proportion to others, they lofe their rank in wealth, and from the firft clafs in which they ftood they will flide infenfibly down to a lower.

There is one confequence of an additional beneficial trade, which raifes demand and increafes wealth; but if we fuppofe no proportional augmentation of fupply, it will prove at beft but an airy dream which lafts for a moment; and when the gilded fcene is paffed away, numberlefs are the inconveniences which are feen to follow.

We fhall now point out the natural confequences of this augmentation of wealth drawn from foreign nations, when the ftatefman remains inattentive to increafe the fupply both of food and manufactures, in proportion to the augmentation of mouths, and of the demand for the produce of induftry.

In fuch a fituation profits will daily fwell, and every fcheme for reducing them within the bounds of moderation, will be looked upon as a hurtful and unpopular meafure: be it fo; but let us examine the confequences.

We have faid, that the rife of demand for manufactures naturally increafes the value of work: now we muft add, that under fuch circumftances, the augmentation of riches in a country, either not capable of improvement as to the foil, or where precautions have not been taken for facilitating a multiplication of inhabitants, by the importation of fubfiftence, will be productive of the moft calamitous confequences.

On one fide, this wealth will effectually diminifh the mafs of the food before produced; and on the other, will increafe the number of ufelefs confumers. The firft of thefe circumftances will raife the demand for food; and the fecond will diminifh the number of ufeful free hands, and confequently raife the price of manufactures: here are fhortly the outlines of this progrefs.

The more rich and luxurious a people are, the more delicate they become in their manner of living; if they fed on bread formerly, they will now feed on meat; if they fed on meat, they will now feed on fowl. The fame ground which feeds a hundred with bread, and a proportional quantity of animal-food, will not maintain an equal number of delicate livers. Food

Food muſt then become more ſcarce; demand for it riſes; the rich are always the ſtrongeſt in the market; they conſume the food, and the poor are forced to ſtarve. Here the wide door to modern diſtreſs opens; to wit, a hurtful competition for ſubſiſtence. Farther, when a people become rich, they think leſs of economy; a number of uſeleſs ſervants are hired, to become an additional dead weight on conſumption; and when their ſtarving countrymen cannot ſupply the extravagance of the rich ſo cheaply as other nations, they either import inſtruments of foreign luxury, or ſeek to enjoy them out of their own country, and thereby make reſtitution of their gains.

Is it not therefore evident, that if, before things come to this paſs, additional ſubſiſtence be not provided by one method or other, the number of inhabitants muſt diminiſh; although riches may daily increaſe by a balance of additional matter ſuppoſed to be brought into the country in conſequence of the hitherto beneficial foreign trade? This is not all. We ſay further, that the beneficial trade will laſt for a time only. For the infallible conſequences of the riſe of prices at home will be, that thoſe nations which at firſt conſumed your manufactures, perceiving the gradual increaſe of their price, will begin to work for themſelves; or finding out your rivals who can ſupply them cheaper, will open their doors to them. Theſe again, perceiving the great advantages gained by your traders, will begin to ſupply the market; and ſince every thing muſt be cheaper in countries where we do not ſuppoſe the concurrence of all the circumſtances mentioned above, theſe nations will ſupplant you, and be enriched in their turn.

Here comes a new revolution. Trade is at a ſtand: what then becomes of all the hands which were formerly employed in ſupplying the foreign demands?

Were revolutions ſo ſudden as we are obliged to repreſent them, all would go to wreck; in proportion as they happen by quicker or ſlower degrees, the inconveniences are greater or ſmaller.

Prices, we have ſaid, are made to riſe by competition. If the competition of the ſtrangers was what raiſed them, the diſtreſs upon the manufacturers will be in proportion to the ſuddenneſs of their deſerting the market. If the competition was divided between the ſtrangers and the home-conſumers, the inconveniences which enſue will be leſs; becauſe the deſertion of the ſtrangers will be in ſome meaſure made up by an increaſe of home-conſumption which will follow upon the fall of prices. And if, in the third caſe, the natives have been ſo imprudent, as not only to ſupport a competition with the ſtrangers, and thereby diſguſt them from coming any more to market, but even to continue the competition between themſelves, the whole loſs ſuſtained by the revolution will be national. Wealth will ceaſe to augment; but the inconveniences, in place of being felt by the manufacturers, will only affect the ſtate; theſe will continue in affluence, extolling the generoſity of their countrymen, and deſpiſing the poverty of the ſtrangers who had enriched them.

Domeſtic luxury will here prove an expedient for preſerving from ruin the induſtrious part of a people, who in ſubſiſting themſelves had enriched their country. No change will follow in their condition; they will go on with a painful aſſiduity to labour; and if the conſequences of it become now hurtful to one part of the ſtate, they muſt at leaſt be allowed to be eſſentially neceſſary for the ſupport of another.

But that luxury is no neceſſary concomitant of foreign trade, in a nation where the true principles of it are underſtood, will appear very plain, from a contraſt we are now going to point out, in the example of a modern ſtate, renowned for its commerce and frugality. The country is Holland.

A ſet of induſtrious and frugal people were aſſembled in a country by nature ſubject to many inconveniences, the removing of which neceſſarily employed abundance of hands. Their ſituation upon the continent, the power of their former maſters, and the ambition of their neighbours, obliged them to keep great bodies of troops. Theſe two articles added to the numbers of the community, without either enriching the ſtate by their labour exported, or producing food for themſelves or countrymen.

The ſcheme of a commonwealth was calculated to draw together the induſtrious; but it has been ſtill more uſeful in ſubſiſting them: the republican form of government being there greatly ſubdivided, veſts authority ſufficient in every part of it, to make ſuitable proviſion for their own ſubſiſtence; and the tie which unites them, regards only matters of public concern. Had the whole been governed by one ſovereign, or by one council, this important matter never could have been effected.

It would be impoſſible for the moſt able miniſter that ever lived, to provide nouriſhment for a country ſo extended as France, or even as England, ſuppoſing theſe as fully peopled as Holland is; even although it ſhould be admitted that a ſufficient quantity of food might be found in other countries for their ſubſiſtence. The enterpriſe would be too great, abuſes would multiply; the conſequence would be, that the inhabitants would die for want. But in Holland, the caſe is different: every little town takes care of its own inhabitants; and this care being the object of application and profit to ſo many perſons, is accompliſhed with ſucceſs.

When once it is laid down as a maxim in a country, that food muſt of neceſſity be got from abroad in order to feed the inhabitants at home, the corn-trade becomes conſiderable, and at the ſame time certain, regular, and permanent. This was the caſe in Holland: as the inhabitants were induſtrious, the neceſſary conſequence has been, a very extraordinary multiplication; and at the ſame time ſuch an abundance of grain, that, inſtead of being in want themſelves, they often ſupply their neighbours. There are many examples of England's being ſupplied with grain from thence; and, which is ſtill more extraordinary, from the re-exportation of the very produce of its own fruitful ſoil.

It is therefore evident, that the only way to ſupport induſtry, is to provide a ſupply of ſubſiſtence, conſtantly proportional to the demand that may be made for it. This is a precaution indiſpenſably neceſſary for preventing hurtful competition. This is the particular care of the Dutch: ſo long as it can be effectual, their ſtate can fear no decline; but whenever they come to be diſtreſſed in the markets, upon which

which they depend for ſubſiſtence, they will ſink into ruin. It is by mere dint of frugality, cheap and parſimonious living, that the navigation of this induſtrious people is ſupported. Conſtant employment, and an accumulation of almoſt imperceptible gains, fill their coffers with wealth, in ſpite of the large outgoings, to which their own proper nouriſhment yearly forces them. The large profits upon induſtry in other countries, which are no proof of generoſity, but a fatal effect of a ſcanty ſubſiſtence, is far from dazzling their eyes. They ſeldom are found in the liſt of competitors at any foreign port; if they have their cargo to diſpoſe of, they wait with pleaſure in their own veſſels, conſuming their own proviſions, and at laſt accept of what others have left. It may be ſaid, that many other circumſtances concur in favour of the Dutch, beſides the article of ſubſiſtence. Without diſputing this matter, it may be obſerved, that if a computation be made of the hands employed in providing ſubſiſtence, and of thoſe who are ſeverally taken up in ſupplying every other want, their numbers will be found nearly to balance one another in the moſt luxurious countries. From this we may conclude, that the article of food, among the lower claſſes, muſt bear a very high proportion to all the other articles of their conſumption; and therefore a diminution upon the price of ſubſiſtence, muſt be of infinite conſequence to manufacturers who are obliged to buy it. From this conſideration, let us judge of the conſequence of ſuch augmentations upon the price of grain as are familiar to us; 30 or 40 per cent. ſeems nothing. Now this augmentation operates upon two-thirds, at leaſt, of the whole expence of a labouring man: let any one who lives in tolerable affluence make the application of this to himſelf, and examine how he would manage his affairs, if, by accidents of rains or winds, his expences were to riſe 30 per cent. without a poſſibility of reſtraining them; for this is unfortunately the caſe with all the lower claſſes. From whence it may be concluded, that the keeping food cheap, and ſtill more the preſerving it at all times at an equal ſtandard, is the fountain of the wealth of Holland; and that any hurtful competition in this article muſt beget a diſorder which will affect the whole of the manufacturers of a ſtate.

COMMERCY, a handſome town of France in the duchy of Bar, with the title of a principality, and a magnificent caſtle. It is ſeated on the river Meuſe, in E. Long. 5. 24. N. Lat. 48. 20.

COMMERSONIA. See Botany *Index*.

COMMINATION, an office in the liturgy of the church of England, appointed to be read on Aſh Wedneſday, or the firſt day of Lent. It is ſubſtituted in the room of that *godly diſcipline in the primitive church*, by which (as the introduction to the office expreſſes it), "ſuch perſons, as ſtood convicted of notorious ſins, were put to open penance, and puniſhed in this world, that their ſouls might be ſaved in the day of the Lord; and that others, admoniſhed by their example, might be the more afraid to offend." This diſcipline, in after ages, degenerated, in the church of Rome, into a formal confeſſion of ſins upon Aſh Wedneſday, and the empty ceremony of ſprinkling aſhes upon the heads of the people. Our reformers wiſely rejected this ceremony, as mere ſhadow and ſhow; and ſubſtituted this office in its room, which is *A denunciation of God's anger and judgment againſt ſinners*, that the people being appriſed of God's wrath and indignation againſt ſin, may not, through want of diſcipline in the church, be encouraged to follow and purſue them; but rather be moved to ſupply that diſcipline to themſelves, and ſo as to avoid being judged and condemned at the tribunal of God.

COMMINATORY, an appellation given to whatever threatens puniſhment, or ſome penalty. Thus, in France, when an exile is enjoined not to return under pain of death, it is deemed a *comminatory* penalty; ſince, if he do return, it is not ſtrictly executed: but a ſecond injunction is laid on him, which is more than comminatory, and, from the day of the date thereof, imports death without remedy.

COMMINGES, a province of France, 45 miles in length, and 15 in breadth; bounded on the north by Gaſcony, on the ſouth by Catalonia, on the eaſt by Couſſerans, and on the weſt by Bigorre. Its principal trade conſiſts in cattle, mules, and corn. St Bertrand is the capital town.

COMMINUTION, denotes the breaking, or rather grinding, a body to very ſmall particles.

COMMIRE, John, a celebrated Latin poet, born at Amboiſe in 1625, entered into the ſociety of the Jeſuits, and taught polite literature and divinity. He died at Paris in 1702. We have a volume of his Latin Poems, and a collection of his poſthumous works. His odes and fables are more particularly admired.

COMMISSARY, in the eccleſiaſtical law, an officer of the biſhop, who exerciſes ſpiritual juriſdiction in places of a dioceſe ſo far from the epiſcopal ſee, that the chancellor cannot call the people to the biſhop's principal conſiſtory court, without giving them too much inconveniency.

Commissary-Court, in Scotland, a court originally conſtituted by the biſhops for executing in their name an uſurped juriſdiction; and was anciently called the *biſhop's court, curia Chriſtianitatis*, or *conſiſtorial court*. This court was modelled by Queen Mary at the Reformation, and continues to this day.

Commissary, in a military ſenſe, is of different ſorts.

Commissary-General of the Muſters, an officer appointed to muſter the army, as often as the general thinks proper, in order to know the ſtrength of each regiment

Commissary, Commission.

regiment and company, to receive and inſpect the muſter-rolls, and to keep an exact ſtate of the ſtrength of the army.

COMMISSARY of Horſes, an officer in the artillery appointed to have the inſpection of the artillery-horſes, to ſee them muſtered, and to ſend ſuch orders as he receives from the commanding officer of the artillery by ſome of the conductors of horſes, of which he has a certain number for his aſſiſtants.

COMMISSARY of Proviſions, an officer who has the charge of furniſhing the army with proviſions.

COMMISSARY of Stores, an officer in the artillery who has the charge of all the ſtores, for which he is accountable to the office of ordnance.

COMMISSION, in common law, the warrant or letters patent, which all perſons exerciſing juriſdiction have to empower them to hear or determine any cauſe or ſuit; as the commiſſion of the judges, &c.

COMMISSION of Bankruptcy, is the commiſſion that iſſues from the lord chancellor on a perſon's becoming a bankrupt within any of the ſtatutes, directed to certain commiſſioners appointed to examine into it, and to ſecure the bankrupt's lands and effects for the ſatisfaction of his creditors. See the article BANKRUPT.

The proceedings on a commiſſion of bankruptcy may be divided, 1. Into thoſe which affect the bankrupt himſelf. 2. Into thoſe which affect his property.

Blackſt Comment.

1. As to thoſe of the former kind, there muſt, in the firſt place, be a petition to the lord chancellor by one creditor to the amount of 100l. or by two to the amount of 150l. or by three or more to the amount of 200l.; upon which he grants a commiſſion to ſuch diſcreet perſons as to him ſhall ſeem good, who are then ſtyled commiſſioners of bankrupt. The petitioners, to prevent malicious applications, muſt be bound in a ſecurity of 200l. to make the party amends, in caſe they do not prove him a bankrupt. And if, on the other hand, they receive any money or effects from the bankrupt, as a recompenſe for ſuing out the commiſſion, ſo as to receive more than their rateable dividends of the bankrupt's eſtate, they forfeit not only what they ſhall have ſo received, but their whole debt. When the commiſſion is awarded and iſſued, the commiſſioners are to meet at their own expence, and to take an oath for the due execution of their commiſſion, and to be allowed a ſum not exceeding 20s. *per diem* each, at every ſitting. And no commiſſion of bankruptcy ſhall abate or be void on any demiſe on the crown.

When the commiſſioners have received their commiſſion, they are firſt to receive proof of the perſon's being a trader, and having committed ſome act of bankruptcy; and then to declare him bankrupt, if proved ſo; and to give notice thereof in the gazette, and at the ſame time to appoint three meetings. At one of theſe meetings an election muſt be made of aſſignees, or perſons to whom the bankrupt's eſtate ſhall be aſſigned, and in whom it ſhall be veſted for the benefit of the creditors; which aſſignees are choſen by the major part, in value, of the creditors who ſhall then have proved their debts; but may be originally appointed by the commiſſioners, and afterwards approved or rejected by the creditors; but no creditors ſhall be admitted to vote in the choice of aſſignees,

Commiſſion.

whoſe debt on the balance of accounts, does not amount to 10l. And at the third meeting at fartheſt, which muſt be on the 42d day after the advertiſement in the gazette, the bankrupt, upon notice alſo perſonally ſerved upon him, or left at his uſual place of abode, muſt ſurrender himſelf perſonally to the commiſſioners, and muſt henceforth in all reſpects conform to the directions of the ſtatutes of bankruptcy; or, in default thereof, ſhall be guilty of felony without benefit of clergy, and ſhall ſuffer death, and his goods and eſtate ſhall be divided among his creditors.

In caſe the bankrupt abſconds, or is likely to run away between the time of the commiſſion iſſued and the laſt day of ſurrender, he may, by warrant from any judge or juſtice of the peace, be apprehended and committed to the county gaol, in order to be forthcoming to the commiſſioners, who are alſo empowered immediately to grant a warrant for ſeizing his goods and papers.

When the bankrupt appears, the commiſſioners are to examine him touching all matters relating to his trade and effects. They may alſo ſummon before them, and examine, the bankrupt's wife, and any other perſon whatſoever, as to all matters relating to the bankrupt's affairs: And in caſe any of them ſhall refuſe to anſwer, or ſhall not anſwer fully, to any lawful queſtion, or ſhall refuſe to ſubſcribe ſuch their examination, the commiſſioners may commit them to priſon without bail, till they make and ſign a full anſwer; the commiſſioners ſpecifying in their warrant of commitment the queſtion ſo refuſed to be anſwered. And any gaoler, permitting ſuch perſon to eſcape or go out of priſon, ſhall forfeit 500l. to the creditors.

The bankrupt, upon this examination, is bound, upon pain of death, to make a full diſcovery of all his eſtate and effects, as well in expectancy as poſſeſſion, and how he has diſpoſed of the ſame; together with all books and writings relating thereto: and is to deliver up all in his power to the commiſſioners (except the neceſſary apparel of himſelf, his wife, and his children); or in caſe he conceals or embezzles any effects to the amount of 20l. or withholds any book or writings, with intent to defraud his creditors, he ſhall be guilty of felony without benefit of clergy.

After the time allowed the bankrupt for ſuch diſcovery is expired, any other perſon voluntarily diſcovering any part of his eſtate before unknown to the aſſignees, ſhall be entitled to five per cent. out of the effects ſo diſcovered, and ſuch farther reward as the aſſignees and commiſſioners ſhall think proper. And any truſtee wilfully concealing the eſtate of any bankrupt, after the expiration of 42 days, ſhall forfeit 100l. and double the value of the eſtate concealed, to the creditors.

Hitherto every thing is in favour of the creditors; and the law ſeems to be pretty rigid and ſevere againſt the bankrupt; but, in caſe he proves honeſt, it makes him full amends for all this rigour and ſeverity. For, if the bankrupt hath made an ingenuous diſcovery, hath conformed to the directions of the law, and hath acted in all points to the ſatisfaction of his creditors; and if they, or four parts in five of them in number and value (but none of them creditors for leſs than 20l.

Commiſſion.

20l. will ſign a certificate to that purport; the commiſſioners are then to authenticate ſuch certificate under their hands and ſeals, and to tranſmit it to the lord chancellor: and he, or two judges whom he ſhall appoint, on oath made by the bankrupt that ſuch certificate was obtained without fraud, may allow the ſame; or diſallow it, upon cauſe ſhown by any of the creditors of the bankrupt.

If no cauſe be ſhown to the contrary, the certificate is allowed of courſe; and then the bankrupt is entitled to a decent and reaſonable allowance out of his effects for his future ſupport and maintenance, and to put him in a way of honeſt induſtry. This allowance is alſo in proportion to his former good behaviour, in the early diſcovery of the decline of his affairs, and thereby giving his creditors a large dividend. For if his effects will not pay one half of his debts, or 10s. in the pound, he is left to the diſcretion of the commiſſioners and aſſignees, to have a competent ſum allowed him, not exceeding 3 per cent.; but if they pay 10s. in the pound, he is to be allowed 5 per cent; if 12s. 6d. then 7½ per cent.; and if 15s. in the pound, then the bankrupts ſhall be allowed 10 per cent; provided that ſuch allowance do not in the firſt caſe exceed 200l. in the ſecond 250l. and in the third 300l.

Beſides this allowance, he has alſo an indemnity granted him, of being free and diſcharged for ever from all debts owing by him at the time he became a bankrupt; even though judgment ſhall have been obtained againſt him, and he lies in priſon upon execution for ſuch debts; and, for that among other purpoſes, all proceedings on commiſſion of bankrupt, are, on petition, to be entered on record, as a perpetual bar againſt actions to be commenced upon this account: though, in general, the production of the certificate properly allowed ſhall be ſufficient evidence of all previous proceedings. Thus the bankrupt becomes a clear man again; and by the aſſiſtance of his allowance and his own induſtry, may become an uſeful member of the commonwealth; which is the rather to be expected, as he cannot be entitled to theſe benefits, but by the teſtimony of his creditors themſelves of his honeſt and ingenuous diſpoſition; and unleſs his failures have been owing to misfortunes, rather than to miſconduct and extravagance.

2. As to the proceedings which affect the bankrupt's property.

By virtue of the ſtatutes before mentioned, all the perſonal eſtate and effects of the bankrupt are conſidered as veſted, by the act of bankruptcy, in the future aſſignees of his commiſſioners, whether they be goods in actual poſſeſſion, or debts, contracts, and other choſes in action; and the commiſſioners by their warrant may cauſe any houſe or tenement of the bankrupt to be broken open, in order to enter upon and ſeize the ſame. And when the aſſignees are choſen or approved by the creditors, the commiſſioners are to aſſign every thing over to them; and the property of every part of the eſtate is hereby as fully veſted in them as it was in the bankrupt himſelf, and they have the ſame remedies to recover it.

The property veſted in the aſſignees is the whole that the bankrupt had in himſelf, at the time he committed the firſt act of bankruptcy, or that has been veſted in him ſince, before his debts are ſatisfied or agreed for. Therefore, it is uſually ſaid that once a bankrupt and always a bankrupt; by which is meant, that a plain direct act of bankruptcy once committed, cannot be purged, or explained away, by any ſubſequent conduct, as a dubious equivocal act may be; but that, if a commiſſion is afterward awarded, the commiſſion and the property of the aſſignees ſhall have a relation, or reference, back to the firſt and original act of bankruptcy. Inſomuch that all tranſactions of the bankrupt are from that time abſolutely null and void, either with regard to the alienation of his property, or the receipt of his debts from ſuch as are privy to his bankruptcy; for they are no longer his property, or his debts, but thoſe of the future aſſignees. And if an execution be ſued out, but not ſerved and executed on the bankrupt's effects till after the act of bankruptcy, it is void, as againſt the aſſignees. But the king is not bound by this fictitious relation, nor is within the ſtatutes of bankrupts; for if, after the act of bankruptcy committed, and before the aſſignment of his effects, an extent iſſues for the debt of the crown, the goods are bound thereby. In France this doctrine of relation is carried to a very great length: for there, every act of a merchant, for ten days precedent to the act of bankruptcy, is preſumed to be fraudulent, and is therefore void. But with us the law ſtands upon a more reaſonable footing; for as theſe acts of bankruptcy may ſometimes be ſecret to all but a few, and it would be prejudicial to trade to carry this notion to its utmoſt length, it is provided by ſtat. 19 Geo. II. c. 32. that no money paid by a bankrupt to a *bona fide*, or real creditor, in a courſe of trade, even after an act of bankruptcy done, ſhall be liable to be refunded. Nor by ſtat. 1 Jac. I. c. 15. ſhall any debtor of a bankrupt that pays him his debt without knowing of his bankruptcy, be liable to account for it again. The intention of this relative power being only to reach fraudulent tranſactions, and not to diſtreſs the fair trader.

The aſſignees may purſue any legal method of recovering this property ſo veſted in them by their own authority; but cannot commence a ſuit in equity, nor compound any debts owing to the bankrupt, nor refer any matters to arbitration, without the conſent of the creditors, or the major part of them in value, at a meeting to be held in purſuance of notice in the gazette.

When they have got in all the effects they can reaſonably hope for, and reduced them to ready money, the aſſignees muſt, within 12 months after the commiſſion iſſued, give 21 days notice to the creditors, of a meeting for a dividend or diſtribution; at which time they muſt produce their accounts, and verify them upon oath, if required. And then the commiſſioners ſhall direct a dividend to be made, at ſo much in the pound, to all creditors who have before proved, or ſhall then prove their debts. This dividend muſt be made equally, and in a rateable proportion, to all the creditors, according to the quantity of their debts; no regard being paid to the quality of them. Mortgages, indeed, for which the creditor has a real ſecurity in his own hands, are entirely ſafe; for the commiſſion of bankrupt reaches only the equity of redemption. So are all perſonal debts, where the creditor

ditor has a chattel in his hands, or a pledge or pawn, for the payment, or has taken the debtor's lands or goods in execution. And, upon the equity of the ſtat. 8 An. c. 14. (which directs, that upon all executions of goods being on any premiſes demiſed to a tenant, one year's rent and no more, ſhall, if due, be paid to the landlord) it hath alſo been held, that under a commiſſion of bankrupt, which is in the nature of a ſtatute execution, the landlord ſhall be allowed his arrears of rent to the ſame amount, in preference to other creditors, even though he hath neglected to diſtrain while the goods remained on the premiſes; which he is otherwiſe entitled to do for his entire rent, be the quantum what it may. But otherwiſe judgments and recognizes (both which are debts of record, and therefore at other times have a priority), and alſo bonds and obligations by deed or ſpecial inſtrument (which are called deeds by ſpeciality, and are uſually the next in order), theſe are all put on a level with debts by mere ſimple contract, and all paid *pari paſſu*. Nay, ſo far is this matter carried, that, by the expreſs proviſion of the ſtatutes, debts not due at the time of the dividend made, as bonds or notes of hand, payable at a future day, ſhall be paid equally with the reſt, allowing a diſcount or drawback in proportion.' And inſurances, and obligations upon bottomry or reſpondentia, *bona fide*, made by the bankrupt, though forfeited after the commiſſion is awarded, ſhall be looked upon in the ſame light as debts contracted before any act of bankruptcy.

Within 18 months after the commiſſion iſſued, a ſecond and final dividend ſhall be made, unleſs all the effects were exhauſted by the firſt. And if any ſurplus remains, after paying every creditor his full debt, it ſhall be reſtored to the bankrupt. This is a caſe which ſometimes happens to men in trade, who involuntarily, or at leaſt unwarily, commit acts of bankruptcy, by abſconding and the like, while their effects are more than ſufficient to pay their creditors. And if any ſuſpicious or malevolent creditor will take the advantage of ſuch acts, and ſue out a commiſſion, the bankrupt has no remedy, but muſt quietly ſubmit to the effects of his own imprudence: except that upon ſatisfaction made to all the creditors, the commiſſion may be ſuperſeded. This caſe may alſo happen when a knave is deſirous of defrauding his creditors, and is compelled, by a commiſſion, to do them that juſtice which otherwiſe he wanted to evade. And therefore, though the uſual rule is, that all intereſt on debts carrying intereſt ſhall ceaſe from the time of iſſuing the commiſſion, yet in caſe of a ſurplus left after payment of every debt, ſuch intereſt ſhall again revive, and be chargeable on the bankrupt or his repreſentatives.

Commiſſion of LUNACY, iſſues out of the court of chancery, whether a perſon repreſented to be a lunatic, be ſo or not. See LUNACY.

COMMISSION of Teinds, a court at Edinburgh, which came in place of a committee of the Scottiſh parliament, for erecting new pariſhes, and valuing teinds for the ſupport of the clergy. It is veſted in the lords of ſeſſion. See LAW *Index*.

COMMISSION-officers. See OFFICERS.

COMMISSION, in *Commerce*. See FACTORAGE.

COMMISSIONER, a perſon authorized by commiſſion, letters patent, or other lawful warrant, to examine any matters, or execute any lawful commiſſion.

COMMISSIONER in the General Aſſembly of the church of Scotland. See ASSEMBLY (*General*).

COMMISSIONERS of the Cuſtoms. See CUSTOMS.

COMMISSIONERS of Exciſe. See EXCISE.

COMMISSIONERS of the Navy. See NAVY.

Lords COMMISSIONERS of the Treaſury. See TREASURY and EXCHEQUER.

COMMISSURE, a term uſed by ſome authors for the ſmall metuſes or interſtices of bodies; or the little clefts between the particles: eſpecially when thoſe particles are broadiſh and flat, and lie contiguous to one another, like thin plates and lamellæ. The word literally ſignifies *a joining* or connecting of one thing to another.

COMMISSURE, in *Architecture*, &c. denotes the joint of two ſtones, or the application of the ſurface of the one to that of the other. See MASONRY.

Among anatomiſts, commiſſure is ſometimes alſo uſed for a ſuture of the cranium or ſkull. See SUTURE.

COMMITMENT, in criminal law, is the ſending to priſon a perſon who hath been guilty of any crime. This takes place where the offence is not bailable, or the party cannot find BAIL; muſt be by proper warrant, containing the cauſe of the commitment; and continues till put an end to by the courſe of law (ſee TRIAL); impriſonment being intended only for ſafe cuſtody, and not for puniſhment (ſee ARRESTMENT and BAIL). In this dubious interval between the commitment and trial, a priſoner ought to be uſed with the utmoſt humanity; and neither be loaded with needleſs fetters, nor ſubjected to other hardſhips than ſuch as are abſolutely requiſite for the purpoſe of confinement only: though what are ſo requiſite muſt too often be left to the direction of the gaolers, who are frequently a mercileſs race of men, and by being converſant in ſcenes of miſery, ſteeled againſt any tender ſenſation.

COMMITTEE, one or more perſons to whom the conſideration or ordering of a matter is referred, either by ſome court, or by the conſent of parties to whom it belongs.

COMMITTEE of Parliament, a certain number of members appointed by the houſe for the examination of a bill, making a report of an inquiry, proceſs of the houſe, &c. See PARLIAMENT.

Sometimes the whole houſe is reſolved into a committee; on which occaſion each perſon has a right to ſpeak and reply as much and as often as he pleaſes: an expedient they uſually have recourſe to in extraordinary caſes, and where any thing is to be thoroughly canvaſſed. When the houſe is not in a committee, each gives his opinion regularly, and is only allowed to ſpeak once, unleſs to explain himſelf.

The ſtanding committees, appointed by every new parliament, are thoſe of privileges and elections, of religion, of grievances, of courts of juſtice, and of trade; though only the former act.

COMMIXTION, in *Scots Law*, is a method of acquiring property, by mixing or blending together different ſubſtances belonging to different proprietors. See LAW *Index*.

COMMODATE,

COMMODATE, COMMODATUM, in the civil jurisprudence, the loan or free conceſſion of any thing moveable or immoveable, for a certain time, on condition of reſtoring again the ſame individual after a certain term. The commodate is a kind of loan; there is this difference, however, between a loan and a commodate, that the latter is gratis, and does not transfer the property: the thing muſt be returned in eſſence, and without impairment; ſo that things which conſume by uſe or time cannot be objects of a commodate, but of a loan; in regard they may be returned in kind, though not in identity. See LAW *Index*.

COMMODIANUS, GAZEUS, a Chriſtian author in the 4th century, who wrote a work in Latin verſe, entitled Inſtructions; the moral of which is excellent, but the verſe extremely heavy. M. Davies publiſhed a fine edition of it in 1711, at the end of Minucius Felix.

COMMODITY, in a general ſenſe, denotes all ſorts of wares and merchandiſes whatſoever that a perſon deals or trades in.

Staple COMMODITIES, ſuch wares and merchandiſes as are commonly and readily ſold in a market, or exported abroad; being for the moſt part the proper produce or manufacture of the country.

COMMODORE, a general officer in the Britiſh marine, inveſted with the command of a detachment of ſhips of war, deſtined on any particular enterpriſe, during which time he bears the rank of brigadier-general in the army, and is diſtinguiſhed from the inferior ſhips of his ſquadron by a broad red pendant tapering towards the outer end, and ſometimes forked. The word is corrupted from the Spaniſh *comendador*.

COMMODORE is alſo a name given to ſome ſelect ſhip in a fleet of merchantmen, who leads the van in time of war, and carries a light in his top to conduct the reſt and keep them together. He is always the oldeſt captain in the fleet which he commands.

COMMODUS, L. AURELIUS ANTONINUS, ſon of M. Antoninus, ſucceeded his father in the Roman empire. He was naturally cruel and fond of indulging his licentious propenſities. He wiſhed to be called Hercules; and, like that hero, he adorned his ſhoulders with a lion's ſkin, and armed his hand with a knotted club. He publicly fought with the gladiators, and boaſted of his dexterity in killing the wild beaſts in the amphitheatre. He required divine honours from the ſenate, and they were granted. He was wont to put ſuch an immenſe quantity of gold duſt in his hair, that when he appeared bareheaded in the ſunſhine his head glittered as if ſurrounded with ſun-beams. Martia, one of his concubines, whoſe death he had prepared, poiſoned him: but as the poiſon did not quickly operate, he was ſtrangled by a wreſtler. He died in the 31ſt year of his age, and the 13th of his reign. It has been obſerved, that he never truſted himſelf to a barber; but always burnt his beard, in imitation of the tyrant Dionyſius. A. D. 192.

COMMON, COMMUNIS, ſomething that belongs to all alike; is owned or allowed by all; and not confined to this more than that. In this ſenſe, *common* ſtands oppoſed to *proper*, *peculiar*, &c. Thus, the earth is ſaid to be our *common* mother; in the firſt or golden age all things were in *common*, as well as the ſun and elements: the name animal is *common* to man and beaſt; that of ſubſtance to body and ſpirit.

COMMON, *Communia*, (i. e. *quod ad omnes pertinet*), in law, ſignifies that ſoil, the uſe whereof is common to a particular town or lordſhip; or it is a profit that a man hath in the land of another perſon, uſually in common with others; or a right which a perſon hath to put his cattle to paſture into ground that is not his own. And there is not only common of paſture, but alſo common of piſcary, common of eſtovers, common of turbary, &c. And in all caſes of common, the law much reſpects the cuſtom of the place; for there the rule is, *conſuetudo loci eſt obſervanda*. See COMMONTY.

COMMON Council. See COUNCIL.

COMMON Law, that body of law received as rules in parliament to alter the ſame. See LAW, Part II. N° 36.

COMMON-Place Book, is a regiſter of what things occur, worthy to be noted, in the courſe of a man's thinking or ſtudy, ſo diſpoſed as that among a number of ſubjects any one may be eaſily found. The advantages of making a common-place book are many: it not only makes a man read with accuracy and attention, but induces him inſenſibly to think for himſelf, provided he conſiders it not ſo much as a regiſter of ſentiments that ſtrike him in the courſe of reading, but as a regiſter of his own thoughts upon various ſubjects. Many valuable thoughts occur even to men of no extraordinary genius. Theſe, without the aſſiſtance of a common-place book, are generally loſt both to himſelf and others. There are various methods of arranging common-place books; that of Mr Locke is as good as any that have hitherto been contrived.

The firſt page of the book you intend to take down their common-place in, is to ſerve as a kind of index to the whole, and to contain references to every place or matter therein: in the commodious contrivance of which index, ſo as it may admit of a ſufficient copia or variety of materials, without any confuſion, all the ſecret of the method conſiſts.

In order to this, the firſt page, as already mentioned, or for more room, the two firſt pages that front each other, are to be divided by parallel lines into 25 equal parts; whereof every fifth line is to be diſtinguiſhed by its colour or other circumſtance. Theſe lines are to be cut perpendicularly by others, drawn from top to bottom: and in the ſeveral ſpaces thereof the ſeveral letters of the alphabet, both capital and minuſcle, are to be duly written.

The form of the lines and diviſions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following ſpecimen; wherein, what is to be done in the book for all the letters of the alphabet, is here ſhown in the firſt four, *A*, *B*, *C*, and *D*.

	a			*a*	
	e			*e*	
A	*i*		*C*	*i*	
	o			*o*	
	u			*u*	
	a			*a*	
	e	2, 3.		*e*	
B	*i*		*D*	*i*	
	o			*o*	
	u			*u*	

The index to the common-place book thus formed, matters are ready for the taking down any thing therein.

In order to this, consider to what head the thing you would enter is most naturally referred; and under which one would be led to look for such a thing; in this head, or word, regard is had to the initial letter, and the first vowel that follows it; which are the characteristic letters whereon all the use of the index depends.

Suppose (*e. gr.*) I would enter down a passage that refers to the head *beauty*. *B*, I consider, is the initial letter, and *e* the first vowel: then looking upon the index for the partition *B*, and therein the line *e* (which is the place for all words whose first letter is *b*, and the first vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blemishes*), and finding no numbers already down to direct me to any page of the book where words of this characteristic have been entered, I turn forward to the first blank page I find (which, in a fresh book, as this is supposed to be, will be page 2d), and here write what I have occasion for on the head *beauty*; beginning the head in the margin, and indenting all the other subservient lines, that the head may stand out, and show itself; this done, I enter the page where it is written, viz. 2. in the index in the space B *e*; from which time the class *be* becomes wholly in possession of the 2d and 3d pages, which are consigned to letters of this characteristic.

Had I found any page or number already entered in the space *B e*, I must have turned to the page, and have written my matter in what room was left therein: so, if after entering the passage on beauty, I should have occasion for *benevolence*, or the like, finding the number 2 already possessed of the space of this characteristic, I begin the passage on benevolence in the remainder of the page; which not containing the whole, I carry it on to page 3d, which is also for *be*; and add the number 3 in the index.

COMMON Pleas is one of the king's courts now held constantly in Westminster-hall, but in former times was moveable.

All civil causes, as well real as personal, are, or were formerly, tried in this court, according to the strict law of the land. In personal and mixed actions it has a concurrent jurisdiction with the king's bench, but has no cognizance of pleas of the crown. The actions belonging to the court of common-pleas come thither by original, as arrests and outlawries; or by privilege, or attachment for or against privileged persons; or out of inferior courts, not of record, by *pone*, *recordari*, *accedas ad curiam*, writ of false judgment, &c. The chief judge of this court is called *lord chief justice of the common pleas*, who is assisted by three other judges. The other officers of the court are the *custos brevium*, who is the chief clerk; three prothonotaries, and their secondaries; the clerk of the warrants, clerk of the essoins, 14 filazers, 4 exigentors, a clerk of the juries, the chirographer, the clerk of the king's silver, clerk of the treasury, clerk of the seal, clerk of the outlawries, clerk of the inrolment of fines and recoveries, and clerk of the errors.

COMMON-Prayer is the liturgy in the church of England: (See LITURGY.) Clergymen are to use the public form of prayers prescribed by the Book of Common Prayer: and refusing to do so, or using any other public prayers, are punishable by stat. 1 Eliz. c. ii.

COMMON, in *Grammar*, denotes the gender of nouns which are equally applicable to both sexes; thus *parens*, "a parent," is of the common gender.

COMMON, in *Geometry*, is applied to an angle, line, or the like, which belongs equally to two figures.

COMMON Divisor, a quantity or number which exactly divides two or more other quantities or numbers, without leaving any remainder.

COMMONALTY, the lower of the two divisions of the civil state. See *CIVIL State*.

The commonalty, like the nobility, are divided into several degrees: and as the lords, though different in rank, yet all of them are peers in respect of their nobility: so the commoners, though some are greatly superior to others, yet all are in law commonalty, in respect of their want of nobility.

1. The first name of dignity next beneath a peer was anciently that of *vidames*, *vice-domini*, or *valvasors*: who are mentioned by our ancient lawyers as *viri magnæ dignitatis*; and Sir Edward Coke speaks highly of them. Yet they are now quite out of use; and our legal antiquarians are not agreed upon even their original or ancient office.

2. Now, therefore, the first personal dignity after the nobility is a knight of the order of St George or of the Garter, first instituted by Edw. III. A. D. 1344.

3. Next (but not till after certain official dignities, as privy-counsellors, the chancellors of the exchequer and duchy of Lancaster, the chief justice of the king's bench, the master of the rolls, and the other English judges), follows a *knight banneret*; who indeed, by statutes 5 Richard II. stat. 2. c. 4. and 14 Richard II. c. 11. is ranked next after barons; and his precedence before the younger sons of viscounts was confirmed to him by order of King James I. in the tenth year of his reign.

reign. But in order to entitle him to this rank, he muſt have been created by the king in perſon, in the field, under the royal banners, in time of open war; elſe he ranks after,

4. *Baronets;* who are the next in order: which is a dignity of inheritance, created by letters patent, and uſually deſcendible to the iſſue-male. See BARONETS.

5. Next follow *knights of the Bath.* See BATH.

6. The laſt of theſe inferior nobility are *knights bachelors;* the moſt ancient, though the loweſt, order of knighthood amongſt us. See BACHELOR.

7. The above, with thoſe enumerated under the article NOBILITY, Sir Edward Coke ſays, are all the names of *dignity* in this kingdom; *eſquires* and *gentlemen* being only names of *worſhip.* But before theſe laſt the heralds rank all colonels, ſergeants at law, and doctors in the three learned profeſſions.

8. *Eſquires* and *gentlemen* are confounded together by Sir Edward Coke: who obſerves, that every eſquire is a gentleman, and a gentleman is defined to be one *qui arma gerit,* "who bears coat-armour;" the grant of which adds gentility to a man's family: in like manner as civil nobility among the Romans was founded in the *jus imaginum,* or having the image of one anceſtor at leaſt who had borne ſome curule office. It is indeed a matter ſomewhat unſettled what conſtitutes the diſtinction, or who is a real eſquire; for it is not an eſtate, however large, that confers this rank upon its owner. Camden, who was himſelf a herald, diſtinguiſhes them the moſt accurately; and he reckons up four ſorts of them: 1ſt, The eldeſt ſons of knights, and their eldeſt ſons in perpetual ſucceſſion. 2dly, The eldeſt ſons of younger ſons of peers, and their eldeſt ſons, in like perpetual ſucceſſion: both which ſpecies of eſquires Sir Henry Spelman entitles *armigeri natalitii.* 3dly, Eſquires created by the king's letters patent, or rather inveſtiture; and their eldeſt ſons. 4thly, Eſquires by virtue of their office: as juſtices of the peace and others who bear any office of truſt under the crown. To theſe may be added the eſquires of the knights of the Bath, each of whom conſtitutes three at his inſtallation; and all foreign, nay, Iriſh peers; for not only theſe, but the eldeſt ſons of peers of Great Britain, though frequently titular lords, are only eſquires in the law, and muſt be ſo named in all legal proceedings.

9. As for *gentlemen,* ſays Sir Thomas Smith, they be made good cheap in this kingdom; for whoſoever ſtudieth the laws of the realm, who ſtudieth in the univerſities, who profeſſeth liberal ſciences, and (to be ſhort) who can live idly and without manual labour, and will bear the part, charge, and countenance of a gentleman, he ſhall be called maſter, and ſhall be taken for a gentleman.

10. A *yeoman* is he that hath free land of 40s. by the year; who is thereby qualified to ſerve on juries, vote for knights of the ſhire, and do any other act where the law requires one that is *probus et legalis homo.*

11. The reſt of the commonalty are *tradeſmen, artificers,* and *labourers;* who (as well as all others) muſt, in purſuance of the ſtatute 1 Henry V. c. 5. be ſtyled by the name and addition of their eſtate, degree, or myſtery, in all actions and other legal proceedings.

COMMONER, or GENTLEMAN-COMMONER, in the univerſities, a ſtudent entered in a certain rank.

COMMONS, or HOUSE OF COMMONS, a denomination given to the lower houſe of parliament. See PARLIAMENT.

The commons conſiſt of all ſuch men of any property in the kingdom as have not ſeats in the houſe of lords, every one of whom has a voice in parliament, either perſonally or by his repreſentatives. In a free ſtate, every man who is ſuppoſed a free agent, ought to be in ſome meaſure his own governor: and therefore a branch at leaſt of the legiſlative power ſhould reſide in the whole body of the people. And this power, when the territories of the ſtate are ſmall and its citizens eaſily known, ſhould be exerciſed by the people in their aggregate or collective capacity, as was wiſely ordained in the petty republics of Greece, and the firſt rudiments of the Roman ſtate. But this will be highly inconvenient when the public territory is extended to any conſiderable degree, and the number of citizens is increaſed. Thus when, after the Social war, all the burghers of Italy were admitted free citizens of Rome, and each had a vote in the public aſſemblies, it became impoſſible to diſtinguiſh the ſpurious from the real voter, and from that time all elections and popular deliberations grew tumultuous and diſorderly; which paved the way for Marius and Sylla, Pompey and Cæſar, to trample on the liberties of their country, and at laſt to diſſolve the commonwealth. In ſo large a ſtate as ours, therefore, it is very wiſely contrived, that the people ſhould do that by their repreſentatives which it is impracticable to perform in perſon: repreſentatives choſen by a number of minute and ſeparate diſtricts, wherein all the voters are or may be eaſily diſtinguiſhed. The counties are therefore repreſented by knights, elected by the proprietors of lands; and cities and boroughs are repreſented by citizens and burgeſſes choſen by the mercantile or ſuppoſed trading intereſt of the nation; much in the ſame manner as the burghers in the diet of Sweden are choſen by the corporate towns, Stockholm ſending four, as London does with us, other cities two, and ſome only one. The number of Engliſh repreſentatives is 513, of Scots 45, of Iriſh 100; in all 658; and every member, though choſen by one particular diſtrict, when elected and returned, ſerves for the whole realm; for the end of his coming thither is not particular, but general; not barely to advantage his conſtituents, but the commonwealth; to adviſe his majeſty, as appears from the writ of ſummons, "de communi conſilio ſuper negotiis quibuſdam arduis et urgentibus, regem, ſtatum, et defenſionem regni Angliæ et eccleſiæ Anglicanæ concernentibus." And therefore he is not bound, like a deputy in the United Provinces, to conſult with, or take the advice of, his conſtituents upon any particular point, unleſs he himſelf thinks it proper or prudent ſo to do.

The peculiar laws and cuſtoms of the houſe of commons relate principally to the raiſing of taxes, and the elections of members to ſerve in parliament. See TAXES and ELECTIONS.

Doctors

Doctors COMMONS. See *COLLEGE of Civilians*.

Proctor of the COMMONS. See PROCTOR.

COMMONTY, in *Scots Law*, ſometimes ſignifies lands belonging to two or more common proprietors; ſometimes a heath or muir, though it ſhould belong in property to one, if there has been a promiſcuous poſſeſſion upon it by paſturage; and the act 1695 mentions commonties belonging in property to the king and to royal boroughs. See LAW *Index*.

COMMONWEALTH. See REPUBLIC.

COMMOTE, an ancient term in Wales, denoting half a cantred, or hundred: containing 50 villages. See HUNDRED. Wales was anciently divided into three provinces; each of theſe ſubdivided into cantreds, and every cantred into two commotes or hundreds. Silveſter Girald, however, tells us in his Itinerary, that a commote is but a quarter of a hundred.

COMMUNIS, in *Botany*, the name of a claſs in Linnæus's *Methodus Calycina*, conſiſting of two plants which, like teazel and dandelion, have a calyx or flower-cup common to many flowers or florets. Theſe are the aggregate or compound flowers of other ſyſtems.

COMMUNIBUS LOCIS, a Latin term, in frequent uſe among philoſophical, &c. writers; implying ſome medium or mean relation, between ſeveral places. Dr Keil ſuppoſes the ocean to be one quarter of a mile deep, *communibus locis*, q. d. at a medium, or taking one place with another.

COMMUNIBUS Annis, has the ſame import with regard to years that *communibus locis* has with regard to places. Mr Derham obſerves that the depth of rain, *communibus annis*, or one year with another, were it to ſtagnate on the earth, would amount in Townley in Lancaſhire, to $42\frac{1}{2}$ inches; at Upminſter in Eſſex, to $19\frac{1}{4}$; at Zurich, $32\frac{1}{4}$; at Piſa, $43\frac{1}{4}$: and at Paris to 19 inches.

COMMUNICATING, in *Theology*, the act of receiving the ſacrament of the euchariſt. Thoſe of the reformed, and of the Greek church, communicate under both kinds; thoſe of the Romiſh, under only one. The oriental communicants receive the ſpecies of wine by a ſpoon, and anciently they ſucked it through a pipe, as has been obſerved by Beat. Rheanus on Tertullian.

COMMUNICATION, in a general ſenſe, the act of imparting ſomething to another.

COMMUNICATION, is alſo uſed for the connection of one thing with another, or the paſſage from one place to another; thus a gallery is a communication between two apartments.

COMMUNICATION of motion, the act whereby a body at reſt is put into motion by a moving body; or, it is the acceleration of motion in a body already moving.

Lines of COMMUNICATION, in military matters, trenches made to continue and preſerve a ſafe correſpondence between two forts or poſts; or at a ſiege between two approaches, that they may relieve one another.

Canal of COMMUNICATION. See CANAL.

COMMUNION, in matters of religion, the being united in doctrine and diſcipline; in which ſenſe of the word, different churches are ſaid to hold communion with each other.

In the primitive Chriſtian church, every biſhop was obliged, after his ordination, to ſend circular letters to foreign churches, to ſignify that he was in communion with them. The three grand communions into which the Chriſtian church is at preſent divided, is that of the church of Rome, the Greek church, and the Proteſtant church: but originally all Chriſtians were in communion with each other, having one common faith and diſcipline.

COMMUNION is alſo uſed for the act of communicating the ſacrament of the euchariſt, or the Lord's ſupper.

The fourth council of Lateran decrees, that every believer ſhall receive the communion, at leaſt at Eaſter; which ſeems to import a tacit deſire, that they ſhould do it oftener; as, in effect, they did it much oftener in the primitive days. Gratian, and the maſter of the ſentences, preſcribe it as a rule for the laity, to communicate three times a-year, at Eaſter, Whitſuntide, and Chriſtmas. But in the 13th century, the practice was adopted, never to approach the euchariſt, except at Eaſter; and the council thought fit to enjoin it then by a law, leſt their coldneſs and remiſſneſs ſhould go farther ſtill. And the council of Trent renewed the ſame injunction, and recommended frequent communion without enforcing it by an expreſs decree.

In the ninth century the communion was ſtill received by the laity in both kinds; or, rather the ſpecies of bread was dipped in the wine, as is owned by the Romaniſts themſelves. (Acta SS Benedict. Sæc. III). M. de Marca obſerves, that they received it at firſt in their hands, Hiſt. de Bearn, and believes the communion under one kind alone to have had its riſe in the Weſt under Pope Urban II. in 1096, at the time of the conqueſt of the Holy Land. And it was more ſolemnly enjoined by the council of Conſtance in 1414. The twenty-eighth canon of the council of Clermont enjoins the communion to be received under both kinds, diſtinctly; adding, however, two exceptions; the one of neceſſity, the other of caution, *niſi per neceſſitatem et cautelam*; the firſt in favour of the ſick, the ſecond of the abſtemious, or thoſe who had an averſion for wine.

It was formerly a kind of canonical puniſhment, for clerks guilty of any crime, to be reduced *to lay communion*, i. e. only to receive it as the laity did, viz. under one kind.

They had another puniſhment of the ſame nature, though under a different name, called *foreign communion*; to which the canons frequently condemned their biſhops and other clerks. This puniſhment was not any excommunication, or depoſition; but a kind of ſuſpenſion from the function of the order, and a degradation from the rank they held in the church. It had its name becauſe the communion was only granted to the criminal on the foot of a foreign clerk, i. e. being reduced to the loweſt of his order, he took place after all thoſe of his rank, as all clerks, &c. did in the churches to which they did not belong. The ſecond council of Agda orders every clerk that abſents himſelf from the church to be reduced to foreign communion.

COMMUNION Service, in the liturgy of the church of England, the office for the adminiſtration of the holy

 ſacrament,

facrament, extracted from feveral ancient liturgies, as thofe of St Bafil, St Ambrofe, &c.

By the laft rubric, part of this fervice is appointed to be read every Sunday and holiday, after the morning prayer, even though there be no communicants.

COMMUNITY, denotes a fociety of men living in the fame place, under the fame laws, the fame regulations, and the fame cuftoms.

COMMUTATION, in *Law*, the change of a penalty or punifhment from a greater to a lefs; as when death is commuted for banifhment, &c.

COMNENA, Ann, daughter of Alexius Comnenus emperor of the Eaft; memorable for her great learning and virtue, and for her hiftory of the life and actions of her father, which is highly efteemed. She flourifhed about the year 1117. The hiftory, which is in 15 books, was firft publifhed very imperfectly by Hefchelius in 1610; and afterwards printed in the collection of the Byzantine hiftorians, with a diffufe and incorrect Latin verfion by the Jefuit Poffimus, but with excellent notes by the learned Du Frefne.

COMO, a ftrong and populous town of Italy, in the duchy of Milan, and in the Comafco, with a bifhop's fee. It was taken by the Imperialifts in 1706, and is feated on a lake of the fame name, in E. Long. 8. 57. N. Lat. 45. 45.

Como, the lake fo called, is the largeft in Italy. It is fituated in the duchy of Milan, in the Comafco, on the confines of Switzerland and the Grifons. It is 88 miles in circumference, yet is not above 6 miles over in any part.

COMORA iflands lie between the north end of the ifland of Madagafcar and the coaft of Zanguebar, from 10 to 15 degrees fouth latitude. Authors differ greatly with regard to their number, fome fpeaking of three, others of five, and fome of eight of thefe iflands. They all abound in horned cattle, fheep, hogs, and a variety of fruits common in warm countries. They are faid alfo to produce a kind of rice which turns of a violet colour when boiled. The moft remarkable of them, and which the Europeans are beft acquainted with, is the ifland of Johanna. See that article.

COMORIN, or Cape Comorin, the moft foutherly promontory of the Hither India, lying north-weft of the ifland of Ceylon.

COMORRA, a handfome and large town of Lower Hungary, and capital of a territory of the fame name. It is fo well fortified, that the Turks could never take it. The greateft part of the inhabitants are Hungarians or Ruffians, who are very rich, and are of the Greek religion. It is feated on the river Danube, in the ifland of Silbut. E. Long. 18. 5. N. Lat. 47. 46.

COMOSÆ, in *Botany*, from *Coma;* an order of plants in the former edition of Linnæus's Fragments of a Natural Method, confifting of the fpiked willow or fpiræa frutex, dropwort, and greater meadowfweet. Thefe, though formerly diftinct genera, are by Linnæus collected into one, under the name of *fpiræa*. The flowers growing in a head refemble a bufh, or tuft of hair, which probably gave rife to the epithet *Comofæ*

COMPACT, in *Philofophy*, is faid of bodies which are of a clofe, denfe, and heavy texture, with few pores, and thofe very fmall.

Compact, in a legal fenfe, fignifies an agreement or contract ftipulated between feveral parties.

COMPANION, one with whom a man frequently converfes.

As the human mind cannot always be on the ftretch, nor the hand always employed in labour, recreation becomes both agreeable and neceffary. Of all recreations, that of the company of a few chofen companions muft be allowed to be the moft manly and moft improving: but as in thofe hours of recreation we are moft in danger of being mifled, being generally at fuch feafons more off our guard than ufual, the greateft care fhould be taken in making choice of whom to affociate with; for according to our choice of them, both our character and difpofition will receive a tincture, as waters paffing through minerals partake of their tafte and efficacy. This is a truth fo univerfally received, that it is become a proverb both in the natural and moral world, That a man is known by his company. As by chemiftry we learn, that difcordant mixtures produce nothing but broil and fermentation till one of them gets the afcendency of the reft; fo from Scripture we learn, that two cannot walk together except they be agreed. From which we may fee, how impoffible it is for any one to be thought a perfon of real goodnefs and integrity, whilft he choofes for his companions the abandoned and licentious.

By affociating with fuch, he will not only lofe his character, but his virtue; for whatever fallacious diftinction he may be pleafed to make between the men and their vices, in the end the firft generally qualifies the laft; and by ceafing to hate them he will foon learn both to love and practife them. In fhort, the fociety of fenfual men is peculiarly enfnaring. The malignity of their contagion doth not appear all at once. Their frolics firft appear harmlefs; then, when partaken of, they leave a longing relifh behind them; and one appointment makes way for another, one expence leads on to a fecond; and fo time and fortune are wafted away to very bad purpofe. The one appetite craves, and another muft be gratified, till all become too importunate to be denied; which verifies what the wifeft of men long fince faid, "That the beginning of fin is like the breaking forth of waters, which when it once makes an entrance, carries all before it with rufhing impetuofity." Some pangs of remorfe may be felt by the infatuated creature on his firft degeneracy, and fome faint refolutions againft being feduced any more; which will no fooner be difcovered by thofe leaders to deftruction, than all arts will be ufed to allure him back to bear them company in the broad beaten path to ruin. Of all which methods, none is more to be dreaded than raillery; for this is generally exercifed with all its force, and too often proves fatal. Another method ufed to miflead the young novice not yet hackneyed in vice, and no lefs dangerous than the other, is to call evil good, and good evil. Luft and fenfuality muft pafs for love and gallantry; revenge and malice, for heroifm. But fteadinefs fhould be fhown, by holding fuch pefts of fociety in derifion, and looking on them with contempt; by appearing unmoved

ved by their ill-founded banters, and unflung by their impious jefts.

Upon the whole, in order to efcape the danger which attends the keeping of evil company, let thofe you affociate with be perfons as carefully educated and as honeftly difpofed as yourfelf; of a good moral character, not given to any known vice; whofe lives are temperate, and whofe expences are moderate: with fuch company as thefe, you will neither get difcredit, nor degenerate into excefs. You will be a mutual check to each other; and your reputation will be fo eftablifhed, that it will be the ambition of others to be admitted members of your fociety. Select thofe for your companions who are men of good fenfe and underftanding; and, if poffible, who excel in fome art, fcience, or accomplifhment; that fo, in the courfe of your acquaintance, your very hours of amufement may contribute to your improvement; and for the moft part fuch are open and communicative, and take as much pleafure in being heard as you to be informed. By purfuing fuch a conduct, you will be an ornament and ufeful member of fociety.

COMPANY, a collective term, underftood of feveral perfons affembled together in the fame place, or with the fame defign. The word is formed of the French *compagnie*, and that of *companio*, or *companies*, which Chifflet obferves, are found in the Salic law, tit. 66. and are proper military words, underftood of foldiers, who, according to the modern phrafe, are comrades or mefs-mates, i. e. lodge together, eat together, &c. of the Latin *cum*, "with," and *panis*, "bread." It may be added, that in fome Greek authors under the weftern empire, the word κȣμπανια occurs in the fenfe of fociety.

COMPANY, in a familiar or fafhionable fenfe, is ufed for an affemblage of perfons met for the purpofe of converfation, paftime, or feftivity.

The love of company and of focial pleafures is natural, and attended with fome of the fweeteft fatisfactions of human life; but, like every other love, when it proceeds beyond the bounds of moderation, it ceafes to produce its natural effect, and terminates in difguftful fatiety. The foundation-ftone and the pillar on which we build the fabric of our felicity, muft be laid in our own hearts. Amufement, mirth, agreeable variety, and even improvement, may be fometimes fought in the gaiety of mixed company, and in the ufual diverfions of the world; but if we found our general happinefs on thefe, we fhall do little more than raife caftles in the air, or build houfes on the fand.

To derive the proper pleafure and improvement from company, it ought to be felect, and to confift of perfons of character, refpectable both for their morals and their underftandings. Mixed and undiftinguifhed fociety tends only to diffipate our ideas, and induce a laxity of principles and practice. The pleafure it affords is of a coarfe, mixed, noify, and rude kind. Indeed, it commonly ends in wearinefs and difguft, as even they are ready to confefs who yet conftantly purfue it, as if their chief good confifted in living in a crowd.

Among thefe, indeed, who are exempted by their circumftances from profeffional and official employments, and who profeffedly devote themfelves to a life of pleafure, little elfe feems to conftitute the idea of it, but an unceafing fucceffion of company, public or private. The drefs, and other circumftances preparatory to the enjoyment of this pleafure, fcarcely leave a moment for reflection. Day after day is fpent in the fame toilfome round, till a habit is formed, which renders diffipation neceffary to exiftence. One week without it would probably induce a lownefs of fpirits, which might terminate in defpair and fuicide. When the mind has no anchor, it will fuffer a kind of fhipwreck; it will fink in whirlpools, and be dafhed on rocks. What, indeed, is life or its enjoyments without fettled principles, laudable purpofes, mental exertions, and internal comfort? It is merely a vapour, or, to drop the language of figure on fo ferious a fubject, it is a ftate worfe than non-entity, fince it poffeffes a reftlefs power of action, productive of nothing but mifery.

It is recommended, therefore, to all who wifh to enjoy their exiftence (and who entertains not that wifh)? that they fhould acquire a power not only of bearing, but of taking a pleafure in, temporary folitude. Every one muft, indeed, fometimes be alone. Let him not repine when he is alone, but learn to fet a value on the golden moments. It is then that he is enabled to ftudy himfelf and the world around him. It is then that he has an opportunity of feeing things as they are, and of removing the deceitful veil, which almoft every thing affumes in the bufy fcene of worldly employments. The foul is enabled to retire into herfelf, and to exert thofe energies which are always attended with fublime pleafure. She is enabled to fee the dependent, frail, and wretched ftate of man as the child of nature; and incited by her difcovery, to implore grace and protection from the Lord of the univerfe. They, indeed, who fly from folitude, can feldom be religious; for religion requires meditation. They may be faid to "live without God in the world;" not, it is true, from atheiftical principles, but from a careleffnefs of difpofition; a truly deplorable ftate, the confcioufnefs of which could not fail to cloud the gaiety of thofe halcyon beings who fport in the funfhine of unremitted pleafure.

There is no doubt that man is made for action, and that his duties and pleafures are often moft numerous and moft important amidft the bufy hum of men. Many vices, and many corrupt difpofitions, have been foftered in a folitary life. Monkery is not favourable to human nature or human happinefs; but neither is unlimited diffipation.

In fhort, let there be a fweet interchange of retirement and affociation, of repofe and activity. A few hours fpent every day by the votaries of pleafure in ferious meditation, would render their pleafure pure, and more unmixed with mifery. It would give them knowledge, fo that they would fee how far they might advance in their purfuit without danger; and refolution, fo that they might retreat when danger approached. It would teach them how to live, a knowledge which indeed they think they poffefs already; and it would alfo teach them, what they are often too little folicitous to learn, how to die.

COMPANY, in a commercial fenfe, is a fociety of merchants, mechanics, or other traders, joined together in one common intereft.

When there are only two or three joined in this manner, it is called a partnerfhip; the term *company* being

Company. being reſtrained to ſocieties conſiſting of a conſiderable number of members, aſſociated together by a charter obtained from the prince.

The mechanics of all corporations, or towns incorporated, are thus erected into companies, which have charters of privileges and large immunities.

COMPANY ſeems more particularly appropriated to thoſe grand aſſociations ſet on foot for the commerce of the remote parts of the world, and veſted by charter with peculiar privileges.

When companies do not trade upon a joint ſtock, but are obliged to admit any perſon, properly qualified, upon paying a certain fine, and agreeing to ſubmit to the regulations of the company, each member trading upon his own ſtock and at his own riſk, they are called *Regulated Companies*. When they trade upon a joint ſtock, each member ſharing in the common profit or loſs in proportion to his ſhare in this ſtock, they are called *Joint-ſtock Companies*. Such companies, whether regulated or joint-ſtock, ſometimes have, and ſometimes have not, excluſive privileges.

However injurious companies with joint-ſtock, and incorporated with excluſive privileges, may at this time be reckoned to the nation in general, it is yet certain that they were the general parent of all our foreign commerce; private traders being diſcouraged from hazarding their fortunes in foreign countries, until the method of traffic had been firſt ſettled by joint-ſtock companies. But ſince the trade of this kingdom and the number of traders have increaſed, and the methods of aſſurance of ſhipping and merchandiſe, and the navigation of all parts of the known world have become familiar to us, theſe companies, in the opinion of moſt men, have been looked upon in the light of monopolies; their privileges have therefore been leſſened from time to time, in order to favour a free and general trade; and experience has ſhown, that the trade of the nation has advanced in proportion as monopolies have been diſcouraged. In ſhort, as all reſtrictions of trade are found to be hurtful, nothing can be more evident, than that no company whatſoever, whether they trade in a joint-ſtock or only under regulation, can be for the public good, except it may be eaſy for all or any of his majeſty's ſubjects to be admitted into all or any of the ſaid companies, at any time, and for a very inconſiderable fine.

I. REGULATED Companies reſemble, in every reſpect, the corporations of trades, ſo common in the cities and towns of all the different countries of Europe; and are a ſort of enlarged monopolies of the ſame kind. As no inhabitant of a town can exerciſe an incorporated trade, without firſt obtaining his freedom in the corporation; ſo in moſt caſes no ſubject of the ſtate can lawfully carry on any branch of foreign trade, for which a regulated company is eſtabliſhed, without firſt becoming a member of that company. The monopoly is more or leſs ſtrict according as the terms of admiſſion are more or leſs difficult; and according as the directors of the company have more or leſs authority, or have it more or leſs in their power to manage in ſuch a manner as to confine the greater part of the trade to themſelves and their particular friends. In the moſt ancient regulated companies the privileges of apprenticeſhip were the ſame as in other corporations; and entitled the perſon who had ſerved his time to a member of the company, to become himſelf a member, either without paying any fine, or upon paying a much ſmaller one than what was exacted from other people. The uſual corporation ſpirit, wherever the law does not reſtrain it, prevails in all regulated companies. When they have been allowed to act according to their natural genius, they have always, in order to confine the competition to as ſmall a number of perſons as poſſible, endeavoured to ſubject the trade to many burdenſome regulations. When the law has reſtrained them from doing this, they have become altogether uſeleſs and inſignificant.

The regulated companies for foreign commerce, which at preſent ſubſiſt in Great Britain, are, The Hamburgh Company, the Ruſſia Company, the Eaſtland Company, the Turkey Company, and the African Company.

1. *The Hamburgh Company* is the oldeſt trading eſtabliſhment in the kingdom; though not always known by that name, nor reſtrained to thoſe narrow bounds under which it is now confined. It was firſt called the *Company of Merchants trading to Calais, Holland, Zealand, Brabant, and Flanders*: then it acquired the general title of *Merchant-adventurers of England*: as being compoſed of all the Engliſh merchants who traded to the Low Countries, the Baltic, and the German ocean. Laſtly, it was called the *Company of Merchant-adventurers of England trading to Hamburgh*.

This company was firſt incorporated by Edward I. in 1296; and eſtabliſhed again, by charter, in 1406, under the reign of King Henry IV. It was afterwards confirmed, and augmented with divers privileges, by many of his ſucceſſors. Before the charter of Henry IV. all the Engliſh merchants who trafficked out of the realm, were left to their own diſcretion, and managed their affairs with foreigners as might be moſt for their reſpective intereſts, without any regard to the general commerce of the nation. Henry, obſerving this diſorder, endeavoured to remedy it, by uniting all the merchants in his dominions into one body; wherein, without loſing the liberty of trading each for himſelf, they might be governed by a company ſtill ſubſiſting; and be ſubject to regulations, which ſhould ſecure the general intereſt of the national commerce, without prejudice to the intereſt of particulars. With this view, he granted all the merchants of his ſtates, particularly thoſe of Calais, then in his hands, a power of aſſociating themſelves into a body politic, with directors and governors, both in England and abroad; to hold aſſemblies, both for the direction of buſineſs and the deciding of controverſies among merchants; make laws; puniſh delinquents; and impoſe moderate duties and taxes on merchandiſes, and merchants, to be employed in the ſervice of the corporation. Theſe few articles of the charter of Henry IV. were afterwards much augmented by Henry VII. who firſt gave them the title of *Merchant-adventurers to Calais, Holland*, &c. gave them a power of proclaiming and continuing free fairs at Calais; and ordered, that to be reputed a member of the ſociety, each perſon pay 20 marks ſterling; and that the ſeveral members ſhould attend the general meetings, or courts, appointed by the directors, whether at London, Calais, or elſewhere.

A petition being made to Queen Elizabeth, in 1564, for

Company.

for an explanation of certain articles in the charter of Henry VII. and a confirmation of the reſt granted by other kings; that princeſs, by a charter of the ſame year, declares that, to end all diſputes, they ſhall be incorporated anew, under the title of the *Company of Merchant-adventurers of England;* that all who were members of the former company ſhould, if they deſired it, be admitted members of this; that they ſhould have a common ſeal; that they ſhould admit into their ſociety what other perſons, and on what terms, they pleaſed, and expel them again on miſbehaviour; that the city of Hamburgh and neighbouring cities ſhould be reputed within their grant, together with thoſe of the Low Countries, &c. in that of the former company: that no member ſhould marry out of the kingdom, nor purchaſe lands, &c. in any city beyond ſea; and that thoſe who do, ſhall be, *ipſo facto*, excluded for ever. Twenty-two years after this firſt charter, Queen Elizabeth granted them a ſecond; confirming the former, and further granting them a privilege of excluſion; with a power of erecting in each city within their grant a ſtanding council.

The revolutions which happened in the Low Countries towards the end of the ſixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom; it was obliged to turn it almoſt wholly to the ſide of Hamburgh, and the cities on the German ocean; from which change, ſome people took occaſion to change its name to that of the *Hamburgh Company;* though the ancient title of *Merchant-adventurers* is ſtill retained in all their writings.

About the middle of the laſt century, the fine for admiſſion was fifty, and at one time one hundred pounds, and the conduct of the company was ſaid to be extremely oppreſſive. In 1643, in 1645, and in 1661, the clothiers and free traders of the weſt of England complained of them to parliament, as of monopoliſts who confined the trade and oppreſſed the manufactures of the country. Though thoſe complaints produced no act of parliament, they had probably intimidated the company ſo far, as to oblige them to reform their conduct. The terms of admiſſion are now ſaid to be quite eaſy; and the directors either have it not in their power to ſubject the trade to any burdenſome reſtraint or regulations, or at leaſt have not of late exerciſed that power.

2. *The Ruſſia Company* was firſt projected towards the end of the reign of King Edward VI. executed in the firſt and ſecond years of Philip and Mary; but had not its perfection till its charter was confirmed by act of parliament, under Queen Elizabeth, in 1566. It had its riſe from certain adventurers, who were ſent in three veſſels on the diſcovery of new countries; and to find out a north-eaſt paſſage to China; theſe, falling into the White ſea, and making up to the port of Archangel, were exceedingly well received by the Muſcovites; and, at their return, ſolicited letters patent to ſecure to themſelves the commerce of Ruſſia, for which they had formed an aſſociation.

By their charter, the aſſociation was declared a body politic, under the name of the *Company of Merchant-adventurers of England, for the diſcovery of lands, territories, iſlands,* &c. *unknown or unfrequented.* Their privileges were, to have a governor, four conſuls, and 24 aſſiſtants, for their commerce; for their policy, to make laws, inflict penalties, ſend out ſhips, to make diſcoveries, take poſſeſſion of them in the king's name, ſet up the banner royal of England, plant them; and laſtly, the excluſive privilege of trading to Archangel, and other ports of Muſcovy, not yet frequented by the Engliſh.

This charter not being ſufficiently guarded, was confirmed by parliament in the 8th year of Queen Elizabeth; wherein it was enacted, that in regard the former name was too long, they ſhould now be called *Company of Engliſh Merchants for diſcovering new trades;* under which name, they ſhould be capable of acquiring and holding all kinds of lands, manors, rents, &c. not exceeding 100 marks per annum, and not held of her majeſty; that no part of the continent, iſland, harbour, &c. not known or frequented before the firſt enterpriſe of the merchants of their company, ſituated to the north, or north-weſt, or north-eaſt of London; nor any part of the continent, iſlands, &c. under the obedience of the emperor of Ruſſia, or in the countries of Armenia, Media, Hyrcania, Perſia, or the Caſpian ſea, ſhould be viſited by any ſubjects of England, to exerciſe any commerce, without the conſent of the ſaid company, on pain of confiſcation. The ſaid company ſhall uſe no ſhips in her new commerce but thoſe of the nation; nor tranſport any cloths, ſerges, or other woollen ſtuffs, till they have been dyed and preſſed. That in caſe the company diſcontinue of itſelf to unload commodities in the road of the abbey of S. Nicolas, in Ruſſia, or ſome other port on the north coaſts of Ruſſia, for the ſpace of three years, the other ſubjects of England ſhall be allowed to traffic to Narva, while the ſaid company diſcontinues its commerce into Ruſſia, only uſing Engliſh veſſels.

This company ſubſiſted with reputation almoſt a whole century, till the time of the civil wars. It is ſaid, the czar then reigning, hearing of the murder of King Charles I. ordered all the Engliſh in his ſtates to be expelled; which the Dutch taking the advantage of, ſettled in their room. After the reſtoration, the remains of the company re-eſtabliſhed part of their commerce at Archangel, but never with the ſame ſucceſs as before; the Ruſſians being now well accuſtomed to the Dutch merchants and merchandiſe.

This company ſubſiſts ſtill, under the direction of a governor, four conſuls, and aſſiſtants. By the 10th and 11th of William III. c. 6. the fine for admiſſion was reduced to 5l.

3. *The Eaſtland Company* was incorporated by Queen Elizabeth. Its charter is dated in the year 1579. By the firſt article the company is erected into a body politic under the title of the *Company of Merchants of the Eaſt;* to conſiſt of Engliſhmen, all real merchants, who have exerciſed the buſineſs thereof, and trafficked through the Sound before the year 1568, into Norway, Sweden, Poland, Livonia, Pruſſia, Pomerania, &c. as alſo Revel, Coningſberg, Dantzick, Copenhagen, &c. excepting Narva, Muſcovy, and its dependencies. Moſt of the following articles grant them the uſual prerogatives of ſuch companies, as a ſeal, governor, courts, laws, &c.

The privileges peculiar to this company are, that none ſhall be admitted a member who is already a member

Company. member of any other company; nor any retail-dealer at all. That no merchant qualified be admitted without paying ſix pounds thirteen ſhillings and ſixpence. That a member of another company deſiring to renounce the privileges thereof, and to be received into that of the Eaſt ſhall be admitted *gratis;* provided he procures the ſame favour for a merchant of the Eaſt willing to fill his place. That the merchant-adventurers who never dealt in the Eaſt, in the places expreſſed in the charter, may be received as members of the company on paying 40 marks; that, notwithſtanding this union of the adventurers of England with the company of the Eaſt, each ſhall retain its rights and privileges. That they ſhall export no cloths but what are dyed and preſſed, except a hundred pieces per annum, which are allowed them *gratis*. This charter was confirmed by Charles II. in 1629, with this addition, that no perſon, of what quality ſoever, living in London, ſhould be admitted a member, unleſs he were free of the city. This company was complained of as a monopoly, and firſt curtailed by legal authority in 1672; and ſince the declaration of rights in 1689, exiſt only in name; but ſtill continue to elect their annual officers, who are a governor, a deputy, and twenty-four aſſiſtants.

7. *The Turkey or Levant Company*, had its riſe under Queen Elizabeth, in 1581. James I. confirmed its charter in 1605, adding new privileges. During the civil wars, there happened ſome innovations in the government of the company; many perſons having been admitted members, not qualified by the charters of Queen Elizabeth and King James, or that did not conform to the regulations preſcribed. Charles II. upon his reſtoration, endeavoured to ſet it upon its ancient baſis; to which end, he gave them a charter, containing not only a confirmation of their old one, but alſo ſeveral new articles of reformation. By this, the company is erected into a body politic, capable of making laws, &c. under the title of the *Company of Merchants of England trading to the ſeas of the Levant*. The number of members is not limited, but is ordinarily about three hundred. The principal qualification required is, that the candidate be a freeman of London, and a wholeſale merchant, either by family or by ſerving an apprenticeſhip of ſeven years. Thoſe under 25 years of age pay 25l. ſterling at their admiſſion; thoſe above, twice as much. The fine was reduced by act of parliament, in 1753, to 20l. and the privilege of admiſſion extended to every Britiſh ſubject. Each makes oath at his entrance not to ſend any merchandiſe to the Levant but on his own account; and not to conſign them to any but the company's agents or factors. This reſtriction is likewiſe enlarged by the above-mentioned ſtatute.

The company has a court or board at London, which is compoſed of a governor, deputy-governor, and fifteen directors or aſſiſtants, who are all actually to live in London or the ſuburbs. They have alſo a deputy-governor in every city and port, where there are any members of the company. The aſſembly at London ſends out the veſſels, regulates the tariff for the price at which the European merchandiſes ſent to the Levant are to be ſold, and for the quality of thoſe returned. It raiſes taxes on merchandiſes, to defray impoſitions, and the common expences of the company; preſents the ambaſſador which the king is to keep at the Porte, elects two conſuls for Smyrna and Conſtantinople, &c.

One of the beſt regulations of the company is, not to leave the conſuls, or even ambaſſador, to fix the impoſition on veſſels for defraying the common expences (a thing fatal to the companies of moſt other nations); but to allow a penſion to the ambaſſador and conſuls, and even to the chief officers, as ſecretary, chaplain, interpreters, and janizaries, that there may not be any pretence for their raiſing any ſum at all on the merchants or merchandiſes.

In extraordinary caſes, the conſuls, and even the ambaſſador, have recourſe to two deputies of the company, reſiding in the Levant; or, if the affair be very important, they aſſemble the whole body. Here are regulated the preſents to be given, the voyages to be made, and every thing to be deliberated; and on the reſolutions here taken, the deputies appoint the treaſurer to furniſh the moneys, &c. required.

The ordinary commerce of this company employs from 20 to 25 veſſels, carrying from 25 to 30 pieces of cannon. The merchandiſes exported thither are, cloths of all kinds and colours, pewter, lead, pepper, cochineal, and a great deal of ſilver, which they take up at Cadiz: the returns are in raw ſilk, galls, camlets, wools, cottons, Morocco leather, aſhes for making glaſs and ſoap, and ſeveral gums and medicinal drugs. The commerce to Smyrna, Conſtantinople, and Scanderoon, is not eſteemed much leſs conſiderable than that of the Eaſt India Company; but is, doubtleſs, more advantageous to Britain, becauſe it takes off much more of the Britiſh manufactures than the other, which is chiefly carried on in money. The places reſerved for the commerce of this company are, all the ſtates of Venice, in the gulf of Venice; the ſtate of Raguſa; all the ſtates of the grand ſeignior, and the ports of the Levant and Mediterranean; excepting Carthagena, Alicant, Barcelona, Valencia, Marſeilles, Toulon, Genoa, Leghorn, Civita Vecchia, Palermo, Meſſina, Malta, Majorca, Minorca, and Corſica; and other places on the coaſts of France, Spain, and Italy.

5. *The Company of Merchants trading to Africa*, eſtabliſhed in 1750. Contrary to the former practice with regard to regulated companies, who were reckoned unfit for ſuch ſort of ſervice, this company was ſubjected to the obligation of maintaining forts and garriſons. It was expreſsly charged at firſt with the maintenance of all the Britiſh forts and garriſons that lie between Cape Blanc and the Cape of Good Hope, and afterwards with that of thoſe only which lie between Cape Rouge and the Cape of Good Hope. The act which eſtabliſhes this company (the 23d of George II. c. 31.) ſeems to have had two diſtinct objects in view; firſt, to reſtrain effectually the oppreſſive and monopolizing ſpirit which is natural to the directors of a regulated company; and ſecondly, to force them as much as poſſible to give an attention, which is not natural to them, towards the maintenance of forts and garriſons.

For the firſt of theſe purpoſes, the fine for admiſſion is limited to forty ſhillings. The company is prohibited from trading in their corporate capacity, or upon a joint ſtock; from borrowing money upon common

Company. mon seal, or from laying any restraints upon the trade which may be carried on freely from all places, and by all persons being British subjects, and paying the fine. The government is in a committee of nine persons who meet at London, but who are chosen annually by the freemen of the company at London, Bristol, and Liverpool; three from each place. No committee man can be continued in office for more than three years together. Any committee-man might be removed by the board of trade and plantations; now by a committee of council, after being heard in his own defence. The committee are forbid to export negroes from Africa, or to import any African goods into Great Britain. But, as they are charged with the maintenance of forts and garrisons, they may for that purpose export from Great Britain to Africa goods and stores of different kinds. Out of the money which they shall receive from the company, they are allowed a sum not exceeding eight hundred pounds, for the salaries of their clerks and agents at London, Bristol, and Liverpool; the house-rent of their office at London; and all other expences of management, commission, and agency, in England. What remains of this sum, after defraying those different expences, they may divide among themselves, as compensation for their trouble, in what manner they think proper. "By this constitution, it might have been expected (Dr Smith observes), that the spirit of monopoly would have been effectually restrained, and the first of these purposes sufficiently answered. It would seem, however, that it had not. Though by the 4th of George III. c. 20. the fort of Senegal, with all its dependencies, had been vested in the company of merchants trading to Africa, yet in the year following (by the 5th of George III. c. 24.), not only Senegal and its dependencies, but the whole coast from the port of Sallee, in south Barbary, to Cape Rouge, was exempted from the jurisdiction of that company, was vested in the crown, and the trade to it declared free to all his majesty's subjects. The company had been suspected of restraining the trade, and of establishing some sort of improper monopoly. It is not, however, very easy to conceive how, under the regulations of the 23d George II. they could do so. From the printed debates of the house of commons (not always the most authentic records of truth), it appears, however, that they have been accused of this. The members of the committee of nine being all merchants, and the governors and factors, in their different forts and settlements, being all dependent upon them, it is not unlikely that the latter might have given peculiar attention to the consignments and commissions of the former, which would establish a real monopoly."

For the second purpose mentioned, the maintenance of the forts and garrisons, an annual sum has been allotted to them by parliament, generally about 13,000l. For the proper application of this sum, the committee is obliged to account annually to the cursitor baron of exchequer; which account is afterwards to be laid before parliament. But parliament (continues our author), which gives so little attention to the application of millions, is not likely to give much to that of 13,000l. a-year; and the cursitor baron of exchequer, from his profession and education, is not likely to be profoundly skilled in the proper expence of forts and garrisons. The captains of his majesty's navy, indeed, or any other commissioned officers, appointed by the board of admiralty, may inquire into the condition of the forts and garrisons, and report their observations to that board. But that board seems to have no direct jurisdiction over the committee, nor any authority to correct those whose conduct it may thus inquire into; and the captains of his majesty's navy, besides, are not supposed to be always deeply learned in the science of fortification. Removal from an office, which can be enjoyed only for the term of three years, and of which the lawful emoluments, even during that term, are so very small, seems to be the utmost punishment to which any committee-man is liable, for any fault, except direct malversation, or embezzlement either of the public money or that of the company; and the fear of that punishment, can never be a motive of sufficient weight to force a continual and careful attention to a business to which he has no other interest to attend. The commitee are accused of having sent out bricks and stones from England for the reparation of Cape Coast Castle on the coast of Guinea, a business for which parliament had several times granted an extraordinary sum of money. These bricks and stones too, which had thus been sent upon so long a voyage, were said to have been of so bad a quality, that it was necessary to rebuild from the foundation the walls which had been repaired with them. The forts and garrisons which lie north of Cape Rouge are not only maintained at the expence of the state, but are under the immediate government of the executive power; and why those which lie south of that cape, and which too are, in part at least, maintained at the expence of the state, could be under a different government, it seems not very easy even to imagine a good reason."

The above company succeeded that called *The Royal African Company*, which traded upon a joint stock with an exclusive privilege. Though England began to trade to Africa as early as the year 1536, and several voyages were made to Guinea in 1538, and some following years, for the importation of gold and elephants teeth, nothing like a company was formed till the year 1588, when Queen Elizabeth granted a patent of exclusive privilege to certain persons for ten years. In 1618, King James I. established a company by charter, which was soon dissolved. Another company was erected by charter of Charles I. in 1631, which met with little success; but the demand for negroes in the English American plantations increasing, a third company was established by a charter granted 1662, in favour of the duke of York; securing to him the commerce of all the country, coasts, islands, &c. belonging to the crown of England, or not possessed by any other Christian prince, from Cape Blanco in 20° N. Lat. to the Cape of Good Hope, in 34° 34′ S. Lat. The charter was soon after returned into the king's hands by the duke, and revoked, by consent of the parties associated with him in the enterprise; in consequence of which, the fourth and last exclusive company was established and incorporated by letters patent in 1672, under the title of the *Royal African Company*. A capital was soon raised of 111,000l. and this new company improved their trade, and increased their forts; but after the revolution in 1689, this trade was laid open. In 1698, all private traders to Africa were obliged

Company.

obliged by ſtat. 9 and 10 Will. to pay ten per cent. in order to aſſiſt the company in maintaining their forts and factories. But notwithſtanding this heavy tax, the company were ſtill unable to maintain the competition; their ſtock and credit gradually declined. In 1712, their debts had become ſo great, that a particular act of parliament was thought neceſſary, both for their ſecurity and for that of their creditors. It was enacted, that the reſolution of two-thirds of theſe creditors in number and value ſhould bind the reſt, both with regard to the time which ſhould be allowed to the company for the payment of their debts, and with regard to any other agreement which it might be thought proper to make with them concerning thoſe debts. In 1730, their affairs were in ſo great diſorder, that they were altogether incapable of maintaining their forts and garriſons; the ſole purpoſe and pretext of their inſtitution. From that year till their final diſſolution, the parliament judged it neceſſary to allow the annual ſum of ten thouſand pounds for that purpoſe. In 1732, after having been for many years loſers by the trade of carrying negroes to the Weſt Indies, they at laſt reſolved to give it up altogether; to ſell to the private traders to America the negroes which they purchaſed upon the coaſt; and to employ their ſervants in a trade to the inland parts of Africa for gold duſt, elephants teeth, dyeing drugs, &c. But their ſucceſs in this more confined trade was not greater than in their former extenſive one. Their affairs continued to go gradually to decline, till at laſt being in every reſpect a bankrupt company, they were diſſolved by act of parliament, and their forts and garriſons veſted in the preſent *Regulated Company of Merchants trading to Africa.*

II. *JOINT-STOCK Companies*, eſtabliſhed either by royal charter or by act of parliament, differ in ſeveral reſpects not only from regulated companies, but from private copartneries. 1. In a private copartnery, no partner, without the conſent of the company, can transfer his ſhare to another perſon, or introduce a new member into the company. Each member, however, may, upon proper warning, withdraw from the copartnery, and demand payment from them of his ſhare of the common ſtock. In a joint-ſtock company, on the contrary, no member can demand payment of his ſhare from the company: but each member can, without their conſent, transfer his ſhare to another perſon, and thereby introduce a new member. The value of a ſhare in a joint-ſtock is always the price which it will bring in the market; and this may be either greater or leſs, in any proportion, than the ſum which its owner ſtands credited for in the ſtock of the company. 2. In a private copartnery, each partner is bound for the debts contracted by the company to the whole extent of his fortune. In a joint-ſtock company, on the contrary, each partner is bound only to the extent of his ſhare.

The trade of a joint-ſtock company is always managed by a court of directors. This court indeed is frequently ſubject, in many reſpects, to the controul of a general court of proprietors. But the greater part of thoſe proprietors ſeldom pretend to underſtand any thing of the buſineſs of the company; and when the ſpirit of faction happens not to prevail among them, give themſelves no trouble about it, but receive contentedly ſuch half-yearly or yearly dividend as the directors think proper to make to them. This total exemption from trouble and from riſk, beyond a limited ſum, encourages many people to become adventurers in joint-ſtock companies, who would upon no account hazard their fortunes in any private copartnery. Such companies, therefore, commonly draw to themſelves much greater ſtocks than any private copartnery can boaſt of. The trading ſtock of the South-Sea Company, at one time, amounted to upwards of thirty-three millions eight hundred thouſand pounds. The directors of ſuch companies, however, being the managers rather of other people's money than of their own, it cannot well be expected that they ſhould watch over it with the ſame anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the ſtewards of a rich man, they are apt to conſider attention to ſmall matters as not for their maſter's honour, and very eaſily give themſelves a diſpenſation from having it. Negligence and profuſion, therefore, muſt always prevail, more or leſs, in the management of the affairs of ſuch a company. It is upon this account that joint-ſtock companies for foreign trade have ſeldom been able to maintain the competitions againſt private adventurers. They have, accordingly, very ſeldom ſucceeded without an excluſive privilege; and frequently have not ſucceeded with one. Without an excluſive privilege they have commonly miſmanaged the trade. With an excluſive privilege they have both miſmanaged and confined it.

The principal joint-ſtock companies preſently ſubſiſting in Great Britain are, the *South Sea* and the *Eaſt India* companies; to which may be added, though of very inferior magnitude, the *Hudſon's Bay* Company.

1. *The South-Sea Company.* During the long war with France in the reign of Queen Anne, the payment of the ſailors of the royal navy being neglected, they received tickets inſtead of money, and were frequently obliged, by their neceſſities, to ſell theſe tickets to avaricious men at a diſcount of 40 and ſometimes 50 per cent. By this and other means, the debts of the nation unprovided for by parliament, and which amounted to 9,471,321l. fell into the hands of theſe uſurers. On which Mr Harley, at that time chancellor of the exchequer, and afterwards earl of Oxford, propoſed a ſcheme to allow the proprietors of theſe debts and deficiencies 6 per cent. per annum, and to incorporate them for the purpoſe of carrying on a trade to the South Sea; and they were accordingly incorporated under the title of "the Governor and Company of Merchants of Great Britain trading to the South Seas, and other parts of America, and for encouraging the Fiſhery," &c.

Though this company ſeemed formed for the ſake of commerce, the miniſtry never thought ſeriouſly, during the courſe of the war, about making any ſettlement on the coaſt of South America, which was what flattered the expectations of the people; nor was it ever carried into execution by this company.

Some other ſums were lent to the government in the reign of Queen Anne at 6 per cent. In the third of George I. the intereſt of the whole was reduced to 5 per cent. and the company advanced two millions more to the government at the ſame intereſt. By the

ſtatute

Company.

statute of the 6th of George I. it was declared, that they might redeem all or any of the redeemable national debts; in consideration of which, the company were empowered to augment their capital according to the sums they should discharge; and for enabling them to raise such sums for purchasing annuities, exchanging for ready money new exchequer bills, carrying on their trade, &c. they might, by such means as they should think proper, raise such sums of money as in a general court of the company should be judged necessary. The company were also empowered to raise money on the contracts, bonds, or obligations under their common seal, on the credit of their capital stock. But if the sub-governor, deputy-governor, or other members of the company, should purchase lands or revenues of the crown upon account of the corporation, or lend money by loan or anticipation on any branch of the revenue, other than such part only on which a credit of loan was granted by parliament, such sub-governor, or other member of the company, should forfeit treble the value of the money so lent.

The fatal South Sea scheme, transacted in the year 1720, was executed upon the last-mentioned statute. The company had at first set out with good success, and the value of their stock, for the first five years, had risen faster than that of any other company; and his majesty, after purchasing 10,000l. stock, had condescended to be their governor. Things were in this situation, when, taking advantage of the above statute, the South Sea bubble was projected. The pretence was, to raise a fund for carrying on a trade to the South Sea, and purchasing annuities, &c. paid to the other companies: and proposals were printed and distributed, showing the advantages of this design. The sum necessary for carrying it on, together with the profits that were to arise from it, were divided into a certain number of shares, or subscriptions, to be purchased by persons disposed to adventure therein. And the better to carry on the deception, the directors engaged to make very large dividends: and actually declared that every 100l. original stock would yield 50l. per annum; which occasioned so great a rise of their stock, that a share of 100l. was sold for upwards of 800l. This was in the month of July; but before the end of September it fell to 150l. by which multitudes were ruined, and such a scene of distress occasioned, as is scarcely to be conceived. But the consequences of this infamous scheme are too well known; most of the directors were severely fined, to the loss of nearly all their property: some of them had no hand in the deception, nor gained a farthing by it; but it was agreed, they ought to have opposed and prevented it.

The South-Sea Company never had any forts or garrisons to maintain, and therefore were entirely exempted from one great expence, to which other joint-stock companies for foreign trade are subject. But they had an immense capital divided among an immense number of proprietors. It was naturally to be expected, therefore, that folly, negligence, and profusion, should prevail in the whole management of their affairs.

Their stock-jobbing speculations were succeeded by mercantile projects, which, Dr Smith observes, were not much better conducted. The first trade which they engaged in, was that of supplying the Spanish West Indies with negroes, of which (in consequence of what was called the Assiento contract granted them by the treaty of Utrecht) they had the exclusive privilege. But as it was not expected that much profit could be made by this trade, both the Portuguese and French companies, who had enjoyed it upon the same terms before them, having been ruined by it, they were allowed, as compensation, to send annually a ship of a certain burden to trade directly to the Spanish West Indies. Of the ten voyages which this annual ship was allowed to make, they are said to have gained considerably by one, that of the Royal Caroline in 1731, and to have been losers, more or less, by almost all the rest. Their ill success was imputed, by their factors and agents, to the extortion and oppression of the Spanish government; but was, perhaps, principally owing to the profusion and depredations of those very factors and agents; some of whom are said to have acquired great fortunes even in one year. In 1734, the company petitioned the king, that they might be allowed to dispose of the trade and tonnage of their annual ship, on account of the little profit which they made by it, and to accept of such equivalent as they could obtain from the king of Spain.

In 1724, this company had undertaken the whale-fishery. Of this, indeed, they had no monopoly; but as long as they carried it on, no other British subjects appear to have engaged in it. Of the eight voyages which their ships made to Greenland, they were gainers by one, and losers by all the rest. After their eighth and last voyage, when they had sold their ships, stores, and utensils, they found that their whole loss, upon this branch, capital and interest included, amounted to upwards of 237,000l.

In 1722, this company petitioned the parliament to be allowed to divide their immense capital of more than 33,800,000l. the whole of which had been lent to government, into two equal parts: The one-half, or upwards of 16,900,000l. to be put upon the same footing with other government annuities, and not to be subject to the debts contracted, or losses incurred, by the directors of the company, in the prosecution of their mercantile projects; the other half to remain, as before, a trading stock, and to be subject to those debts and losses. The petition was too reasonable not to be granted. In 1733, they again petitioned the parliament that three-fourths of their trading stock might be turned into annuity stock, and only one-fourth remain as trading stock, or exposed to the hazards arising from the bad management of their directors. Both their annuity and trading stocks had by this time, been reduced more than 2,000,000l. each, by several different payments from government; so that this fourth amounted only to 3,662,784l. 8s. 6d. In 1748, all the demands of the company upon the king of Spain, in consequence of the Assiento contract, were by the treaty of Aix-la-Chapelle, given up for what was supposed an equivalent. An end was put to their trade with the Spanish West Indies, the remainder of their trading stock was turned into an annuity stock, and the company ceased in every respect to be a trading company.

This company is under the direction of a governor, sub-governor, deputy-governor, and 21 directors: but no person

Company.

son is qualified to be governor, his majesty excepted, unless such governor has in his own name and right 5000l. in the trading stock; the sub-governor is to have 4000l. the deputy-governor 3000l. and a director 2000l. in the same stock. In every general court, every member having in his own name and right 500l. in trading stock, has one vote; if 2000l. two votes; if 3000l. three votes; and if 5000l. four votes.

2. *The East India Company.* The first, or as it is called the *Old East India Company*, was established by a charter from Queen Elizabeth in 1600; but for some time the partners seem to have traded with separate stocks, though only in the ships belonging to the whole company. In 1612, they joined their stocks into one common capital: and though their charter was not as yet confirmed by act of parliament, it was looked upon in that early period to be sufficiently valid, and no body ventured to interfere with their trade. At this time their capital amounted to about 740,000l. and the shares were as low as 50l.: their trade was in general successful, notwithstanding some heavy losses, chiefly sustained through the malice of the Dutch East India Company. In process of time, however, it came to be understood that a royal charter could not by itself convey an exclusive privilege to traders, and the company was reduced to distress by reason of the multitude of interlopers who carried off the most of their trade. This continued during the latter part of the reign of Charles II. the whole of that of James II. and part of William III. when in 1698 a proposal was made to parliament for advancing the sum of 2,000,000l. to government, on condition of erecting the subscribers into a new company with exclusive privileges. The old company endeavoured to prevent the appearance of such a formidable rival, by offering government 700,000l. nearly the amount of their capital at that time; but such were the exigencies of the state, that the larger sum, though at eight per cent. interest, was preferred to the smaller at one half the expence.

Thus were two East India Companies erected in the same kingdom, which could not but be very prejudicial to each other. Through the negligence of those who prepared the act of parliament also, the new company were not obliged to unite in a joint-stock. The consequence of this was, that a few private traders, whose subscriptions scarce exceeded 7200l. insisted on a right of trading separately at their own risk. Thus a kind of third company was established; and by their mutual contentions with one another, all the three were brought to the brink of ruin. Upon a subsequent occasion, in 1730, a proposal was made to parliament for putting the trade under the management of a regulated company, and thus laying it in some measure open. This, however, was opposed by the company, who represented in strong terms the mischiefs likely to arise from such a proceeding. "In India (they said), it raised the price of goods so high, that they were not worth the buying; and in England, by overstocking the market, it sunk the price to such a degree that no profit could be made of them." Here Dr Smith remarks, that by a more plentiful supply, to the great advantage and conveniency of the public, it must have reduced very much the price of Indian goods in the

Smith's Wealth of Nations, vol. iii. p. 134.

2

English market, cannot well be doubted; but that it should have raised very much their price in the Indian market, seems not very probable, as all the extraordinary demand which that competition could occasion, must have been but as a drop of water in the immense ocean of Indian commerce. The increase of demand, adds he, though in the beginning it may sometimes raise the price of goods, never fails to lower it in the issue. It encourages production, and thereby increases the competition of the producers, who, in order to undersell one another, have recourse to new divisions of labour and new improvements of art, which might never otherwise have been thought of. The miserable effects of which the company complained, were the cheapness of consumption and the encouragement given to production, precisely the two effects which it is the business of political economy to promote. The competition, however, of which they gave this doleful account, had not been allowed to continue long. In 1702 the two companies were, in some measure, united by an indenture tripartite, to which the queen was the third party; and in 1708, they were, by act of parliament, perfectly consolidated into one company by their present name of "The United Company of Merchants trading to the East Indies." Into this act it was thought worthy to insert a clause, allowing the separate traders to continue their traffic till Michaelmas 1711, but at the same time empowering the directors, upon three years notice, to redeem their capital of 7200l. and thereby convert the whole capital of the company into a joint-stock. By the same act, the capital of the company, in consequence of a new loan to government, was augmented from 2,000,000l. to 3,200,000l. In 1743, another million was advanced to government. But this being raised, not by a call upon the proprietors, but by selling annuities and contracting bond-debts, it did not augment the stock upon which the proprietors could claim a dividend. Thus, however, their trading stock was augmented; it being equally liable with the other 3,200,000l. to the losses sustained, and debts contracted, by the company in the prosecution of their mercantile projects. From 1708, or at least from 1711, this company being freed from all competitors, and fully established in the monopoly of the English commerce to the East Indies, carried on a successful trade; and from their profits made annually a moderate dividend to their proprietors. Unhappily, however, in a short time, an inclination for war and conquest began to take place among their servants; which, though it put them in possession of extensive territories and vast nominal revenues, yet embarrassed their affairs in such a manner, that they have not to this day been able to recover themselves. The particulars of these wars are given under the articles BRITAIN, and INDOSTAN. Here it will be sufficient to observe, that they originated during the war in 1741 through the ambition of M. Dupleix the French governor of Pondicherry, who involved the company in the politics and disputes of the Indian princes. After carrying on hostilities for some time with various success, they at last lost Madras, at that time the principal settlement in the East Indies, but it was restored by the treaty of Aix-la-Chapelle. During the war of

of 1755, they acquired the revenues of a rich and extensive territory, amounting, as was then said, to near 3,000,000l. per annum.

For several years they remained in quiet possession of the revenue arising from this territory, though it certainly never answered the expectations that had been formed concerning it. But in 1767 the British ministry laid claim to the territorial possessions of the company, and the revenue arising from them, as of right belonging to the crown; and the company, rather than yield up their territories in this manner, agreed to pay government a yearly sum of 400,000l. They had before this gradually augmented their dividend from about six to ten per cent.; that is, on their capital of 3,200,000l. they had raised it from 192,000l. to 320,000l. a-year. About this time also they were attempting to raise it still farther, viz. from 10 to 12½ per cent.; but from this they were prevented by two successive acts of parliament, the design of which was to enable them to make a more speedy payment of their debts, at this time estimated at more than six or seven millions sterling. In 1769 they renewed their agreement with government for five years more, stipulating, that during the course of that period they should be allowed gradually to augment their dividend to 12½ per cent.; never increasing it, however, more than one per cent. annually. Thus their annual payments could only be augmented by 608,000l. beyond what they had been before their late territorial acquisitions. By accounts from India in the year 1768, this revenue, clear of all deductions and military charges, was stated at 2,048,747l. At the same time they were said to possess another revenue, arising partly from lands, but chiefly from the customs established at their different settlements, amounting to about 439,000l. The profits of their trade, too, according to the evidence of their chairman before the house of commons, amounted to at least 400,000l. per annum; their accountant made it 500,000l.; and the lowest account stated it at least equal to the highest dividend paid to their proprietors. Notwithstanding this apparent wealth, however, the affairs of the company from this time fell into disorder; insomuch that in 1773 their debts were augmented by an arrear to the treasury in the payment of the 400,000l. stipulated; by another to the customhouse for duties unpaid; by a large sum borrowed from the bank; and by bills drawn upon them from India to the amount of more than 1,200,000l. Thus they were not only obliged to reduce their dividend all at once to six per cent. but to apply to government for assistance. A particular account of this transaction is given under the article BRITAIN. Here it may be mentioned in general, that the event proved very unfavourable to the company, as they were now subjected to an interference of government altogether unknown before. Several important alterations were made in their constitution both at home and abroad. The settlements of Madras, Bombay, and Calcutta, which had hitherto been entirely independent of one another, were subjected to a governor-general; assisted by a council of four assessors. The nomination of the first governor and council, who were to reside at Calcutta, was assumed by parliament; the power of the court of Calcutta, which had gradually extended its jurisdiction over the rest, was now reduced and confined to the trial of mercantile causes, the purpose for which it was originally instituted. Instead of it a new supreme court of judicature was established, consisting of a chief justice and three judges to be appointed by the crown. Besides these alterations, the stock necessary to entitle any proprietor to vote at the general courts was raised from 500l. to 1000l. To vote on this qualification, too, it was necessary that he should have possessed it, if acquired by his own purchase and not by inheritance, for at least one year, instead of six months, the term requisite formerly. The court of 24 directors had before been chosen annually; but it was now enacted, that each director should for the future be chosen for four years; six of them, however, to go out of office by rotation every year, and not to be capable of being rechosen at the election of the six new directors for the ensuing year. It was expected that, in consequence of these alterations, the courts both of the proprietors and directors would be likely to act with more dignity and steadiness than formerly. But this was far from being the case. The company and its servants showed the utmost indifference about the happiness or misery of the people who had the misfortune to be subjected to their jurisdiction. This indifference, too, was more likely to be increased than diminished by some of the new regulations. The house of commons, for instance, had resolved, that when the 1,600,000l. lent to the company by government should be paid, and their bond debts reduced to 1,500,000l. they might then, and not till then, divide eight per cent. upon their capital; and that whatever remained of their revenues and nett profits at home should be divided into four parts; three of them to be paid into the exchequer for the use of the public, and the fourth to be reserved as a fund, either for the further reduction of their bond debts, or for the discharge of other contingent exigencies which the company might labour under. But it could scarce be expected that, if the company were bad stewards and bad sovereigns when the whole of their nett revenue and profits belonged to themselves, they would be better when three-fourths of these belonged to other people. The regulations of 1773, therefore, did not put an end to the troubles of the company. Among other institutions, it had been at this time enacted, that the presidency of Bengal should have a superiority over the other presidencies in the country; the salary of the chief justice was fixed at 8000l. per annum, and those of the other judges at 6000l. each. In consequence of this act, Sir Elijah Impey, who was created a baronet on the occasion, set sail with three other judges, for India, in the year 1774. The powers with which they were invested were very extraordinary. They had the title of his Majesty's Supreme Court of Judicature in India. Civil law, common law, ecclesiastical, criminal, and admiralty jurisdiction, belonged of right to them. They were empowered to try Europeans on personal actions, and to assess damages without a jury. Every native, either directly or indirectly in the service of the company, or in their territories, was made subject to their jurisdiction, with a view to prevent the Europeans from eluding justice under the pretence of employing

ploying natives in the commiſſion of their crimes; ſo that in fact they were abſolute lords and ſovereigns of the whole country.

Such exceſſive and unlimited powers conferred on any ſmall number of men, could not but be extremely diſagreeable to the Europeans, who had been accuſtomed to enjoy a liberty almoſt equally unbounded before; nor was it to be ſuppoſed that the judges, thus ſuddenly raiſed from the rank of ſubjects to the height of deſpotiſm, would always uſe their power in an unexceptionable manner. The deſign of the eſtabliſhment was to preſerve the commerce and revenues of the company from depredation; by ſubjecting its ſervants to the controul of the court; to relieve the ſubject from oppreſſion by facilitating the means of redreſs; and to fix a regular courſe of juſtice for the ſecurity of liberty and property. Inſtead of conſidering the circumſtances of the country, however, or the manners and cuſtoms of the natives, the judges now precipitately introduced the Britiſh laws in their full extent, without the leaſt modification to render them agreeable to the Aſiatics, who had been accuſtomed to others of a quite different nature; nor did they even pay the leaſt regard to the religious inſtitutions or habits to which the Indians are ſo obſtinately attached, that they would ſooner part with life itſelf than break through an article of them.

Beſides this it was ſaid, that, on the firſt arrival of the judges, they endeavoured to extend their authority beyond even what the Britiſh legiſlature had allowed them. Hence they were frequently at variance with the council; and complaints of their conduct were repeatedly ſent to England by the ſervants of the company. Theſe produced a letter in 1777 from the directors to Lord Weymouth, ſecretary of ſtate for the ſouthern department. In this they ſtated, that the ſupreme court of India had extended its juriſdiction to thoſe whom it did not appear to have been the intention of the king or parliament to ſubject to its authority. It had alſo taken cognizance of matters which, they apprehended, belonged properly to other courts. That the judges conſidered the criminal law of England as in force, and binding on the natives of Bengal, though utterly repugnant to the laws and cuſtoms by which they had hitherto been governed; and that the juriſdiction exerciſed by the ſupreme court was incompatible with the powers given by parliament to the governor-general and council, obſtructed the adminiſtration of government, and tended to alienate the minds of the natives; all which they feared would prevent the eſtabliſhment of the government of India upon any ſettled or permanent foundation.

This letter not having produced any effect, the diſcontents of India, both in the Europeans and natives, continued and increaſed. The deciſions of the judges were ſuch as by no means did them honour. A number of adventurers had alſo emigrated along with them, in hopes of enriching themſelves under the new conſtitution. Some of theſe were of the loweſt ſort of people, who had rendered it in a manner impoſſible for them to remain in England on account of their vices or extravagance. Many ſuch perſons had enrolled themſelves among the domeſtics of the judges, or had become their immediate dependents; and ſome of theſe were permitted to aſſume the characters of attorneys, court-officers, under-ſheriffs, and bailiffs. It may eaſily be ſuppoſed, that people of ſuch characters would find it for their intereſt to promote ſuits in the ſupreme court: and in this ſome of them employed themſelves with great ſucceſs. The conſequence of all this was, that on the 4th of December 1780, a petition was preſented againſt the ſupreme court by a great number of Britiſh inhabitants in the kingdom of Bengal, Bahar, and Orixa. In this, complaint was made of the indiſcriminate manner in which the judges of the ſupreme court attempted to exerciſe the Engliſh laws in that country, at the ſame time that they refuſed the undoubted right of every Britiſh ſubject, viz. that of trial by jury. They entreated the houſe "to reflect on the innumerable hardſhips which muſt enſue, and the univerſal confuſion which muſt be occaſioned, by giving to the voluminous laws of England a boundleſs retroſpective power in the midſt of Aſia, and by an application of thoſe laws, made for the freeſt and moſt enlightened people on earth, the principle of whoſe conſtitution was founded on virtue and liberty, to tranſactions with the natives of India, who had, from time immemorial, lived under a deſpotic government, founded on fear and reſtraint. What muſt be the terrors of individuals to find their titles to property, and their tranſactions with the natives previous to the eſtabliſhment of this court of judicature, tried by the ſtandard of the Engliſh law, and by men educated under its forms, and unavoidably imbibing its prejudices, when no ſuch law could be known to or practiſed by natives or Europeans then reſiding in the country, and that at a time when there were few perſons of legal knowledge in the country to adviſe or aſſiſt them? No tyranny could be more fatal in its conſequences, than that a court, inveſted with all the authority of one of the firſt courts in England, ſhould alſo poſſeſs undefined powers and juriſdiction, of which its judges were the ſole interpreters, and at ſuch an immenſe diſtance from the mother country. This was in truth the ſituation of the Britiſh ſubjects in India at that time; for the judges of the ſupreme court could at pleaſure determine on the denomination of a civil jury, the degree of guilt incurred by any offence, the ſtatute by which it ſhould be tried, what penalties ſhould be inflicted, as well as who were and who were not amenable to the juriſdiction of the court.

"Beſides their other powers alſo, the judges of the ſupreme court were allowed to ſit as a court of chancery, and in that capacity to reviſe, correct, reſcind, or confirm the deciſions paſſed by themſelves as a court of law; and by another part of their conſtitution, they were allowed to ſtop execution in criminal caſes until his majeſty's pleaſure was known. The petitioners conceived, that there muſt be ſome fundamental error in that conſtitution, which required a more than ordinary degree of temper, integrity, and ability, to carry its purpoſes into execution; and they did not heſitate to declare, that to adminiſter the powers appertaining to the inſtitution of the ſupreme court, without committing flagrant acts of injuſtice, and doing great detriment to the public, required more equity, moderation, diſcernment, and enlightened abilities, than they could hope to find in any ſet of men." They concluded with earneſtly ſoliciting parliament, that a trial by

by jury might be granted to the British subjects in Bengal, in all cases where it was established by law in England; that the retrospective powers of the supreme court might be limited to the time of its establishment in Bengal; that it should be defined beyond the power of discretional distinction who the persons were that properly came under the jurisdiction of the court, and who did not; that it should be expressly declared what statutes should, and what should not, be in force in Bengal; that distinct and separate judges for the law and equity sides of the court should be appointed; and that a power of delaying executions in criminal cases until his majesty's pleasure was known, should be lodged in the governor and council.

This petition was soon followed by another signed by Warren Hastings, Esq. governor-general, Philip Francis and Edward Wheeler, Esqs. counsellors for the government and presidency of Fort-William in Bengal; in which they represented, "that, though the jurisdiction of the supreme court of judicature at Calcutta, as well as the powers granted to the governor-general and council, were clearly limited by parliament and the king's letters patent, yet the chief justice and judges of that court had exercised authority over persons not legally within their jurisdiction, and had illegally and improperly advised and admitted suits against the governor-general and council: that they had attempted to execute their writs upon natives of high rank in the kingdom of Bengal, who were not within their jurisdiction: the governor and council therefore had found themselves under a necessity of opposing them, and of affording protection to the country and people, who were placed under their own immediate inspection, and freeing them from the terrors of a new and usurped dominion. They had even been obliged to make use of a military force, in order to resist the proceedings of the judges and their officers: And they declared, that no other conduct could have saved those provinces, and the interests of the company, or of the British nation itself, from the ruin with which they were threatened. They also declared themselves to be of opinion, that the attempt to extend, to the inhabitants of these provinces, the jurisdiction of the supreme court of judicature, and the authority of the English law, which were still more intolerable than the law itself, would be such a restraint on the minds of the people of those provinces, by the difference of such laws and forms from their laws, that they might at last inflame them, notwithstanding their known mildness and patience, into an open rebellion." The petition was concluded, by soliciting an indemnity from the legal consequences of the resistance they had been obliged to make to that court.

While the British were thus expressing their displeasure against the conduct of these judges, the natives were thrown into the utmost consternation and despair by the acts of oppression and violence committed by them. A prosecution for forgery had been commenced against Nundcomar, a bramin of the first rank in Bengal. The crime was not capital by the laws of Indostan, and had been committed many years before; yet with the utmost cruelty and injustice was this man condemned and executed on the British statute, by which forgery is made capital; a statute which, at the commission of the crime, he had never heard of, nor could ever dream that he would be subjected to its power. What rendered this execution the more remarkable was, that, at the very time when the charge of forgery was brought against him, Nundcomar had been employed in exhibiting an accusation against Mr Hastings. This, together with the hurry in which the court were to have him put to death (for the court refused to allow him a respite till his majesty's pleasure was known), made the natives conclude that he was executed, not on account of the forgery, but for having ventured to prefer an accusation against an English governor. In other respects they were terrified to such a degree, that many of them ran into the river on seeing a bramin put to death with such circumstances of ignominy.

The alarm excited by the execution of Nundcomar was kept up by fresh decisions of the supreme court: Among those the Patna cause, as it is commonly called, was one of the most remarkable. An adventurer, named Shahaz Beg Cawn, had come from Cabul in Persia to Bengal, where he entered himself in the service of the company, and was preferred to the command of a body of horse. Having gained a competent fortune, and obtained from the Mogul a grant of lands called an *Ultumghaw* in the province of Bahar, he retired from the army, and settled in Patna. About this time, when advanced in years, he married a woman of low rank, named *Nadara Begum*, by whom he had no children. His brother, Allum Beg, came likewise to Patna; and on his leaving the place some time after, committed the care of one of his sons, named *Behader Beg*, to his brother Shahaz Beg Cawn. On the death of the latter in 1776, a dispute ensued concerning the inheritance betwixt the widow and Behader Beg. The widow having taken possession of the whole property of Shahaz, the nephew, as adopted son and heir, gave in a petition to the provincial council at Patna, on the 2d of January 1777, setting forth his claim. In this petition he stated, that the widow was removing and secreting the effects of the deceased; and concluded with a prayer, that orders should be given to prevent their removal; to recover such as had already been carried away; and that the cadi or Indian judge should be directed to ascertain his right. As the parties were Mahometans, the council of course referred the cause to the cadi and two mufties, the proper officers for determining it according to the established laws of the country. These having inquired into the matter, reported, that the title-deeds, on which the widow pretended to found her right, appeared to be forged; and that, even if they had appeared in the life-time of Shahaz, they were still informal, on account of a point of the Mahometan law, which requires, that to make deeds of gift valid, possession should be entered into at the time of executing or delivering them over; but that, as no possession of this kind had been given, the estate ought to be divided according to the Mahometan law; viz. one-fourth to the wife, and three-fourths to the nephew, as the representative of his father Allum Beg, who was considered as the more immediate heir of the deceased. This decision was confirmed by the council of Patna, with the following exception in favour of the widow, that the heir-at-law should pay her one-fourth of the rents of the ultumghaw, or royal grant, for

for her ſupport during life. The widow, however, refuſed to ſubmit to the deciſion, or to deliver up the effects of her huſband; in conſequence of which compulſatory methods were uſed; when by the advice of ſome Engliſh lawyers, an action of treſpaſs was brought, according to the law of England, againſt the cadi and two mufties for their proceedings againſt her, laying the damages at about 66,000l. ſterling. This proceſs being brought before the ſupreme court, was by them conducted in ſuch a manner as muſt entail everlaſting infamy on the actors. They began with obliging the cadi and mufties to find bail in no leſs than 40,000 pounds for their appearance, which was immediately given by the council at Patna. The ſupreme court then having entered into the merits of the cauſe, and decided the matter in the moſt rigorous manner, according to all the forms of Engliſh law, aſſeſſed the cadi and mufties in damages no leſs than 30,000l. ſterling. Their houſes and effects were ſeized by the ſheriff's officers, and publicly put up to ſale; the cadi, who was upwards of 60 years of age, and had been in office for many years with great applauſe, died on his way to the common gaol at Calcutta, to which the nephew and two mufties were conveyed, being a diſtance of no leſs than 400 miles from their former reſidence at Patna. A ſuit, however, was commenced againſt the widow, on account of having forged the title-deeds by which ſhe claimed her huſband's eſtate; but it was ſuppreſſed on account of ſome informality.

Another deciſion, by which the ſupreme court likewiſe incurred much cenſure, was that againſt Jaggernaut, the principal public officer of a Mahometan court at Dacca. The action was brought at the inſtigation of an Engliſh attorney, in behalf of one Khyne, a ſervant or meſſenger, who had been fined and impriſoned for a miſdemeanor, in which Jaggernaut had concurred in virtue of his office as judge of the Nizamut (the name of the Mahometan court juſt mentioned). The ſheriff-officers attempted to arreſt the judge as he ſat on the tribunal; which could not fail to produce much diſturbance. Jaggernaut, with his officers, denied the authority of the ſupreme court over the Nizamut, and refuſed to comply with the writ. The Engliſh ſheriff-officers proceeded to force; and a violent ſcuffle enſuing, Jaggernaut's father was wounded in the head with a ſword by one of the under-ſheriff's attendants, while his brother-in-law was very dangerouſly wounded with a piſtol bullet by the under-ſheriff himſelf. The immediate conſequence of this was an abſolute refuſal of the judge to take cognizance of any criminal matter; and this was intimated in a letter from the council at Dacca to the Engliſh governor and council of India; wherein they declared that all criminal juſtice was at a ſtand.

The ſupreme court, having proceeded in this arbitrary and oppreſſive manner for ſome time, at length attempted to extend their juriſdiction over the hereditary zemindars of Bengal. Theſe are a kind of tributary lords, or great landholders, who are anſwerable to the company for the revenues or rents of the diſtricts; and excepting the circumſtances of remitting their revenues to the company, have not the leaſt connection with the Engliſh in any reſpect. At the time we ſpeak of, however, a writ upon an action of debt was iſſued out to arreſt one of theſe zemindars in his palace. Timely notice, however, was given, by one of the company's collectors, of this attempt to the governor and council, and application made to protect a man of ſuch quality from the diſgrace of an arreſt. They being unanimouſly of opinion that the zemindar was not within the juriſdiction of the court of Calcutta, deſired him to pay no regard to the writ. The court, however, determined to enforce their proceſs by a writ of ſequeſtration; upon which the natives, who are ſuperſtitiouſly attached to their zemindars, roſe in his defence, and inſulted the ſheriff's officers. The latter having obtained a reinforcement, the zemindar's palace was entered by 86 men armed with bludgeons, cutlaſſes, and muſkets; the apartment of his women, always held inviolably ſacred by the Aſiatics, was broken open; his temple profaned; and the image, which was the object of his worſhip, put into a baſket, and carried off with ſome common lumber. This rouſed the attention of the governor and council; who, from a full conviction of the ruinous tendency of theſe proceedings, determined at laſt to oppoſe it force by force. They accordingly ſent a party of military to apprehend the ſheriff's people, and they were all conducted priſoners to Calcutta. The judges ordered attachments againſt the officers who commanded the troops, and againſt two other ſervants of the company; while the governor and council endeavoured to juſtify their proceedings, by writing to England as already mentioned.

Beſides all this, the natives themſelves teſtified their diſapprobation of the conduct of the ſupreme court in very ſtrong terms. A petition to his Britannic majeſty was ſent by the natives of Patna; in which are the following remarkable paſſages: "When the ordinances of this court of judicature were iſſued, as they were all contrary to the cuſtoms, modes, uſages, and inſtitutions, of this country, they occaſioned terror in us; and day by day, as the powers of this court have become more eſtabliſhed, our ruin, uneaſineſs, diſhonour, and diſcredit, have accumulated; till at laſt we are reduced to ſuch a ſituation, that we conſider death to us as infinitely preferable to the dread we entertain of the court: for from this court no credit, no character is left to us, and we are now driven to the laſt extremity. Several who poſſeſſed means and ability deeming flight as their only ſecurity, have baniſhed themſelves from the country; but bound as we are by poverty and inability, and fettered by the deareſt ties of conſanguinity, we do not all of us poſſeſs the means of flight, nor have we power to abide the oppreſſion of this court."—"If, which God forbid! it ſhould ſo happen, that this our petition ſhould not be accepted, and ſhould be rejected at the chamber of audience, thoſe amongſt us who have power and ability, diſcarding all affection for our families, will fly to any quarter we can; whilſt the remainder, who have no means or ability, giving themſelves up with pious reſignation to their fate, will ſit down in expectation of death."

Theſe repeated complaints could not but be taken notice of in parliament. On the 12th of February 1781, General Smith made a motion in the houſe of commons, that the petition from the Britiſh inhabitants of Bengal, Bahar, and Oriſſa, ſhould be taken into conſideration by a ſelect committee, conſiſting of 15 perſons, choſen by ballot. In the introduction to his

his motion, he ſtated briefly the bad conduct of the ſupreme court in the particulars already related; and concluded, that the affairs of Bengal required the immediate attention and conſideration of parliament. The matter was accordingly debated; when, after various propoſals, a motion was at length made by General Smith, for leave to bring in a bill "to explain and amend ſo much of an act paſſed in the 13th year of his preſent majeſty, for the better regulation of the Eaſt India Company, as related to the adminiſtration of juſtice in Bengal: and alſo to indemnify the governor and council of Bengal for having reſiſted by force of arms the execution of an order of the ſupreme court of judicature in that kingdom." Leave was accordingly given to bring in the bill. The houſe having reſolved itſelf into a committee, Lord North obſerved, "that it had been much his wiſh that an agreement for the renewal of the company's charter had been made in an amicable manner; and that voluntary propoſitions ſhould have come from themſelves, offering terms for the benefit of the excluſive trade and the territorial acquiſitions. No ſuch terms, however, had been propoſed, nor any agreement made. A negociation had indeed taken place between him and the chairman and deputy-chairman; but the propoſitions made by them were neither ſuch as the public might expect, nor had the company any right to them. With regard to the territorial poſſeſſions, he was clearly of opinion, that they of right belonged to the public; though how far it might be proper to allow the revenue of them to remain in the poſſeſſion of the company was quite another matter. In his opinion it would be proper to allow it to remain in their hands as long as they poſſeſſed an excluſive trade, but he never would conſent to forego the claim of the public. He made a motion, therefore, "that it was the opinion of the committee, that three-fourths of the ſurplus of the nett profits of the Eaſt India Company, ever ſince the company's bond debt was reduced to 1,500,000l. and the company's dividends had been eight per cent. per annum, belong to the public; and that 600,000l. in lieu thereof, and in diſcharge of all claims on that part of the public, be paid into his majeſty's exchequer by inſtalments, in ſuch manner, and at ſuch times, as ſhall be agreed on." This propoſal was vehemently oppoſed by the minority. Mr Burke called it the daring effort of a miniſter determined on rapine and plunder, without regard to truth, honour, or juſtice. Mr Huſſey reprobated the idea of taking 600,000l. from the company in their circumſtances at that time. He produced a paper full of arithmetical calculations, which he read to the houſe; aſſerting that they contained an exact ſtate of the amount of the company's exports and imports, the expences of their trade at home, and the balance of profit of each year, for many years paſt, diſtinguiſhing the territorial from the commercial income and expences. From theſe he ſhowed, that the commercial and territorial revenues of the company had, upon an average for 16 years, conſtituted a ſum equivalent to a proportion of 16 per cent.; that 9 per cent. of this had ariſen from the commercial profits accruing to the company; and therefore, that there had not been 8 per cent. divided upon that part of the profits to which the public had any claim or pretenſion. The acceſſion of territorial poſſeſſions, he obſerved, had brought along with it additional expences; and the public had already received a very large ſhare of the company's profits. He declared it to be his opinion, that the company ſhould always make it a rule to give as ample and full relief to the public burdens as their ſituation would allow; and if they did this, he ſaw no reaſon why the miniſter ſhould exact any more. Mr Dempſter reminded the houſe of the conſequences of violating the American charters; and added, that to tear from the company by force what was not ſtipulated in any act of parliament, would be a breach of public faith diſgraceful to the nation, and ſuch as would damp the ſpirit of enterpriſe and adventure, which had been productive of ſuch happy effects.—Notwithſtanding theſe remonſtrances, however, the bill was at laſt paſſed into a law; only with this mitigation, that the company ſhould pay only 400,000l. inſtead of 600,000l. demanded originally by the miniſter.—Another bill was alſo paſſed the ſame year, in conſequence of the motion made by General Smith. This act declared, that the governor-general and council of Bengal were not ſubject to the juriſdiction of the ſupreme court, and indemnified the former for the reſiſtance they had made to the orders of that court. It enacted alſo, that no perſon ſhould be ſubject to the juriſdiction of that court on account of his being a landholder or farmer of land in the provinces of Bengal, Bahar, or Oriſſa; that no judicial officers in the country courts ſhould be liable to actions in the ſupreme court for their deciſions; and the two mufties, with Behader Beg, who were then in priſon, in conſequence of the deciſion of that court in the Patna cauſe, were ordered to be ſet at liberty.

The debates on this ſubject were attended with the moſt violent charges againſt the miniſter, and aſſertions the moſt humiliating and diſgraceful to the Britiſh nation. Mr Townſhend affirmed, that it was from the miniſter's ſcreening the delinquents who came from India that all the evils in that quarter had originated; and if matters were ſuffered to go on in that country as they had done for ſome time paſt, the conduct of the Britiſh in the Eaſt Indies muſt be viewed in a light ſtill more deteſtable than that of the Spaniards in America. It was reported, that the nabob of Arcot had ſeveral members in the houſe of commons! If it were true, that by ſending over a ſum of money to England he could ſeat eight or ten members in that houſe, then Mr Townſhend declared, that in his opinion they were the moſt abject and contemptible beings in the world.—The bill for regulating the powers of the ſupreme court, alſo, though ſo evidently founded in reaſon and juſtice, did not paſs without oppoſition, particularly from Mr Dunning; who was thought on this occaſion to have allowed his regard for his friend Sir Elijah Impey, the chief juſtice, to bias him too much.

The regulations juſt mentioned did not yet put an end to the troubles of the Eaſt India Company, nor allay the ferment which had been ſo effectually excited. Their affairs were ſtill a ſubject of parliamentary diſcuſſion; and in the month of April 1782, a motion was made by Mr Dundas, then lord advocate of Scotland, for taking into conſideration the ſeveral reports concerning affairs, which had been made by the ſecret committee appointed to inquire into them during the laſt and preſent

present feffion of parliament. In his fpeech on this occafion, he remarked, that the opinion of Lord Clive had been againft keeping too extenfive a territory in that country. Inftead of this he had reftored Sujah Dowlah to the poffeffion of his country; confidering the Britifh territories in Hindoftan, with thofe on the coaft of Coromandel and Bombay, as fufficient for all the purpofes by which this country could be benefited; but inftead of adhering to the maxims of found policy laid down by his lordfhip, they had become fo ambitious of extending their territories, that they had involved themfelves in a war with almoft all India. He then confidered the finances of the company. The revenue of Bombay, he faid, fell fhort of the neceffary civil and military eftablifhment by 200,000l. a-year, which was annually drawn from Bengal. With regard to that of Madras, it appeared on an average of 12 years, from 1767 to 1779, that there had been eight years of war and only four of peace; and that, during the whole time of war, the revenue had not been able to fupport the civil and military eftablifhments; though in time of peace, it was able to do nearly one-half more. Bengal, however, was the moft lucrative of all the Eaft India fettlements; but fuch had been the expences of the Mahratta war, that the governor-general had been obliged to contract a very large debt, infomuch, that it was doubtful whether the inveftments for England fhould be wholly or partially fufpended. Mr Haftings, he faid, had in many inftances proved himfelf a very meritorious fervant: but he wifhed that every one of their fervants would confider himfelf as bound in the firft place to prove a faithful fteward to the company; not to fancy that he was an Alexander or Aurengzebe, and prefer frantic military exploits to the improvement of the trade and commerce of his country.—General Smith obferved, that by the evidence produced to the committee, it appeared that there had been a variety of great abufes in India. Sir Elijah Impey, his majefty's chief juftice in that country, had fo far derogated from the character of a judge, as to accept of a place from the company; by which means he was brought under their controul, and confequently allowed himfelf to be deprived of that independence which he ought to poffefs as a judge. Juftice had been fo partially adminiftered, that feveral worthy and refpectable perfons had been imprifoned, fome had been ruined, and others died in jail. From all which confiderations he moved, that the affairs of the company ought to be taken into confideration by a committee of the whole houfe. Some hints were thrown out by Mr Dundas, that the territorial poffeffions in the Eaft ought to be taken from the company entirely, and put under the direction of the crown; but this was oppofed by Mr Fox, as furnifhing minifters with fuch ample means of corruption and undue influence, as might overthrow the conftitution entirely. For this reafon, he thought it would be more prudent to leave the appointment of its own fervants to the company; but at the fame time to keep a watchful eye over them, in order to be able to punifh and remove thofe who fhould be found delinquent.

The houfe having refolved itfelf into a committee, a motion was made by General Smith, "That Warren Haftings, Efq. governor-general of Bengal, and Sir Elijah Impey, the chief juftice, appear to have been concerned, the one in giving, the other in receiving, an office not agreeable to the late act for regulating the company's affairs; which unjuftifiable tranfaction was attended with circumftances of evil tendency and example." Refolutions were alfo paffed for afcertaining more diftinctly the powers of the governor-general and council of Bengal; and votes of cenfure againft Laurence Sullivan, Efq. chairman of the Eaft India Company, for having neglected to tranfmit to India an act for explaining and amending the act for regulating the affairs of the company, and for the relief of certain perfons imprifoned at Calcutta. Among the number of this gentleman's tranfgreffions, alfo, was his impofing an oath of fecrecy on Mr Wilkes, one of the company's clerks; and efpecially his reftraining him from giving information to a felect committee of the houfe of commons.

Mr Dundas having made feveral motions tending to criminate Sir Thomas Rumbold, formerly governor of Bengal, a bill was brought in and paffed into a law, for reftraining him and Peter Perring, Efq. from going out of the kingdom for the fpace of one year, for difcovering their eftates, &c. An addrefs was alfo prefented to the king, requefting him to recal Sir Elijah Impey from India, in order to anfwer for high crimes and mifdemeanours. A number of other refolutions were now paffed by the houfe, in confequence of motions by Mr Dundas, and which were founded on the reports of the fecret committee. Among thefe it was refolved, "That the orders of the court of directors of the Eaft India Company, which have conveyed to their fervants abroad a prohibitory condemnation of all fchemes of conqueft and enlargement of dominion, by prefcribing certain rules and boundaries for the operation of their military force, were founded no lefs in wifdom and policy than in juftice and moderation. That every tranfgreffion of thefe orders, without evident neceffity, by any of the feveral governments in India, has been highly reprehenfible, and tended in a great degree to weaken the force and influence, and to diminifh the influence of the company in thofe parts. That every interference of the company as a party in the domeftic or national quarrels of the country powers, and all new engagements with them in offenfive alliance, have been wifely and providentially forbidden by the company in their commands to their adminiftrations in India. That every unneceffary deviation from thefe rules fhould be feverely reproved and punifhed. That the maintenance of an inviolable character for moderation, good faith, and fcrupulous regard to treaty, ought to have been the fimple grounds on which the Britifh government fhould have endeavoured to eftablifh an extenfive influence, fuperior to that of other Europeans; and that the danger and difcredit arifing from the forfeiture of this pre-eminence, could not be compenfated by the temporary fuccefs of any plan of violence and injuftice. That fhould any relaxation take place, without fufficient caufe, in thofe principles of good government on the part of the directors themfelves, it would bring upon them, in a heavier degree, the refentment of the legiflative power of their country. That the conduct of the company, and their fervants in India, in various inftances fpecified, was contrary to

Company.

to policy and good faith; the company's servants, in their presidency of Bombay, had been guilty of notorious instances of disobedience to the orders of their employers, particularly in forming an alliance with Ragobah, or Ragonaut Row: that they had undertaken, without any adequate military force, or certainty of a sufficient revenue, and without proper communication with the superior government upon which they were to depend for sanction and support, to reinstate the usurper above mentioned, and thereby to involve themselves in a war with the ruling ministers of the Mahratta state, while Ragobah himself was not in the mean time able to give the company any secure possession of the grants he had made to them for the purchase of their assistance. That it was the opinion of the house, that all the disasters in which the British empire in the East was involved had proceeded from the unjustifiable manner in which the Mahrattas had been treated, and the conduct of the Madras presidency in other respects specified. That it is the opinion of this house, that it must be reckoned among the additional mischiefs arising chiefly from the improvident war with the Mahrattas, that the military force of the Carnatic had been weakened by reinforcements sent to the Malabar coast: that the Bengal government had been under a necessity of supporting, on their confines, the army of a power confederated against them (A): that they had been under the necessity of suing for the mediation of the same power: and submitted to a refusal, and purchased at last an uncertain, because apparently an unauthorized, treaty, on most extravagant and dishonourable conditions, with Chimnagee the rajah of Berar's son: and finally, that being burdened with the expences of a variety of distant expeditions, while their allies were in distress, and their tributaries under oppression, there was also an alarming deficiency in the resources of revenue and commerce, by the accumulation of their debt, and the reduction of their investment. That it was the opinion of the house, that an attempt made by the governor-general, in the beginning of January 1781, to form an engagement of alliance, offensive and defensive, with the Dutch East India Company, in the manner stated by the proceedings of their council, was unwarranted, impolitic, extravagant, and unjust."

These severe censures extended even to the directors themselves, whose conduct on some occasions was declared to be indefensible, as well as that of their servants and agents. It was also resolved, "That Warren Hastings, Esq. governor-general of Bengal, and William Hornsby, Esq. president of the council of Bombay, having, in sundry instances, acted in a manner repugnant to the honour and policy of this nation, and thereby brought great calamities on India, and enormous expences on the India company, it was the duty of the directors to pursue all legal and effectual means for the removal of the said governor general and president from their offices, and to recal them to Britain."

The commons having thus seriously entered into a consideration of East India affairs, soon found still more abundant reason for censure. It was discovered, that corruption, fraud, and injustice had pervaded every department. It had become an object with the servants of the company to oppress the natives by every possible method. They monopolised every article of trade, and seemed to have no other principle of commerce but lawless violence: the court of directors sent out instructions; but for the most part without any effect. Though the delegated administration of India ought to have preserved the strictest obedience to that of Britain; yet, being at so great a distance from the seat of supreme authority, and being possessed of endless means of abuse, it had become corrupt in an extreme degree. Instead of being subservient to government at home, the administration of India affected independence. The maxims of Mr Hastings were arbitrary; and he seemed to have no inclination to obey. He treated with sovereign contempt the authority of the court of directors: and the confusion produced by the disputes between them were fostered by the body of India proprietors, who were disposed to act as a check upon the directors. The necessity of new regulations in the government of India was universally admitted; and a bill for this purpose was accordingly brought in by Mr Dundas. His propositions were, that the governor and council of Bengal should have a controuling power and jurisdiction over the inferior presidencies of India; and he was of opinion that the governor-general should be invested with a power to act even against the will and opinion of the council, whenever he should imagine that, by so doing, he could contribute to the public good; though, in these cases, he alone should be responsible for the event. With regard to the inferior governors, though he did not think it proper that they should be authorized to act contrary to the advice of the council, he was of opinion, that they ought to have a right of negativing every proposition, until application was made to the governor-general and council of Bengal. With regard to the zemindaries and other tenures of land, he observed, that when Hindostan had been conquered by the Moguls, a tribute was imposed upon the zemindars; and while they continued to pay this tribute, they accounted themselves to be the real proprietors and masters of the lands they possessed. The people called *ryots*, to whom these zemindaries were lent out, considered themselves likewise as secure in their possessions while they performed the articles of their respective contracts. Of late, however, these rights had been infringed; and the Mogul came to consider himself as the absolute master of all the soil of Indostan; which maxim he was inclined to destroy, and erect upon it another, that might secure the landholders in their property. He proposed to secure the nabob of Arcot and rajah of Tanjore in their territories, by making an act of parliament in favour of the latter; but was of opinion, that the debts of these princes ought not to be too nicely inquired into, as the greatest part of them originated in corruption. He was clearly of opinion, however, that Governor Hastings ought to be recalled;

(A) The power here alluded to was Movedajee Boosla, rajah of Berar. See INDOSTAN.

ed; and that ſteps ought to be taken to prevent the court of proprietors from preſuming to act in contradiſtinction to parliament. Lord Cornwallis appeared to be the moſt proper ſucceſſor to Mr Haſtings. His perſonal honour, and that of his anceſtors, were pledges for his good behaviour; and being independent in his fortune, he could have no view of repairing his eſtate out of the ſpoils of India; and from his profeſſion, he could add to the character of governor that of commander in chief; he would not, however, inſiſt on his name being filled up in the bill, as that would reſt more properly with government.

Mr Haſtings was defended by Governor Johnſtone, who endeavoured to ridicule the arguments and propoſals of Mr Dundas. He obſerved, to the honour of the former, that he had been able to conclude a peace with the Mahrattas; and while he enlarged on his talents for negociation, he admired the reſources with which he had ſupplied the expences of the war. It ought to be conſidered that Mr Haſtings was in a ſituation the moſt difficult, and that no man could have ſuſtained it with more fortitude and ability. His enemies had dealt in inſinuation and invective; but when the hour of trial came, they would find that their charges would be refuted with equal eaſe. He was defended alſo by Mr Dempſter, who adviſed the houſe ſeriouſly to think before they paſſed a vote for the removal of Mr Haſtings. His exertions had been extraordinary; and it would then be as ridiculous to ſuperſede him, as it would have been to recal General Elliot, when the Spaniſh batteries were playing againſt Gibraltar. He was not, however, an advocate for all the meaſures of Mr Haſtings; his errors might be numerous; but no cenſure of him ſhould be eſtabliſhed before they were pointed out and explained.

Mr Dundas having now obtained leave to bring in his bill. another was moved for by Sir Henry Fletcher, "That leave be given to bring in a bill to diſcharge and indemnify the united company of merchants trading to the Eaſt Indies, from all damages, intereſts, and loſſes, in reſpect to their not making regular payment of certain ſums due to the public, and to allow farther time to ſuch payment; to enable the company alſo to borrow a certain ſum of money, and to make a dividend for the proprietors of four per cent. at midſummer 1783." He endeavoured to ſhow, that the public had derived very conſiderable advantages from the company; that their dividend had been 8l. 4s. annually during the time of peace, and 7l. 15s. per cent. during war; they were by no means in a ſtate of inſolvency, as ſome members had endeavoured to prove, their preſent application proceeding only from a temporary embarraſſment. A new diſpute took place concerning Mr Haſtings, who was warmly attacked by Mr Burke, and defended by Governor Johnſtone. The former enlarged on the bloodſhed, ravages, and rapacity, which had taken place in India. The eſtabliſhed ſyſtem of the ſervants of the company, he ſaid, was rapine and robbery. The Mahratta war was occaſioned by their refuſal to be robbed; the famine at Madras was occaſioned by the miſconduct of the Engliſh government in India; and he ſet forth in ſtrong colours the manner in which the Indian princes and princeſſes had been plundered. He inſtanced, that Mr Haſtings had raiſed 800,000l. in Bengal by private loan; and uſed it as an argument that the company had ceaſed to exiſt, and that their commerce was nothing more than an inſtrument for procuring immenſe fortunes to individuals, totally deſtitute of conſcience or principle.

All this was excuſed by Governor Johnſtone. He regarded the ſum of 800,000l. as merely trifling, when the number of civil and military ſervants on the Bengal government was conſidered. The famine at Madras was owing to the modes of war which prevailed in the Eaſt; as the enemy there marked their courſe by deſolation. He concluded with cenſuring the manner in which Mr Haſtings had been ſpoken of; and inſiſted that his high reputation ought to have guarded him from ſuch inſults. Mr Burke replied by an intimation of his deſign to impeach Mr Haſtings on his return; whom he called the greateſt delinquent that had ever violated in India the rights of humanity and juſtice.

It was obſerved by Lord John Cavendiſh, that the territorial acquiſitions of the company were a fruitful ſource of grievance; and it would have been more for their advantage to have confined themſelves to their original character of merchants. However, as the territorial acquiſitions had been obtained, it was proper to take means for their preſervation; as otherwiſe they would not revert to the natives, but fall into the hands of our natural enemies the French.

In the houſe of peers the cauſe of the company was ably defended by Earl Fitzwilliam. He maintained, that their ſituation was deſperate, and bankruptcy inevitable, unleſs relief was inſtantly afforded. A report of their being in an inſolvent ſtate had gone abroad, and nothing was better calculated to preſerve and ſupport their credit than a large dividend ſanctioned by act of parliament. The expenditure on their ſettlements had far exceeded their revenue; of conſequence their ſervants had drawn bills, which they were unable to anſwer without a temporary ſupply. Thus the exiſtence of the company might be ſaid to depend on the bill; and he hoped no objections could be raiſed ſtrong enough to deſtroy it.

On the 18th of November 1783, Mr Fox propoſed his celebrated Eaſt India bill, which for ſome time attracted the attention of the nation at large in a very conſiderable degree. By this it was intended to take from the India proprietors and directors the entire adminiſtration of their territorial and commercial affairs. It took from them alſo their houſe in Leadenhall-ſtreet, together with all books, papers, and documents; veſting the entire management, the appointment of all officers and ſervants, the rights of peace and war, and the diſpoſal of the whole revenue, in the hands of certain commiſſioners. Theſe were, in the firſt inſtance, to be appointed by the whole legiſlature, but afterwards by the crown; and were to hold their offices by the ſame tenure as the judges in England, viz. during their good behaviour; and could be removed only by an addreſs from one of the houſes of parliament. They were required to come to a deciſion upon every queſtion within a limited time, or to aſſign a ſpecific reaſon for their delay. They were never to vote by ballot; and, almoſt in every caſe, were to enter the reaſon of their vote in their journals. They were alſo to ſubmit, once every ſix months, an exact ſtate of their accounts.

accounts to the court of proprietors; and at the beginning of every feffion, a ftate of their accounts and eftablifhments to both houfes of parliament. Their number was limited to feven; but they were to be affifted by a board of nine perfons, each of them poffeffed of 2000l. company's ftock; who, as well as the commiffioners, were to be appointed in the firft inftance by parliament, and ever afterwards by the court of proprietors. They were alfo to be removeable at the pleafure of any five commiffioners, and were difqualified from fitting in the houfe of commons. The whole fyftem of government thus propofed, was to continue for the fpace of three or five years.

This was accompanied with another bill, the profeffed defign of which was to preclude all arbitrary and defpotic proceedings from the adminiftration of the company's territorial poffeffions. By this the powers of the governor-general and fupreme council were afcertained more exactly than had hitherto been done: it deprived the governor-general of all power of acting independent of his council; profcribed the delegation of any truft; and declared every Britifh power in the Eaft incompetent to the acquifition or exchange of any territory in behalf of the company, to the acceding to any treaty of partition, the hiring out of the company's troops, the appointing to office any perfon removed for mifdemeanour, or to the hiring out any property to a civil fervant of the company. By this alfo monopolies were entirely abolifhed; and illegal prefents recoverable by any perfon for his fole benefit. The principal part of the bill, however, related to the zemindars, or native landholders, who were now to be fecured by every poffible means in the poffeffion of their refpective inheritances, and defended in all cafes from oppreffion. Laftly, a mode was prefented for terminating the difputes between the nabob of Arcot and the rajah of Tanjore; difqualifying every perfon in the fervice of the company from fitting in the houfe of commons during his continuance in their fervice, and for a certain fpecified time after his demiffion.

During the courfe of the debates on this bill, Mr Fox fet forth the affairs of the company as in the moft defperate fituation. They had afked leave, he faid, the year before, to borrow 500,000l. upon bonds; had petitioned for 300,000l. in exchequer bills; and for the fufpenfion of a demand of 700,000l. due to government for cuftoms. He took notice alfo, that, according to an act of parliament ftill in force, the directors could not, by their own authority, accept bills to the amount of more than 300,000l.; under which circumftances it would no doubt furprife the houfe to be informed, that bills were now coming over for acceptance to the amount of 2,000,000l. It was evidently, therefore, and indifpenfably neceffary, that government fhould interfere in the affairs of the company to fave them from certain bankruptcy. He ftated their actual debt at no lefs than 11,200,000l. while their ftock in hand did not exceed 3,200,000l. There was therefore a deficiency of 8,000,000l.; a moft alarming fum when compared with the company's capital. Unlefs fpeedily affifted, therefore, they muft inevitably be ruined; and the ruin of a company of merchants fo extenfive in their concerns, and of fuch importance in the eyes of all Europe, could not but give a very fevere blow to the national credit. On the other hand, the requifite affiftance was a matter of very extenfive confideration. It would be abfolutely neceffary to permit the acceptance of the bills to the above-mentioned amount; and to do this without regulating their affairs, and reforming the abufes of their government, would only be to throw away the public money.

The conduct of the company's fervants, and of the company itfelf, was now arraigned by Mr Fox in the moft fevere terms; and their mifconducts were pointed out under their following heads:

1. With regard to Mr Haftings.—The chairman of the committee had moved in the houfe of commons, that it was the duty of the company to recal that gentleman; to which motion the houfe had agreed. In obedience to this refolution, the directors had agreed that Mr Haftings fhould be recalled; but fuppofing this to be a matter rather beyond their jurifdiction, they had fubmitted their determination to a court of proprietors, who refcinded the refolution of the directors; and after this the whole affair came to be laid before the houfe of commons. In the mean time every thing was anarchy and confufion in the Eaft, owing to this unfettled conduct with regard to the governor; as the whole continent had been made acquainted with the refolution of the houfe for recalling him, while that of the proprietors for continuing him in his office was kept a fecret. The proprietors had alfo been guilty of another contradiction in this refpect, as they had voted their thanks to Mr Haftings for his conduct in India. Hence Mr Fox was led to comment on the nature of the company's connexions with their fervants abroad, as well as on the character of the company themfelves. Among the former, he faid, there were a few, who, being proprietors themfelves, endeavoured to promote the trade of the company, and increafe its revenues. The views of the reft were otherwife directed; and from the difference in fpeculation between the two parties, the former were inclined to fupport that governor who enabled them to make large dividends; and who, for that reafon, after having peculated for his own advantage, was obliged to do the fame for the benefit of the proprietors. The latter, therefore, could not better gratify their wifhes, than by fupporting a governor who had in his power fo many opportunities of providing for his friends.

2. The next charge was againft the fervants of the company, whom he accufed of a regular and fyftematic difobedience to the orders of the proprietors.— The fupreme council of Bengal, he faid, had refolved, in oppofition to Mr Haftings, to fend two gentlemen, Mr Fowke and Mr Briftow, the one to refide with the nabob of Oude, the other at Benares. Mr Haftings, however, refufed to fend them; the directors tranfmitted the moft pofitive orders to carry the vote of the fupreme council into execution; but ftill Mr Haftings difobeyed; alleging in his defence, that he could not employ perfons in whom he had no confidence. Afterwards, however, Mr Haftings feemed to contradict himfelf in a very curious manner. He granted Mr Fowke a contract, with a commiffion of 5 per cent.; which, he obferved, was a great fum, and might operate as a temptation to prolong the war.

"But

"But (added he) the entire confidence I have in the integrity and honour of Mr Fowke, amounts to a full and perfect fecurity on that head."

To this Mr Fox added fome other inftances of a fimilar kind; but though he fupported thefe and the projected bill with all the argument and eloquence for which he was fo remarkable, he found it impoffible to make his fcheme agreeable to the majority of the houfe. The ftrongeft opponent was Mr William Pitt, who infifted chiefly on the two following topics. 1. Its infringement, or rather annihilation of the company's charter; and, 2. The new and unconftitutional influence it tended to create. He owned, indeed, that India ftood in need of a reform, but not fuch a one as broke through every principle of juftice and reafon. The charter of the company was a fair purchafe from the public, and an equal compact for reciprocal advantages between the proprietors and the nation at large; but if it was infringed in the manner propofed by the bill, what fecurity could other trading companies have that they fhould not be treated in the fame manner? nay, what fecurity could there be for Magna Charta itfelf? The bill, he faid, amounted to a confifcation of property. It had been fuggefted, indeed, that it was not a bill of disfranchifement, becaufe it did not take from the proprietors their right to an exclufive trade; but this was not the only franchife of the proprietors. A freehold might have a franchife annexed to it, the latter of which might be taken away, and yet the property of the former remain; in which cafe it could not be denied that the freeholders would have great caufe to complain. The cafe was exactly parallel with the India ftock. Perfons poffeffed of this to a certain amount, were entitled to a vote upon every important queftion of the company's affairs; and on this account the purchafe-money was more confiderable. But, by the bill in queftion, this privilege was to be taken away; which plainly amounted to a disfranchifement.

The great objection to this bill, however, feemed to be a fufpicion that it was a fcheme of Mr Fox to gratify his own perfonal ambition as a minifter, he being at that time fecretary of ftate. On this account he was deferted even by the patriotic members, who, upon former occafions, had fo ftrenuoufly fupported his caufe.—Mr Dundas accufed him of attempting to create a fourth eftate in the kingdom, the power and influence of which might overturn the crown and fubvert the conftitution of Britain. A petition was prefented from the proprietors, and another from the directors of the company, reprefenting the bill as fubverfive of their charter, and confifcating their property, without either charge of delinquency, trial, or conviction. They prayed, therefore, that the acts of delinquency prefumed againft them might be ftated in writing, and a reafonable time allowed them to deliver in their anfwer; and that they might be heard by counfel againft the bill. About the fame time the directors gave in a ftate of the company's affairs, differing in the moft extraordinary manner from that given by Mr Fox. In this they reprefented the creditor fide of the account as amounting to 14,311,173l. and they brought themfelves in debtors to the amount of 10,342,692l.; fo that of confequence there was a balance in their favour of 3,968,481l. This was vehemently contefted by the fecretary, who faid he could bring objections to the ftatement of the directors to the amount of more than 12,000,000l. fterling. He then entered into a particular difcuffion of the articles ftated in the directors account, and made good his affertion. Objections to this method of calculation, however, were made on the part of the company; fo that nothing could certainly appear to the public but that the company were at that time much diftreffed, and would fail entirely unlefs powerfully fupported by government.

Mr Fox now proceeded to a particular refutation of the arguments brought againft the bill; in which indeed he difplayed an aftonifhing force of argument and acutenefs of reafoning. The objection drawn from the validity of the company's charter, he fet afide, by fhowing that the company had abufed their power, and that it was therefore neceffary to take it from them. This he faid always had been the cafe, and muft be the cafe in a free nation; and he brought the example of James II. who, on account of the abufe of his power, had been deprived of it by the nation at large. The cafe was the fame with the company. They had made a bad ufe of their power, and therefore the nation at large ought to deprive them of it. It had been objected by the country gentlemen, that the bill augmented the influence of the crown too much; and by Mr Dundas, that it reduced it to nothing. Both thefe objections, he faid, were overturned by the circumftance of making the commiffioners hold their office only during good behaviour. Thus, when confcious that they were liable to punifhment if guilty, but fecure in cafe they faithfully difcharged their truft, they would be liable to no feduction, but would execute their functions with glory to themfelves, and for the common good of their country and of mankind. He then drew a comparifon betwixt his own bill and that of Mr Dundas's already mentioned. The bill of the latter, he faid, had created a defpotic authority in one man over fome millions of his fellow-creatures; not indeed in England, where the remedy againft oppreffion was always at hand; but in the Eaft Indies, where violence, fraud, and mifchief, everywhere prevailed. Thus the bill propofed by Mr Dundas afforded the moft extenfive latitude for malverfation, while his own guarded againft it with every poffible care; as was inftanced in its confiding in no integrity; trufting in no character; and annexing refponfibility not only to every action, but even to the *inaction* of the powers it created.

After having expatiated for a confiderable time, the fecretary was feconded by Mr Burke, whofe force of oratory was chiefly directed, as indeed it ufually was when fpeaking of India affairs, on the monftrous abufe of the company's power in that quarter. He affirmed that there was not in India a fingle prince, ftate, or potentate, with whom the company had *come into contact*, whom they had not fold; and there was not a fingle treaty they had ever made which they had not broken; and that there was not a fingle prince or ftate that had ever put any confidence in the company who had not been ruined. With regard to the firft article, Mr Burke inftanced the fale of the Great Mogul himfelf; of the Rohillas; the nabob of Bengal; the polygars of the Mahratta empire; Ragobah, the pretender

tender to that empire; and the ſubah of Decan.—The ſecond article was proved by a review of the tranſactions from the beginning to the end of the Mahratta war. With regard to the third, viz. the ruin of ſuch princes as put any confidence in the company or their ſervants, he deſired them to look into the hiſtory and ſituation of the nabob of Oude. In the year 1779, this country had been viſited by a famine; a calamity which had been known to relax the ſeverity even of the moſt rigorous government; yet in this ſituation the preſident of Bengal had put an abſolute negative upon the repreſentation of the prince; adding, that perhaps expedients might be found for affording him a gradual relief; but their effects muſt be diſtant. This diſtant relief, however, never arrived, and the country was ruined.

Our limits will not allow a particular detail of the charges againſt the company on the one hand, or the defences on the other. In general, it muſt appear, that ſuch ſevere and heavy charges could not be advanced without ſome foundation, though perhaps they may have been conſiderably exaggerated by the orators who brought them. The picture drawn by Mr Burke on this occaſion indeed was ſhocking. "The Arabs, Tartars, and Perſians, had conquered Indoſtan with vaſt effuſion of blood; while the conqueſts of the Engliſh had been acquired by artifice and fraud, rather than by open force. The Aſiatic conquerors, however, had ſoon abated of their ferocity; and the ſhort life of man had been ſufficient to repair the waſte they had occaſioned. But with the Engliſh the caſe had been entirely different. Their conqueſts were ſtill in the ſame ſtate they had been 20 years ago. They had no more ſociety with the people than if they ſtill reſided in England; but, with the view of making fortunes, rolled in one after another, wave after wave; ſo that there was nothing before the eyes of the natives but an endleſs proſpect of new flights of birds of prey and paſſage, with appetites continually renewing for a food that was continually waſting. Every rupee gained by an Engliſhman in India was for ever loſt to that country. With us there were no retributory ſuperſtitions, by which a foundation of charity compenſated, for ages, to the poor, for the injuſtice and rapine of a day. With us no pride erected ſtately monuments, which repaired the miſchiefs pride had occaſioned, and adorned a country out of its own ſpoils. England had erected no churches, no hoſpitals, no palaces, no ſchools (the trifling foundation at Calcutta excepted); England had built no bridges, made no high-roads, cut no navigations, dug no reſervoirs. Every other conqueror of every other deſcription had left ſome monument either of ſtate or beneficence behind him; but were we to be driven out of India this day, nothing would remain to tell that it had been poſſeſſed, during the inglorious period of our dominion, by any thing better than the oran-outang or the tiger!"

All this eloquence, however, was at preſent entirely ineffectual, and the bill was finally rejected: much confuſion and altercation enſued, which terminated in a change of miniſtry and diſſolution of parliament. On the 26th of May 1784 a petition from the company was preſented to the houſe of commons, praying for ſuch relief as the nature of their affairs might ſeem to demand. This was followed on the 24th of June by a bill for allowing the company to divide four per cent. for the half year concluding with midſummer 1784. This having paſſed, after ſome debate, a new bill was propoſed by Mr Pitt for relieving the company in the mean time, and regulating their affairs in time to come. A bill to this purpoſe had been brought in during the laſt ſeſſion of the former parliament by the ſame gentleman, which he wiſhed to bring to a compariſon with that of Mr Fox, of which an account has already been given. In this bill he began with laying it down as a principle, that "the civil and military government of India, or, in other words, the imperial dominion of our territories in the Eaſt, ought to be placed under other controul than that of the merchants in Leadenhall ſtreet; and this controul could be no other than the executive branch of the conſtitution. The commerce of the company, however, ought to be left as free from reſtrictions as poſſible; and, laſtly, capricious effects from the government of India upon the conſtitution of Britain were to be carefully avoided. A controul in the executive branch of the legiſlature over the government of India had indeed been eſtabliſhed by the regulation bill of 1773; but the former interference of miniſters had not been beneficial, becauſe it had not been active and vigilant. He now propoſed, therefore, that a board ſhould be inſtituted expreſsly for the purpoſe. This board was to be appointed by the king, and to conſiſt of the ſecretary of ſtate for the home department, the chancellor of the exchequer, and a certain number of the privy council. To this board the diſpatches of the company were to be ſubmitted, and were not to be ſent to India until they were counterſigned by them. To prevent queſtions concerning the commercial and political concerns of the company, it was propoſed, that the diſpatches upon the former ſubject ſhould be ſubmitted to the board; and that, in caſe of any difference, an appeal ſhould be made to the king in council. Though he (Mr Pitt) had not thought proper to accept of the propoſal of the company to yield the appointment of foreign councils to the crown, he was nevertheleſs clearly of opinion, that the commander in chief ought to be appointed by the king. He propoſed alſo that this commander ſhould have a vote in council next to the preſident; that the king ſhould be empowered to beſtow the reverſion of his office; that the king might recal the governor-general, the preſidents, and any members of their councils. He yielded the appointment of all officers, with the ſingle exception he had ſtated, to the court of directors, ſubject, however, to the approbation of the king; and that, in caſe of a negative, the directors ſhould proceed to a ſecond choice, and ſo on. He deprived the court of proprietors of the privilege of reſcinding or altering the proceedings of the court of directors: and with reſpect to the foreign government, he was of opinion, that their authority ſhould compriſe in it a conſiderable diſcretion, accompanied with the reſtraint of reſponſibility. He propoſed, that there ſhould be a reviſion of the eſtabliſhment in India with a view to retrenchments; that appointments ſhould take place by gradation; and that a new and ſummary tribunal ſhould be erected for the trial of offences committed in that country. With regard to the zemindaries, though

though he could not help paying a compliment to Mr Fox, on his intention of reftoring them to their proper owners, he yet thought that a general and indifcriminate reftitution was as bad as an indifcriminate confifcation. He therefore propofed that an inquiry fhould be inftituted for the purpofe of reftoring fuch as had been irregularly and unjuftly deprived, and that they fhould in time to come be fecured againft violence.

In the bill of 1784 few alterations were made; and thefe uniformly tended to enlarge the powers of the board of controul. They were permitted, in cafes of emergency, to concert original meafures, as well as to revife, correct, and alter thofe of the directors. In matters relative to peace or war, where fecrecy was a principal object, they were allowed to fend their orders directly to India, without any communication with the directors; to the commander in chief without any communication with the prefidencies; and the number of perfons conftituting the different councils of Bengal, Fort St George, and Bombay, was determined.—The governor-general and council of Bengal were to have an abfolute power to iffue orders to the inferior prefidencies, in fuch cafes as did not interfere with the directions already received from Britain; adding a power of fufpenfion in cafe of difobedience. The fupreme council were forbidden, unlefs any of the Indian princes fhould have firft commenced or meditated hoftilities, to enter upon war, or form an offenfive treaty, without orders from home. The inferior councils were forbidden in all cafes to form alliances; and in cafes of urgency, were commanded to infert a provifional claufe, rendering the permanency of the alliance dependent on the confirmation of the governor-general.

Various falutary regulations were propofed concerning the behaviour of the company's fervants, againft whom fo great complaints had been made. Inquiry was ordered to be made by the different prefidencies into the expulfions that might have been made of any of the hereditary farmers, and of the oppreffive rents and contributions that might have been extorted from them; and meafures were directed to be taken for their relief and future tranquillity. A fimilar examination was ordered into the different eftablifhments in the Indian fettlements; a report of which was to be laid annually before parliament. The company were prohibited from fending out a greater number of cadets or writers than what were abfolutely neceffary; and it was likewife provided, that the age of fuch as were fent out, fhould not be lefs than 15, nor more than 22 years. It was likewife provided, that promotions fhould be made in the order of feniority, unlefs in extraordinary cafes; for which the prefidencies fhould make themfelves fpecifically refponfible. Crimes committed by Englifh fubjects in any part of India, were made amenable to every Britifh court of juftice, in the fame manner as if they had been committed in Britain. Prefents, unlefs fuch as were abfolutely ceremonial, or given to a counfellor at law, a phyfician, a furgeon, or a chaplain, were abfolutely prohibited, under the penalty of confifcation of the prefent, and an additional fine at the difcretion of the court. Difobedience of orders, unlefs abfolutely neceffary, and pecuniary tranfactions prejudicial to the interefts of the company, were declared to be high crimes and mifdemeanors. The company were forbidden to interfere in favour of any perfon legally convicted of any of the above crimes, or to employ him in their fervice for ever. The governors of the different prefidencies were alfo permitted to imprifon any perfon fufpected of illicit correfpondence, and were ordered to fend them to England with all convenient fpeed. Every perfon ferving, or who fhould hereafter ferve in India, was alfo required, on his return to England, to give an exact account, upon oath, to the court of exchequer, of his property, within two months after his arrival; one copy of which was to be kept in the court of exchequer, and the other at the India-houfe. The board of controul, the court of directors, or any three of the proprietors whofe ftock fhould amount together to 1000l. were allowed to move the court of exchequer to examine the validity of the account. In cafe of an apparently-well-founded accufation, the court of exchequer were allowed to examine the party upon oath, and even to imprifon him until the interrogatories propofed to him fhould be anfwered. The whole property of a perfon who fhould neglect to give in fuch an account within the time limited, or who fhould have been guilty of a mifreprefentation in that account to the amount of 2000l. fterling, was ordered to be confifcated; ten per cent. to be paid to the accufer, and the remainder to be equally divided between the public and the company. Every perfon who had once been employed in India, but had afterwards refided in Europe for five years, unlefs fuch refidence had been exprefsly on account of his health, was declared incapable of ever being fent out to India again.

As a farther curb on the company's fervants, the attorney-general or court of directors was authorized to file an information in the court of king's bench againft any perfon for crimes committed in India. That court was empowered alfo to imprifon or admit the accufed to bail immediately. It was then ordered, that within 30 days a certain number of peers fhould be chofen by the houfe of lords, and of the members of the houfe of commons by that houfe, to conftitute a court for the trial of the accufed. The court was finally to confift of three judges appointed by the crown, four peers, and fix members of the houfe of commons; and the accufed had a right to a peremptory challenge. From this court there was no appeal; and it was empowered to adjudge the party incapable of ever ferving the company; to punifh by fine or imprifonment; and in order to proportion the fine to the property of the convict, the court of exchequer might at the requifition of the attorney-general, or of the company, examine him upon oath concerning the fum he was worth. A refufal to anfwer was to be punifhed with confifcation of property, and imprifonment during pleafure.

With regard to the treatment of delinquents in India, Mr Pitt obferved, that at that time we had it not in our power to punifh them. Either a new procefs muft therefore be inftituted, or offences, equally fhocking to humanity, and contrary to every principle of religion and juftice, muft be permitted to continue unchecked. Every perfon therefore who went hereafter, would know the predicament in which he ftood; and would underftand, that by fo doing he agreed to give up fome of the moft valuable privileges of an Englifhman;

man: yet in this he would do no more than a very numerous and honourable body of men, the military, did daily, without the leaſt heſitation, or the ſmalleſt impeachment of their character.

This bill, ſo tremendous in its appearance to the company's ſervants, was vehemently oppoſed by the minority. Mr Francis obſerved, that it went upon two principles, viz. the abuſe of power abroad, and the want of it at home. To remedy theſe, Mr Pitt had propoſed to augment the power abroad, and to diminiſh that at home. He condemned the unlimited power of the commiſſioners, and even pretended to ſuppoſe that there muſt have been ſome miſtake in the ſtructure of the clauſe; it being impoſſible to think that it was intended to ſet aſide the directors at home and the government abroad, in order to throw the whole power into the hands of a military commander. Though he approved of the clauſe by which ſchemes of conqueſt and extenſion of territory were condemned, he remarked, that it was eſſentially defective in other reſpects; as alluding to facts and offences which were not deſcribed, and to criminals whom, ſo far from puniſhing, it did not venture to deſcribe. With reſpect to the affair of preſents, he confeſſed that his opinion was rather ſingular. He was for an unlimited prohibition to men in high ſtations; but in the ordinary tranſactions of buſineſs, he was of opinion that they were uſeful, without giving room for any juſt apprehenſions. The government of India, as it was now conſtituted, was a government of favour, and not of juſtice; and nothing would be done for the natives unleſs the perſons who forward their affairs were gratified. In the mean time, however, the exception in favour of preſents of ceremony was founded upon ideas which he knew to be fallacious, and was even calculated to render the prohibition itſelf uſeleſs and ineffectual. For the purpoſe of receiving preſents of ceremony, all occaſions would be ſufficiently ſolemn. He warmly cenſured alſo the power of impriſonment given to the reſpective preſidencies, and he condemned the inſtitution of the new court of judicature as unneceſſary, arbitrary, and dangerous.

By Mr Fox the bill was ſo highly diſapproved of, that he objected to the houſe going into a committee upon it. He endeavoured to ſhow, that inſtead of diminiſhing, it was calculated to increaſe the calamities of the Eaſt; and inſtead of reforming, to perpetuate the abuſes ſo much complained of. The board of controul, he ſaid, provided for a weak government at home by a diviſion of power; and if there were a receipt or a noſtrum for making a weak government, it was by giving the power of contriving meaſures to one, and the nomination of the perſons who were to execute them to another. The negative given to the commiſſioners operated as a complete annihilation of the company, and the chartered rights ſo much vaunted of. The bill was a ſcheme of dark and deluſive art, and took away the rights of the company by ſlow and gradual ſap. The firſt ſtep was originally to contrive meaſures without the knowledge of the company; and the next, to convey orders ſecretly to India, at the very time perhaps that the commiſſioners were openly giving countenance to orders of a quite different tendency ſent from the directors. With regard to the new tribunal, he conſidered it as in truth a ſcreen for delinquents; ſince no man was to be tried but on the accuſation of the company or of the attorney-general; in which caſe he had only to conciliate government in order to remain in perfect ſecurity.

The oppoſition of Mr Fox's party againſt this bill proved as fruitleſs as their efforts had been in favour of the other. The houſe divided on the ſpeaker's leaving the chair; when the motion was carried by a majority of 215. Still, however, all parts of the bill were warmly debated. In the courſe of converſation upon this ſubject, Mr Dempſter expreſſed a wiſh that the king could be requeſted to ſend over one of his ſons to become ſovereign of that country. We might then enter into a federal union, and enjoy all the benefits that could be derived from the inhabitants of the Eaſt by Europeans, viz. thoſe of commerce. The clauſes relative to the native princes and hereditary farmers were all withdrawn at the motion of Mr Dundas; and under the head of preſents, the exception in favour of thoſe of ceremony was withdrawn. That clauſe, which inſiſted on all perſons returning from India to give an account of the value of their eſtates upon oath, was ſeverely cenſured by Mr Dempſter and Mr Eden; and after ſome debate was entirely withdrawn, as was alſo the idea of making the perſon take the oath when required by the board of controul. Mr Pitt then propoſed, that perſons who had paſſed five years in India, and accumulated no more than 5000l. for that time, or double that ſum for the next five years, ſhould be exempted from all proſecutions on the ſcore of their fortunes. But on a ſuggeſtion by Mr Atkinſon, that, in caſe of ſickneſs, it might not be practicable for a perſon arriving from India to give in an account upon oath in the ſpace of two months; on which ſuggeſtion a power was granted to the court of exchequer for extending the term from time to time as they ſhould think proper. It had been the original idea of the chancellor, that this juriſdiction ſhould take place in twelve months; and it had been objected, that thus perſons would be deprived of the trial by jury, without time being granted them to chooſe whether they would ſubmit to the condition. Mr Pitt now moved, that no account upon oath ſhould be required of any perſon who ſhould arrive from India before the firſt of January 1787. This amendment was likewiſe cenſured by oppoſition, as holding out an indemnity to peculators, and a warning for them to return within the aſſigned period. It was remarked by Mr Sheridan, that by the bill before the houſe, a perſon who took the oath would be liable all his lifetime to a proſecution for perjury. He could therefore make no ſettlement of his fortune; he could not ſell or mortgage his eſtate, as nobody would have any thing to do with a property which was ſtill liable to conteſt and forfeiture. This repreſentation produced another amendment, limiting the commencement of a proſecution to the period of three years. The clauſe prohibiting the return of any perſon to India under certain conditions, was alſo mitigated by two amendments from the chancellor; one of them exempting the officers of the king from its operation; and the other permitting the reſtoration of any perſon with the conſent of the directors, and three-fourths of the court of proprietors.

With theſe amendments, the bill finally paſſed the houſe.

house of commons on the 28th of July. On being carried up to the house of lords, it met with a very vigorous opposition; the principal speakers against it being Lord Stormont and the Earl of Carlisle. The former animadverted upon the principle of seniority established by it; which he said was particularly ill-suited to the critical posture of affairs and our present situation in India; and he asserted, that had such a clause been in effect at the time that Lord Clive first entered into the company's service, there would not have been an inch of the territorial possessions at present belonging to this country. It would damp the ardour of emulation, check the rising spirit of the youth now in Asia, and that at a time when the most extraordinary talents were necessary to raise us from our inauspicious and ruined condition. He objected also to the power of recal in the board of controul; which, he said, was by no means a sufficient check upon the company's servants in India. The distance of time and place, he said, were so great, that a recal from India could not have the least effect. But these remonstrances had very little weight with the house: the bill being finally passed on the 9th of August.

Some years after this, however, a declaratory law was found necessary, in consequence of a controversy which had arisen between the board of controul and the company. It had been resolved, in the month of October 1787, when his majesty had reason to be alarmed, and to look with more than common anxiety to the safety and preservation of every part of the British dominions, to send out four additional regiments for the better protection of our Indian possessions; nor was the design taken up as a temporary, but with a view to a permanent, establishment of his majesty's troops in India. At that time, no unwillingness to receive the regiments on board the company's ships, and provide for their support in India, had been intimated by the court of directors; but, on the contrary, the measure had been considered as a wise one, and the suggestion of it had given universal satisfaction. Since, however, the threatening storm had been dispersed, far different sentiments prevailed. Some of the directors, at least, were of opinion, that unless they made a requisition to government for further military assistance, they had it in their option to bear, or to refuse to bear, the expence of any additional regiments of his majesty's army which might be sent to India; and this opinion seemed to be, in a great measure, grounded on the act of 1781, by which the East India Company were bound to pay for such of his majesty's troops, as had, by their requisition, been sent to India. This idea had been much agitated without doors, and the directors had thought proper to consult different counsel of eminence on the subject.

In this business two questions naturally arose:—First, Whether the king had a right to send his troops to any part of his dominions? and, secondly, If he sent them to India, who ought to defray the expence? That his majesty had an undoubted right, by his royal prerogative, to direct the distribution of his army, no one could, with any colour of reason, dispute. The only point, therefore, which offered itself for discussion was, whether, if his majesty, by virtue of his prerogative, thought proper to send four additional regiments to India, the expence of sending them, and their support, ought to be provided for out of the revenues of India, which they protected? It was certainly the opinion of ministers, that by the act of 1784, the authority and power of the court of directors, touching the military and political concerns of India, and also the collection, management, and application of the revenues of the territorial possessions, was transferred to the board of controul, which might direct the appropriation of these revenues in the manner that to them should appear to be most for the public advantage; but as doubts had been entertained by others, and the opinions of counsel, confirming those doubts, had been taken, all of which had gone abroad into the world, it was considered as a necessary measure to call upon the different branches of the legislature to remove those doubts in the most effectual way by a bill. It was certainly very evident, that, on the present occasion, the four regiments might, on board the company's ships, be sent out to India at a very inconsiderable expence; whereas, if transports had been specially provided for that purpose, the expence must have been enormous. To oblige the company, therefore, to pay the expence out of their Indian revenues, as had already been intimated to them by the commissioners of controul, the chancellor of the exchequer moved, on the 5th of February 1788, "That leave be given to bring in a bill for removing any doubts respecting the power of the commissioners for the affairs of India."

In explanation of this bill, and in answer to the remarks of opposition, Mr Pitt desired to remind the house that he had provoked the discussion of the bill, and had earnestly solicited them to bring it to the test of the most severe and scrupulous investigation. He found that it would be disputed, whether by the act of 1784, the board of controul had any right of superintendence over the revenue. Would it be contended that parliament meant to leave the finances in the hands of the company, who had been declared unfit to be trusted with them? Was it likely, that, when they provided for the better management of the political and military concerns, they had paid no attention to the circumstance upon which these concerns inseparably depended? The board of controul had already proceeded to reduce the enormous establishments in India; their right of interference in that respect had never been questioned; and what indeed would be the consequence of denying this right? The court of directors, if they had it in their power, as the expiration of their charter drew near, and it was doubtful whether their monopoly would be renewed, would certainly make it their first object to swell the amount of their imports, and would neglect the care of the territorial and political state of India. The duty of administration was to look, first, to the prosperity and happiness of the natives; secondly, to the security of the territorial possessions; thirdly, to the discharge of the debts due to the persons who had advanced their money, and enabled the company to struggle with their late difficulties; and, in the last place, to the commercial benefit of the proprietors. Was it probable that the court of directors would act upon that scale? Could it have been intended to confide in their discretion? It had been said, that the powers attributed to the

the board of controul were the ſame in ſubſtance as had before been given to the ſecretaries of ſtate and the lords of the treaſury. But the fact was otherwiſe. The court of directors had been obliged to communicate their diſpatches previous to their going to India; but there was no obligation upon the ſecretary of ſtate to give any directions concerning them. The reſponſibility had ordinarily reſted, under the former government, with the court of directors; under the preſent it was wholly veſted with the board of controul.

An objection had been ſtated, that the declaratory bill conveyed to the king the power of maintaining an army without the conſent of parliament. No propoſition (Mr Pitt obſerved) could be more adverſe to his intentions than that which was thus imputed to him. But in reality the troops in queſtion had already been recogniſed by parliament when they voted the eſtimate for raiſing them; and the number of king's regiments ſerving in India would always be to be aſcertained by the company belonging to each, which remained in England for the purpoſe of recruiting, and the expence of which would be to be provided for by parliament.

Mr Pitt acknowledged that it had been the object of the act of 1784 to aſſume the power of ſuperintendence and controul, without aſſuming the power of patronage. In the preſent bill he declared that every thing had been done which his underſtanding had ſuggeſted for the diminution of patronage. The regiments in queſtion belonged to the crown; and of courſe it could not be ſuppoſed that the ſovereign could entirely depart from his prerogative of naming his own officers. But the king had acted with the moſt gracious attention to the company, and to the merits of the officers who had grown gray in their ſervice; having relinquiſhed nearly half the patronage of the regiments, and leaving the diſpoſal of theſe commiſſions to the court of directors. The company indeed alleged that they had 600 officers unemployed; but the king could not forget that he had 2800 officers upon half-pay, not perhaps more meritorious, but certainly not leſs ſo, than thoſe in the company's ſervice, and many of whom had actually ſerved with diſtinction in India. Such had been the forbearance he had thought it proper to exerciſe upon the ſubject of patronage. But if, by the objection that had been ſtated, it was intended to refer to the great political patronage, this he did not deny that he had at all times intended to aſſume. Men who were reſponſible for the government of a country, ought undoubtedly to have the appointment of thoſe whom they were to entruſt with the execution of their orders. But it would be admitted that the patronage left to the company was very conſiderable, when the great extent of their military eſtabliſhment was properly recollected. Mr Pitt added, that the objections that were ſtated on this head would poſſibly throw difficulties in the way of the conſolidation of the two armies in India; an object on many accounts deſirable, and which in ſome way or other muſt be attempted. If it ſhould be thought adviſable to make the whole army royal, then undoubtedly the patronage of the crown would be greatly increaſed. He believed, however, that the meaſure was neceſſary; and there was ſcarcely any thing to which he would not aſſent, to remove the apprehenſions of the nation reſpecting the undue uſe of this patronage. For the bill now before the houſe, Mr Pitt profeſſed himſelf ready to propoſe clauſes that ſhould annihilate every ſuſpicion of danger.

The ſpeech of Mr Pitt produced a favourable effect upon the country gentlemen; and the clauſes which he had alluded to being moved, were received without any debate. Theſe provided, That no king's troops, beyond the number which was now propoſed, ſhould be ſent to India under the authority of any exiſting law: That no increaſe of ſalary ſhould be given to any of the ſervants of the company, without the diſpatches for that purpoſe being laid before both houſes of parliament thirty days previous to their being ſent; and that no gratuity ſhould be given, the propoſal for which did not originate with the court of directors. A further clauſe was added to theſe by the miniſter, which had not preciſely the ſame object: it directed, that an account of the revenues and diſburſements of the company ſhould be laid before parliament at a certain aſſigned period in the courſe of every year.

The bill was carried up to the houſe of lords on the 14th of March, read a firſt time on the following day, which was Saturday, and propoſed for a ſecond reading on the enſuing Monday. This precipitation was made the ſubject of a petition, offered by certain proprietors, and preſented to the houſe by the duke of Norfolk, in which they requeſted a delay of three days, till a general meeting could be held of the proprietors of the Eaſt India Company. To this ſuggeſtion it was objected by Lord Thurlow and Lord Hawkeſbury, that the ſhips of the Eaſt India Company were now detained in port at the enormous expence of three or four hundred pounds per diem. By Lord Stormont and Lord Loughborough it was replied, that no expence, however great, ought to weigh in conſideration of the preſent queſtion. The bill decided upon a matter of private right, and parliament could not juſtly refuſe to hear the petitioners. The houſe divided upon the queſtion, contents 32, not-contents 75. A motion of Lord Porcheſter was rejected by a ſimilar majority, for referring a queſtion to the twelve judges reſpecting the true meaning and intent of the act of 1784.

The duke of Richmond ſaid, that he was peculiarly circumſtanced on the preſent occaſion, ſince he had never been pleaſed with any of the bills for the government of India that had yet been brought into parliament. He had ever been of opinion, that the concerns of the Eaſt were truſted in the beſt hands when they were veſted in the company itſelf. He had oppoſed the bill of 1783, becauſe it flagrantly violated the charter of the company, and placed an immenſe power in the hands of a commiſſion, that was not reſponſible, ſo far as he could find, either to the king or the parliament. He had oppoſed the act of 1784, becauſe it gave to the crown an enormous addition of power. But he could not admit that the act was in any degree ſo violent and deſpotical as the bill which preceded it. The declaratory meaſure now under conſideration muſt neceſſarily have his complete approbation. It conſiſted of two diſtinct parts; its expoſition of the act of 1784, and certain enacting clauſes

containing checks and reftraints upon the extenfive patronage that the government of the Eaft naturally gave. To the former part he muft inevitably agree. That the act of 1784 gave to the board of controul complete authority, had always been his opinion. For that reafon he had oppofed it; but entertaining that opinion, he muft juftify the prefent bill, which in his mind was a true declaration of the fact. He could not but equally approve of the reftraints that were propofed upon the exercife of patronage. Patronage was infeparable from power. But when he faw the induftry with which it was limited, and minifters were tied down from the abufe of it; when he faw that it was not to be ufed otherwife than for the good of the fervice, he could not view the prefent meafure with the fame jealoufy with which he was accuftomed to regard propofitions for extending the power of the crown.

The bill, however, underwent a fevere difcuffion in this as it had done in the other houfe; but at length paffed.

In May following a petition was prefented to the houfe of commons by the company, ftating certain pecuniary embarraffments which they apprehended to take place on the 1ft of March 1790, owing to the arrears of the war, to the government claim of 500,000l. to the debt incurred in China, and to the advances neceffary to be made for the purpofes of the China trade. In compliance with their petition Mr Pitt moved on the following day that they fhould be empowered to borrow a fum not exceeding 1,200,000l. He at the fame time obferved, that in all probability the company in 1791 would have upwards of 3,000,000l. fterling more than fufficient to difcharge their debts. The meafure was carried through both houfes without oppofition.

3. *Hudfon's Bay Company.* The vaft countries which furround Hudfon's Bay abound with animals whofe furs and fkins are excellent, being far fuperior in quality to thofe found in lefs northerly regions. In 1670, a charter was granted to a company, which does not confift of above nine or ten perfons, for the exclufive trade to this bay; and they have acted under it ever fince with great benefit to themfelves. The company employ four fhips and 130 feamen. They have feveral forts, viz. Prince of Wales's fort, Churchill river, Nelfon, New Severn, and Albany, which ftand on the weft fide of the bay, and are garrifoned by 186 men. The French, in May 1782, took and deftroyed thefe forts, and the fettlements, &c. valued at 500,000l. They export commodities to the value of 16,000l. and bring home returns to the value of 29,340l. which yield to the revenue 3734l. This includes the fifhery in Hudfon's Bay. This commerce, fmall as it is, affords immenfe profits to the company, and even fome advantages to Great Britain in general; for the commodities we exchange with the Indians for their fkins and furs, are all manufactured in Britain; and as the Indians are not very nice in their choice, fuch things are fent of which we have the greateft plenty, and which, in the mercantile phrafe, are drugs with us. Though the workmanfhip too happens to be in many refpects fo deficient that no civilized people would take it off our hands, it may be admired among the Indians. On the other hand, the fkins and furs we bring from Hudfon's Bay, enter largely into our manufactures, and afford us materials for trading with many nations of Europe to great advantage. Thefe circumftances tend to prove inconteftably the immenfe benefit that would redound to Great Britain, by throwing open the trade to Hudfon's Bay, fince even in its prefent reftrained ftate it is fo advantageous. This company, it is probable, do not find their trade fo advantageous now as it was before we got poffeffion of Canada. The only attempt made to trade with Labrador has been directed towards the fifhery, the annual produce of which exceeds 49,000l.

The above are the principal trading companies prefently fubfifting in Great Britain; but to the number might have been added one of vaft importance, the *Scotch Darien Company*, had it not been for the crooked and pufillanimous policy of the Englifh miniftry at the time. For an account of which, see the article DARIEN.

Greenland COMPANY. See GREENLAND.

Banking COMPANIES. See BANK.

Of eftablifhments fimilar to the above in other countries, the following belonging to the Dutch and French, may be mentioned as the moft important.

I. DUTCH Companies. 1. Their Eaft India company had its rife in the midft of the ftruggle which that people had for their liberty: for the Spaniards having forbidden all commerce with them, and fhut up all their ports, neceffity infpired fome Zealanders to feek a north-eaft paffage to China.

This enterprife proving unfuccefsful to three feveral armaments in 1594, 1595, and 1596, a fecond company was formed, under the name of the *Company of Remote Parts*; which, in 1597, took the ordinary route of the Portuguefe to the Indies, and returned in two years and a half's time with little gain but good hopes.

This company, and a new one juft eftablifhed at Amfterdam, being united, equipped other fleets; and thefe occafioned other companies at Amfterdam, Rotterdam, in Zealand, &c. infomuch that the ftates foon began to apprehend they might be prejudicial to each other. Under this concern, they called all the directors of the feveral companies together, who all confented to an union, the treaty whereof was confirmed by the ftates in 1602; a very remarkable epocha, as being that of the moft folid and celebrated eftablifhment of commerce that ever was in the world.

Its firft capital was fix million fix hundred thoufand guilders. It had fixty directors, divided into feveral chambers; twenty in that of Amfterdam, twelve in that of Zealand, fourteen in that of Delft and Rotterdam, and a like number in thofe at Sluys and Horn. As each grant expires, the company is obliged to procure a new one, which it has already done five times fince the firft, paying a confiderable fum each time. The laft application was in 1773, when the company, after ftating that its trade had declined, folicited the ftates-general to grant a diminution of the fum formerly paid for the renewal of the charter. Upon this reprefentation their high mightineffes, in order to have time to inquire into the matter, prolonged the charter

charter for three years, upon the old eſtabliſhment; and finding, upon examination, that the company had really ſuſtained great loſſes, and its trade conſiderably declined, they acted with the ſpirit of a wiſe commercial commonwealth, by complying with the company's requeſt. They, therefore, in 1776, granted them a new charter for 30 years, on the ſame terms as the former, on the immediate payment of 2,000,000 of florins, inſtead of 3,000,000 which they paid before, and the ſum of 360,000 florins yearly; which annual payment they were allowed to make either in money or merchandiſe. In conſequence of this indulgence, the ſtock of the company roſe in a ſhort time no leſs than 19 per cent.

Their factories, reſidences, &c. in the Eaſt Indies, are very numerous; reaching from the Perſian gulf to the coaſt of China: the principal is that of Batavia, the centre of their commerce; here reſides their general, with the ſtate and ſplendour of a ſovereign prince; making war and peace with the eaſtern kings and emperors at pleaſure.

The other more conſiderable factories are, Taiouam on the coaſt of China, Nangiſac in Japan, Malacca, Surat, Amboyna, Banda, Siam, Moluccas, &c. ſeveral on the coaſt of Coromandel, and at Iſpahan, Cape of Good Hope, &c.: in all, they number 40 factories and 25 fortreſſes. But the whole are now in the hands of the Britiſh.

2. Their *Weſt India Company* was eſtabliſhed in 1621, with an excluſive privilege to trade 24 years along the coaſts of Africa, between the tropic of Cancer and the Cape of Good Hope; and in America from the ſouth point of Newfoundland, through the ſtraits of Magellan, that of Le Maire, or others, to the ſtraits of Anian, both in the North and South ſea. The directors are divided into five chambers (as in the Eaſt India Company), out of which 19 are choſen for the general direction of affairs. In 1647, the company renewed its grant for 25 years; but it was ſcarce able to hold out the term, on account of its great loſſes and expences in taking the bay of Todos los Santos, Fernambuc, and the greateſt part of Braſil, from the Portugueſe. The weakneſs of this company, which had ſeveral times in vain attempted to be joined to that of the Eaſt Indies, occaſioned its diſſolution at the expiration of its grant.

In 1674, a new company, compoſed of the ancient proprietors and their creditors, was ſettled in the ſame rights and eſtabliſhment with the former; and ſtill ſubſiſts, though conſiderably decayed. Their firſt capital was about ſix millions of florins. Its principal eſtabliſhments are, one at Cape Verd, another on the Gold Coaſt of Africa, at Tobago, Curaſſao, &c. in America.

II. French Companies. 1. Their *Eaſt India Company* was eſtabliſhed in 1664, with an excluſive privilege to trade for 50 years in all the ſeas of the Eaſt Indies and South ſea. No adventurer to be admitted without 1000 livres in ſtock; and foreigners who have 20,000 livres in ſtock to be reputed regnicoles.

The patent grants them the iſland of Madagaſcar; and the king to be at one-fifth of the expence of the three firſt armaments, without intereſt; the principal to be refunded in ten years; or, if the company find it loſes on the whole, the loſs to fall on the king's ſide.

The capital fund of the company, which was moſtly furniſhed by the king, was ſeven or eight millions of livres, but was to have been fifteen millions.

In effect, though no means were wanting to ſupport the company, yet it ſtill drooped and ſtill ſtruggled; till having ſubſiſted ten years without any change in its form, and being no longer able to diſcharge its engagements, there were new regulations concerted, but to little purpoſe. At length, things not being diſpoſed for a new Eaſt India Company, nor much good to be expected from the old one, in 1708 the miniſter allowed the directors to treat with the rich traders of St Malo, and reſign to them their privileges under certain conditions. In the hands of theſe laſt, the company began to flouriſh. See *India Company*, below.

Its chief factory was at Pondicherry, on the coaſt of Coromandel. This was the reſidence of the director-general. The other factories were inconſiderable. The merchandiſes which the company brought into France were, ſilks, cottons, ſpices, coffee, rice, ſaltpetre; ſeveral kinds of gums and drugs, woods, wax, printed calicoes, muſlins, &c.

2. Their *Weſt India Company* was eſtabliſhed in 1664. Their charter gave them the property and ſeignory of Canada, Acadia, the Antilles iſlands, iſle of Cayenne, and the Terra Firma of America, from the river of the Amazons to that of Oroonoko; with an excluſive privilege for the commerce of thoſe places, as alſo of Senegal and the coaſts of Guinea, for 40 years, only paying half the duties. The ſtock of the company was ſo conſiderable, that in leſs than ſix months 45 veſſels were equipped; with which they took poſſeſſion of all the places in their grant, and ſettled a commerce: yet this only ſubſiſted nine years. In 1674, the grant was revoked, and the countries above reunited to the king's dominions as before: the king reimburſing the actions of the adventurers. This revocation was owing partly to the poverty of the company, occaſioned by its loſſes in the wars with England, which had neceſſitated it to borrow above a million, and even to alienate its excluſive privilege for the coaſts of Guinea: and partly to its having in good meaſure anſwered its end: which was to recover the commerce of the Weſt Indies from the Dutch, who had torn it from them: for the French merchants, being now accuſtomed to traffic to the Antilles, by permiſſion of the company, were ſo attached to it, that it was not doubted they would ſupport the commerce after the diſſolution of the company.

3. Their *Miſſiſſippi Company* was firſt eſtabliſhed in 1684 in favour of the Chevalier de la Salle; who having projected it in 1660, and being appointed governor of the fort of Frontignac at the mouth of that river, travelled over the country in the year 1683, and returned to France to ſolicit the eſtabliſhment. This obtained, he ſet ſail for his new colony with four veſſels laden with inhabitants, &c. but entering the gulf of Mexico, he did not, it ſeems, know the river that had coſt him ſo much fatigue, but ſettled on another river unknown, where his colony periſhed by degrees; ſo that in 1685 there were not 100 perſons remaining. Making ſeveral expeditions to find the Miſ-

ſiſſippi, he was killed in one of them by a party who mutinied againſt him; whereupon the colony was diſperſed and loſt. M. Hiberville afterwards ſucceeded better. He found the Miſſiſſippi, built a fort, and ſettled a French colony there; but he being poiſoned, it is ſaid, by the intrigues of the Spaniards, who feared ſuch a neighbour, in 1712 M. Crozat had the whole property of trading to the French territories called *Louiſiana* granted him for 15 years.

4. *Company of the Weſt*. In 1717, the Sieur Crozat ſurrendered this grant; and in the ſame year a new company was erected under the title of *Company of the Weſt*: to which, beſides every thing granted to the former company, was added the commerce of beaver, enjoyed by the Canada company from the year 1706, but expiring in 1717. In this eſtabliſhment, an equal view was had to the finances and the commerce of the nation; and, accordingly, part of the conditions of its eſtabliſhment regarded the ſettling a colony, a trade, &c.; the other the vending part of the bills, called *bills of ſtate*, which could no longer ſubſiſt on their preſent footing. The former are no more than are uſual in ſuch eſtabliſhments: for the latter, the actions are fixed at 500 livres, each payable in bills of ſtate; the actions to be eſteemed as merchandiſe, and in that quality to be bought, ſold, and trafficked. The bills of ſtate, which make the fund of the actions, to be converted into yearly revenue. To put the finiſhing hand to the company, in 1717, its fund was fixed at an hundred millions of livres; which being filled, the caſh was ſhut up.

5. *India Company*. The junction of the former company with that of Canada was immediately followed by its union with that of Senegal, both in the year 1718, by an arret of council: which at the ſame time granted the new company the commerce of beavers, and made it miſtreſs of the negro or Guinea trade to the French colonies in America.

Nothing was now wanting to its perfection but an union with the Eaſt India company, and with thoſe of China and St Domingo; which was effected, with the two firſt in 1719, and with the third in 1720. This union of the Eaſt India and China company with the company of the Weſt, occaſioned an alteration of the name; and it was henceforth called the *India Company*.

The reaſons of the union were, the inability of the two former to carry on their commerce; the immenſe debts they had contracted in the Indies, eſpecially the Eaſt Company, complaints whereof had been ſent to court by the Indians, which diſcredited the company ſo that they durſt not appear any longer at Surat; the little care they took to diſcharge their engagements; and their having transferred their privilege to the private traders of St Malo, in conſideration of a tenth in the profits of the returns of their ſhips.

The ancient actions of the company of the Weſt, which were not at par when this engraftment was projected, before it was completed, were riſen to 300 per cent.; which unexpected ſucceſs gave occaſion to conclude the new actions of the united companies would not bear leſs credit. The concourſe of ſubſcribers was ſo great, that in a month's time there were above fifty millions ſubſcribed for; the firſt twenty-five million actions which were granted to the India company, beyond the hundred millions of ſtock allowed the company of the Weſt, being filled as ſoon as the books were opened; to ſatisfy the earneſtneſs of the ſubſcribers, the ſtock was increaſed by ſeveral arrets to three hundred millions. Credit ſtill increaſing, the new actions roſe to 1200 per cent. and thoſe of the ancient company of the Weſt to 1900 per cent.; an exorbitant price, to which no other company ever roſe. Its condition was now ſo flouriſhing, that in 1719 it offered the king to take a leaſe of all his farms for nine years at the rate of three millions five hundred thouſand livres per annum more than had been given before; and alſo to lend his majeſty twelve hundred millions of livres to pay the debts of the ſtate. Theſe offers were accepted; and the king, in conſideration hereof, granted them all the privileges of the ſeveral grants of the companies united to that company to the year 1770; on condition, however, of diſcharging all the debts of the Old Eaſt India Company, without any deduction at all. The loan of twelve hundred millions not being ſufficient for the occaſion of the ſtate, was augmented, three months afterwards, with three hundred millions more; which, with the former loan, and another of one hundred millions before, made ſixteen hundred millions, for which the king was to pay intereſt at the rate of three per cent.

The duke of Orleans, in February 1720, did the company the honour to preſide in their aſſembly, where he made ſeveral propoſals to them on the part of the king: the principal of theſe was, that they ſhould take on them the charge and adminiſtration of the royal bank. This was accepted of: and Mr Law, comptroller-general of the finances, was named by the king inſpector-general of the India Company and bank united.

This union, which, it was propoſed, ſhould have been a mutual help to both thoſe famous eſtabliſhments, proved the fatal point from whence the fall of both commenced: from this time, both the bank bills and the actions of the company began to fall. In effect, the firſt periſhed abſolutely, and the other had been drawn along with it but for the prudent precautions taken for its ſupport.

The firſt precaution was the revoking the office of inſpector-general, and the obliging Mr Law to quit the kingdom; the ancient directors were diſcarded, and new ones ſubſtituted; and to find the bottom of the company's affairs, it was ordered they ſhould give an account of what they had received and diſburſed, both on the account of the company and of the bank, which they had had the management of near a year. Another precaution to come at the ſtate of the company was, by endeavouring to diſtinguiſh the lawful actionaries from the Miſſiſſippi extortioners; whoſe immenſe riches, as well as their criminal addreſs in realizing their actions either into ſpecie or merchandiſe, were become ſo fatal to the ſtate, in order, if poſſible, to ſecure the honeſt adventurers in their ſtock. To this end, an inquiſition was made into their books, &c. by perſons appointed by the king; and the new directors, or as they were called, *regiſſeurs*, began ſeriouſly to look about for their commerce abroad. Their affairs, however, declined, and at length ſunk into a ruined and bankrupt ſtate about the year 1769. The king

king immediately ſuſpended their excluſive privileges, and laid the trade to the Eaſt open to all his ſubjects; conſigning, at the ſame time, the affairs of the company to the care of the miniſtry to adjuſt and ſettle. But the various ſchemes which were then formed for the reſtoration of the old company, and the eſtabliſhment of a new one, were accompanied with ſuch inſurmountable difficulties, as to prove wholly ineffectual. Nor was the laying open of the trade attended immediately with the ſucceſs that was expected; the merchants being very ſlow in engaging in it, though the king, by way of encouragement, lent them ſome of his own ſhips to convey their commodities to the Eaſt; and the garriſon and civil eſtabliſhments continued to be ſupported in their exiſting form by the crown. The meaſure, however, proved in time ſucceſsful; ſo that for a courſe of years previous to 1785, the annual importation from India was conſiderably greater than during any former period. But whether it was that they regarded this proſperity as precarious; or aimed at a more extenſive ſucceſs; or that they wiſhed, in imitation of Britain, for territorial acquiſitions in that climate, and believed an incorporated ſociety the beſt inſtrument of obtaining them; the French court was induced to liſten to propoſals for eſtabliſhing a new Eaſt India Company. Their privilege was for ſeven years, with the ſpecial proviſo, that years of war which might occur in the interim ſhould be excluded from the computation.

In the preamble of the act of the 14th April 1785, by which the ſcheme was adopted, it was alleged, "that the commodities of Europe not having of late years been regulated by any common ſtandard, or proportioned to the demands of India, had on the one hand ſold at a low price; while, on the other, the competition of the ſubjects of France had raiſed the price of the objects of importation: that, upon their return home, a want of ſyſtem and aſſortment had been univerſally complained of, the market being overſtocked with one ſpecies of goods, and totally deſtitute of another; that theſe defects muſt neceſſarily continue as long as the trade remained in private hands; and that, on their account, as well as that of the capital required, the eſtabliſhment of a new company was abſolutely neceſſary.

Theſe reaſonings did not appear altogether ſatisfactory to the perſons principally intereſted. France has been ſo far enlightened by the diſcuſſions of the excellent writers ſhe has produced upon queſtions of politics and commerce, as not to be prepared to behold the introduction of monopolies with a very favourable eye. By many perſons it was remarked, that the arguments of the preamble did not apply more to the trade of India than to any other trade; and that, if they were admitted in their entire force, they were calculated to give a finiſhing blow to the freedom of commerce. The capital of the new company, which amounted to 830,000l. was ridiculed as altogether inadequate to the magnitude of the undertaking. The privileges with which it was indulged were treated as enormous. The monopoly of Eaſt India goods imported into France from any part of Europe, was granted to them for two years, as well as the monopoly of Eaſt India goods imported from the place of their growth. It was ſaid, that during that period they would fit out no adventures for India; that they hoped to obtain a prolongation of this injurious indulgence; and that, of conſequence, their incorporation was in reality a conſpiracy to prevent all future communication between France and the ſources of commerce in Aſia. A proviſion in the act, directing that the prices of Eaſt India goods in the iſlands of Mauritius and Bourbon ſhould be regulated by a tariff to be fixed by the court of Verſailles, excited ſtill louder exclamations. In this inſtance, it was ſaid, the firſt principles of commerce were trampled upon in a manner the moſt wanton and abſurd. Inſtead of ſuffering it to find its own level by the mutual colliſion of the wants of one party and the labour of another, it was arbitrarily to be faſhioned by a power whoſe extreme diſtance muſt neceſſarily render its deciſions ill-timed and inapplicable. The very mode in which the monopoly was introduced was a ſubject of complaint. It was determined by a reſolution of the king in council; a proceeding totally inadequate to the importance of the ſubject, and which was to be regarded as clandeſtine and ſurreptitious. In all former inſtances ſuch meaſures aſſumed the form of edicts, and were regiſtered in the parliaments. It was the prerogative of theſe courts to verify them; that is, to inquire into the facts which had led to their adoption. The injured parties had an opportunity of being heard before the privilege aſſumed the form of a law; not privately by the miniſters of the ſovereign, but publicly by the moſt conſiderable bodies in the kingdom, and in the face of the nation.

The act of council eſtabliſhing a new Eaſt India Company, was followed on the tenth of June by another declaration, intended ſtill farther to promote their intereſt; by which it was expreſsly forbidden to import cottons, printed linens, and muſlins, except through the medium of the company. The arret proceeds upon the ſame principles of monopoly as in the former inſtance. It ſets out indeed with a declaration, "that nothing can appear more deſirable to the king, or better accord with the ſentiments of his heart, than a general liberty, that freeing at once the circulation of commodities from every ſpecies of reſtraint, ſhould ſeem to make of all the people of the world but one nation with reſpect to commerce." But it adds, "that the period of this liberty is not yet arrived; that it muſt either be, with reſpect to the nations of Europe, unlimited and reciprocal, or that it cannot be admitted: that the revocation of the former indulgence reſpecting cottons and linens was become neceſſary on account of the opportunities it created for contraband trade; and becauſe the competition of the Eaſt India Company and private traders would occaſion a ſurplus in the market, and the admiſſion of foreign manufactures would decreaſe and annihilate the national induſtry."

The proviſions that were made for carrying this law into effect were conſidered as unjuſt and ſevere. The merchants poſſeſſing any of the prohibited commodities were allowed twelve months to diſpoſe of them; but upon the expreſs condition, that the commodities were to bear a ſtamp, importing that they were vendible only to a certain period; a circumſtance that muſt neceſſarily depreciate their value. It was alſo enacted, that the houſe of any trader might be entered by day

or by night, at the ſolicitation of the directors, to ſearch for prohibited goods, which were to be confiſcated to the uſe of the company. Theſe kinds of viſits of the officers of revenue, hitherto unauthorized in France, were repreſented as peculiarly obnoxious, when they were made for the ſole benefit of a privileged monopoly.

Company, in military affairs, a ſmall body of foot, commanded by a captain, who has under him a lieutenant and enſign.

The number of ſentinels or private ſoldiers in a company is from 50 to 100; and a battalion or regiment conſiſts of 9, 10, or 11, ſuch companies, one of which is always grenadiers, and poſted on the right; next them ſtands the colonel's company, and on the left the light infantry company. Companies not incorporated into regiments are called *irregulars*, or *independent companies*.

Artillery Company. See Artillery.

Company of Ships, a fleet of merchantmen, who make a charter-party among themſelves; the principal conditions whereof uſually are, that certain veſſels ſhall be acknowledged admiral, vice-admiral, and rear-admiral; that ſuch and ſuch ſignals ſhall be obſerved; that thoſe which bear no guns ſhall pay ſo much per cent. of their cargo; and in caſe they be attacked, that what damages are ſuſtained ſhall be reimburſed by the company in general. In the Mediterranean ſuch companies are called *conſerves*.

COMPARATIVE anatomy, is that branch of anatomy which conſiders the ſecondary objects, or the bodies of other animals; ſerving for the more accurate diſtinctions of ſeveral parts, and ſupplying the defect of human ſubjects.

It is otherwiſe called *the anatomy of beaſts*, and ſometimes *zootomy*; and ſtands in contradiſtinction to human anatomy, or that branch of the art which conſiders the human body the primary object of anatomy. See Anatomy.

Comparative Degree, among grammarians, that between the poſitive and ſuperlative degrees, expreſſive of any particular quality above or below the level of another.

COMPARISON, in a general ſenſe, the conſideration of the relation between two perſons or things, when oppoſed to each other, by which we judge of their agreement or difference.

Comparison of Ideas, an act of the mind, whereby it compares its ideas one with another, in reſpect of extent, degree, time, place, or any other circumſtances. See Idea.

Brutes ſeem not to have this faculty in any great degree: they have, probably, ſeveral ideas diſtinct enough; but cannot compare them farther than as to ſome ſenſible circumſtances annexed to the objects themſelves; the power of comparing general ideas, which we obſerve in men, we may probably conjecture they have not at all.

Comparison, in *Grammar*, the inflection of the comparative degree. See Grammar.

Comparison, in *Rhetoric*, is a figure whereby two things are conſidered with regard to ſome third, which is common to them both.

Inſtruction is the principal, but not the only end of compariſon. It may be employed with ſucceſs in putting a ſubject in a ſtrong point of view. A lively idea is formed of a man's courage by likening it to that of a lion; and eloquence is exalted in our imagination by comparing it to a river overflowing its banks, and involving all in its impetuous courſe. The ſame effect is produced by contraſt: a man in proſperity becomes more ſenſible of his happineſs, by comparing his condition with that of a perſon in want of bread. Thus compariſon is ſubſervient to poetry as well as to philoſophy.

Compariſons ſerve two purpoſes: when addreſſed to the underſtanding, their purpoſe is to inſtruct; when to the heart, their purpoſe is to pleaſe. Various means contribute to the latter: 1ſt, The ſuggeſting ſome unuſual reſemblance or contraſt *; 2d, The ſetting an object in the ſtrongeſt light; 3d, The aſſociating an object with others that are agreeable; 4th, The elevating an object; and 5th, The depreſſing it. And that compariſons may give pleaſure by theſe various means, will be made evident by examples which ſhall be given, after premiſing ſome general obſervations.

* See the article Resemblance *and Diſſimilitude*.

Objects of different ſenſes cannot be compared together; for ſuch objects are totally ſeparated from each other, and have no circumſtance in common to admit either reſemblance or contraſt. Objects of hearing may be compared together, as alſo of taſte, of ſmell, and of touch; but the chief fund of compariſon are objects of ſight; becauſe in writing or ſpeaking, things can only be compared in idea, and the ideas of ſight are more diſtinct and lively than thoſe of any other ſenſe.

When a nation emerging out of barbarity begins to think of the fine arts, the beauties of language cannot long lie concealed; and when diſcovered, they are generally, by the force of novelty, carried beyond all bounds of moderation. Thus, in the earlieſt poems of every nation, we find metaphors and ſimiles founded on the ſlighteſt and moſt diſtant reſemblances, which, loſing their grace with their novelty, wear gradually out of repute; and now, by the improvement of taſte, no metaphor nor ſimile is admitted into any polite compoſition but of the moſt ſtriking kind. To illuſtrate this obſervation, a ſpecimen ſhall be given afterward of ſuch metaphors as we have been deſcribing: with reſpect to ſimiles take the following ſpecimen:

> "Behold, thou art fair, my love: thy hair is as
> "a flock of goats that appear from Mount Gilead:
> "thy teeth are like a flock of ſheep from the waſhing,
> "every one bearing twins: thy lips are like
> "a thread of ſcarlet: thy neck like the tower of
> "David built for an armoury, whereon hang a
> "thouſand ſhields of mighty men: thy two breaſts
> "like two young roes that are twins, which feed
> "among the lilies: thy eyes like the fiſh-pools in
> "Heſbon, by the gate of Bath-rabbim: thy noſe
> "like the tower of Lebanon, looking toward Da-
> "maſcus." *Song of Solomon.*

> "Thou art like ſnow on the heath; thy hair like
> "the miſt of Cromla, when it curls on the rocks
> "and ſhines to the beam of the weſt: thy breaſts
> "are

"are like two fmooth rocks feen from Branno of
"the ftreams: thy arms like two white pillars in
"the hall of the mighty Fingal." *Fingal.*

It has no good effect to compare things by way of fimile that are of the fame kind; nor to contraft things of different kinds. The reafon is given in the article above cited on the margin, and fhall be here illuftrated by examples. The firft is a comparifon built upon a refemblance fo obvious as to make little or no impreffion. Speaking of the fallen angels fearching for mines of gold:

A numerous brigade haften'd: as when bands
Of pioneers with fpade and pickaxe arm'd,
Forerun the royal camp to trench a field
Or caft a rampart. *Milton.*

The next is of things contrafted that are of different kinds.

Queen. What, is my Richard both in fhape and mind
Transform'd and weak? Hath Bolingbroke depos'd
Thine intellect? Hath he been in thy heart?
The lion, dying, thrufteth forth his paw,
And wounds the earth, if nothing elfe, with rage
To be o'erpower'd: and wilt thou, pupil like,
Take thy correction mildly, kifs the rod,
And fawn on rage with bafe humility?
Richard II. Act v. fc. 1.

This comparifon has fcarce any force: a man and a lion are of different fpecies, and therefore are proper fubjects for a fimile; but there is no fuch refemblance between them in general, as to produce any ftrong effect by contrafting particular attributes or circumftances.

A third general obfervation is, That abftract terms can never be the fubject of comparifon, otherwife than by being perfonified. Shakefpeare compares adverfity to a toad, and flander to the bite of a crocodile; but in fuch comparifons thefe abftract terms muft be imagined fenfible beings.

To have a juft notion of comparifons, they muft be diftinguifhed into two kinds; one common and familiar, as where a man is compared to a lion in courage, or to a horfe in fpeed; the other more diftant and refined, where two things that have in themfelves no refemblance or oppofition, are compared with refpect to their effects. There is no refemblance between a flower-pot and a cheerful fong; and yet they may be compared with refpect to their effects, the emotions they produce in the mind being extremely fimilar. There is as little refemblance between fraternal concord and precious ointment; and yet obferve how fuccefsfully they are compared with refpect to the impreffions they make.

"Behold, how good and how pleafant it is for
"brethren to dwell together in unity. It is like
"the precious ointment upon the head, that ran
"down upon Aaron's beard, and defcended to the
"fkirts of his garment." *Pfalm* 133.

For illuftrating this fort of comparifon, we fhall add fome more examples:

"Delightful is thy prefence, O Fingal! it is like
"the fun on Cromla, when the hunter mourns his
"abfence for a feafon, and fees him between the
"clouds.

"Did not Offian hear a voice? or is it the found
"of days that are no more? Often, like the evening
"fun, comes the memory of former times on my
"foul.

"His countenance is fettled from war; and is
"calm as the evening-beam, that from the cloud of
"the weft looks on Cona's filent vale." *Fingal.*

We now proceed to illuftrate, by particular inftances, the different means by which comparifons, whether of the one fort or the other, can afford pleafure; and, in the order above eftablifhed, we fhall begin with fuch inftances as are agreeable, by fuggefting fome unufual refemblance or contraft.

Sweet are the ufes of Adverfity,
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in her head.
As you like it, Act ii. fc. 1.

See, how the morning opes her golden gates,
And takes her farewel of the glorious fun;
How well refembles it the prime of youth,
Trimm'd like a yonker prancing to his love.
Second Part Henry VI. Act ii. fc. 1.

Thus they their doubtful confultations dark
Ended, rejoicing in their matchlefs chief:
As when from mountain tops, the dufky clouds
Afcending, while the North-wind fleeps, o'erfpread
Heav'n's cheerful face, the lowering element
Scowls o'er the darken'd landfcape, fnow, and fhower;
If chance the radiant fun with farewel fweet
Extends his ev'ning-beam, the fields revive,
The birds their notes renew, and bleating herds
Atteft their joy, that hill and valley rings.
Paradife Loft, Book ii.

None of the foregoing fimiles tend to illuftrate the principal fubject, and therefore the chief pleafure they afford muft arife from fuggefting refemblances that are not obvious; for undoubtedly a beautiful fubject introduced to form the fimile affords a feparate pleafure, which is felt in the fimiles mentioned, particularly in that cited from Milton.

The next effect of a comparifon in the order mentioned, is to place an object in a ftrong point of view; which effect is remarkable in the following fimiles.

As when two fcales are charg'd with doubtful loads,
From fide to fide the trembling balance nods,
(While fome laborious matron, juft and poor,
With nice exactnefs weighs her woolly ftore),
Till pois'd aloft, the refting beam fufpends
Each equal weight; nor this nor that defcends;
So ftood the war, till Hector's matchlefs might,
With fates prevailing, turn'd the fcale of fight.
Fierce as a whirlwind up the wall he flies,
And fires his holt with loud repeated cries.
Iliad, Book xii. 521.

——— She never told her love;
But let concealment, like a worm i' th' bud,

Compari-ſon.

Feed on her damaſk cheek: ſhe pin'd in thought;
And with a green and yellow melancholy,
She ſat like Patience on a monument,
Smiling at grief. *Twelfth Night*, Act. ii. ſc. 6.

" There is a joy in grief when peace dwells with " the ſorrowful. But they are waſted with mourn- " ing, O daughter of Toſcar, and their days are " few. They fall away like the flower on which " the ſun looks in his ſtrength, after the mildew has " paſſed over it, and its head is heavy with the drops " of night." *Fingal.*

——— Out, out, brief candle!
Life's but a walking ſhadow, a poor player,
That ſtruts and frets his hour upon the ſtage,
And then is heard no more.
Macbeth, Act v. ſc. 5.

O thou goodneſs,
Thou divine nature! how thyſelf thou blazon'ſt
In theſe two princely boys! they are as gentle
As zephyrs blowing below the violet,
Not wagging his ſweet head; and yet as rough
(Their royal blood inchaf'd) as the rudeſt wind,
That by the top doth take the mountain-pine,
And make him ſtoop to the vale.
Cymbeline, Act iv. ſc. 4.

" Why did not I paſs away in ſecret, like the " flower of the rock that lifts its fair head unſeen, " and ſtrows its withered leaves on the blaſt?"
Fingal.

As words convey but a faint and obſcure notion of great numbers, a poet, to give a lively notion of the object he deſcribes with regard to number, does well to compare it to what is familiar and commonly known. Thus Homer compares the Grecian army in point of number to a ſwarm of bees; in another paſſage he compares it to that profuſion of leaves and flowers which appear in the ſpring, or of inſects in a ſummer's evening: And Milton,

——— As when the potent rod
Of Amram's ſon in Egypt's evil day
Wav'd round the coaſt, up call'd a pitchy cloud
Of locuſts, warping on the eaſtern wind,
That o'er the realm of impious Pharaoh hung
Like night, and darken'd all the land of Nile;
So numberleſs were thoſe bad angels ſeen,
Hov'ring on wing under the cope of hell,
'Twixt upper, nether, and ſurrounding fires.
Paradiſe Loſt, Book i.

Such compariſons have, by ſome writers, been condemned for the lowneſs of the images introduced, but ſurely without reaſon; for, with regard to numbers, they put the principal ſubject in a ſtrong light.

The foregoing compariſons operate by reſemblance; others have the ſame effect by contraſt.

York. I am the laſt of noble Edward's ſons,
Of whom thy father, prince of Wales, was firſt;
In war, was never lion rag'd more fierce;
In peace, was never gentle lamb more mild,
Than was that young and princely gentleman.
His face thou haſt, for even ſo look'd he,
Accompliſh'd with the number of thy hours,
But when he frown'd, it was againſt the French,
And not againſt his friends. His noble hand
Did win what he did ſpend; and ſpent not that
Which his triumphant father's hand had won.
His hands were guilty of no kindred's blood,
But bloody with the enemies of his kin.
Oh Richard, York is too far gone with grief,
Or elſe he never would compare between.
Richard II. Act ii. ſc. 3.

Milton has a peculiar talent in embelliſhing the principal ſubject, by aſſociating it with others that are agreeable; which is the third end of a compariſon. Similes of this kind have, beſide, a ſeparate effect: they diverſify the narration by new images that are not ſtrictly neceſſary to the compariſon; they are ſhort epiſodes, which, without drawing us from the principal ſubject, afford great delight by their beauty and variety.

He ſcarce had ceas'd, when the ſuperior fiend
Was moving toward the ſhore; his pond'rous ſhield,
Ethereal temper, maſſy, large, and round,
Behind him caſt: the broad circumference
Hung on his ſhoulders like the moon, whoſe orb
Through optic glaſs the Tuſcan artiſt views
At evening from the top of Feſole.
Or in Valdarno, to deſcry new lands,
Rivers, or mountains, in her ſpotty globe.
Milton, Book i.

——— Thus far theſe beyond
Compare of mortal prowefs, yet obſerv'd
Their dread commander. He, above the reſt,
In ſhape and ſtature proudly eminent,
Stood like a tow'r; his form had not yet loſt
All her original brightneſs, nor appear'd
Leſs than archangel ruin'd, and th' exceſs
Of glory obſcur'd: as when the ſun new-riſen
Looks through the horizontal miſty air
Shorn of his beams; or, from behind the moon,
In dim eclipſe, diſaſtrous twilight ſheds
On half the nations, and with fear of change
Perplexes monarchs. *Milton*, Book i.

As when a vulture on Imaus bred,
Whoſe ſnowy ridge the roving Tartar bounds,
Diſlodging from a region ſcarce of prey
To gorge the fleſh of lambs, or yeanling kids,
On hills where flocks are fed, flies toward the ſprings
Of Ganges or Hydaſpes, Indian ſtreams,
But in his way lights on the barren plains
Of Sericana, where Chineſes drive
With ſails and wind their cany waggons light:
So on this windy ſea of land, the fiend
Walk'd up and down alone, bent on his prey.
Milton, Book iii.

Next of compariſons that aggrandiſe or elevate. Theſe affect us more than any other ſort; the reaſon of which will be evident from the following inſtances:

As when a flame the winding valley fills,
And runs on crackling ſhrubs between the hills,
Then o'er the ſtubble up the mountain flies,
Fires the high woods, and blazes to the ſkies,

This

Compari-
son.

This way and that, the ſpreading torrent roars;
So ſweeps the hero through the waſted ſhores.
Around him wide, immenſe deſtruction pours,
And earth is delug'd with the ſanguine ſhow'rs.
Iliad, xx. 569.

Methinks, King Richard and myſelf ſhould meet
With no leſs terror than the elements
Of fire and water, when their thund'ring ſhock,
At meeting, tears the cloudy cheeks of heaven.
Richard II. Act iii. ſc. 5.

"As ruſheth a foamy ſtream from the dark ſhady
"ſteep of Cromla, when thunder is rolling above, and
"dark brown night reſts on the hill; ſo fierce, ſo vaſt,
"ſo terrible, ruſh forward the ſons of Erin. The
"chief, like a whale of ocean followed by all its bil-
"lows, pours valour forth as a ſtream, rolling its might
"along the ſhore." *Fingal*, Book i.

"As roll a thouſand waves to a rock, ſo Swaran's
"hoſt came on; as meets a rock a thouſand waves, ſo
"Inisfail met Swaran." *Ibid.*

The laſt article mentioned, is that of leſſening or depreſſing a hated or diſagreeable object; which is effectually done by reſembling it to any thing low or deſpicable.

Thus Milton, in his deſcription of the rout of the rebel-angels, happily expreſſes their terror and diſmay in the following ſimile:

——————As a herd
Of goats or timorous flock together throng'd,
Drove them before him thunder-ſtruck, purſu'd
With terrors and with furies to the bounds
And cryſtal wall of heav'n, which op'ning wide,
Roll'd inward, and a ſpacious gap diſclos'd
Into the waſteful deep; the monſtrous ſight
Struck them with horror backward, but far worſe
Urg'd them behind; headlong themſelves they threw
Down from the verge of heav'n. *Milton*, Book vi.

By this time the different purpoſes of compariſon, and the various impreſſions it makes on the mind, are ſufficiently illuſtrated by proper examples. This was an eaſy work. It is more difficult to lay down rules about the propriety or impropriety of compariſons; in what circumſtances they may be introduced, and in what circumſtances they are out of place. It is evident, that a compariſon is not proper upon every occaſion; a man in his cool and ſedate moments is not diſpoſed to poetical flights, nor to ſacrifice truth and reality to the deluſive operations of the imagination; far leſs is he ſo diſpoſed when oppreſſed with care, or intereſted in ſome important tranſaction that occupies him totally. On the other hand it is obſerved, that a man when elevated or animated by any paſſion, is diſpoſed to elevate or animate all his ſubjects; he avoids familiar names, exalts objects by circumlocution and metaphor, and gives even life and voluntary action to inanimate beings. In this warmth of mind, the higheſt poetical flights are indulged, and the boldeſt ſimiles and metaphors reliſhed. But without ſoaring ſo high, the mind is frequently in a tone to reliſh chaſte and moderate ornament; ſuch as compariſons that ſet the principal object in a ſtrong point of view, or that embelliſh and diverſify the narration. In general, when by any animating paſſion, whether pleaſant or painful, an impulſe is given to the imagination; we are in that condition diſpoſed to every ſort of figurative expreſſion, and in particular to compariſons. This in a great meaſure is evident from the compariſons already mentioned; and ſhall be further illuſtrated by other inſtances. Love, for example, in its infancy, rouſing the imagination, prompts the heart to diſplay itſelf in figurative language, and in ſimiles:

Troilus. Tell me, Apollo, for thy Daphne's love,
What Creſſida is, what Pandar, and what we?
Her bed is India, there ſhe lies a pearl:
Between our Ilium and where ſhe reſides,
Let it be call'd the wild and wand'ring flood;
Ourſelf the merchant, and this ſailing Pandar
Our doubtful hope, our convoy, and our bark.
Troilus and Creſſida, Act i. ſc. 1.

Again:

Come, gentle night; come, loving black-brow'd night!
Give me my Romeo: and when he ſhall die,
Take him and cut him out in little ſtars,
And he will make the face of heav'n ſo fine,
That all the world ſhall be in love with night,
And pay no worſhip to the gariſh ſun.
Romeo and Juliet, Act iii. ſc. 4.

But it will be a better illuſtration of the preſent head, to give examples where compariſons are improperly introduced. Similes are not the language of a man in his ordinary ſtate of mind, diſpatching his daily and uſual work: for that reaſon the following ſpeech of a gardener to his ſervant is extremely improper:

Go, bind thou up yon dangling apricots,
Which, like unruly children make their ſire
Stoop with oppreſſion of their prodigal weight:
Give ſome ſupportances to the bending twigs.
Go thou, and, like an executioner,
Cut off the heads of two faſt growing ſprays,
That look too lofty in our commonwealth:
All muſt be even in our government.
Richard II. Act iii. ſc. 7.

The fertility of Shakeſpeare's vein betrays him frequently into this error.

Rooted grief, deep anguiſh, terror, remorſe, deſpair, and all the ſevere diſpiriting paſſions, are declared enemies, perhaps not to figurative language in general, but undoubtedly to the pomp and ſolemnity of compariſon. Upon this account, the ſimile pronounced by young Rutland, under terror of death from an inveterate enemy, and praying mercy, is unnatural:

So looks the pent-up lion o'er the wretch
That trembles under his devouring paws;
And ſo he walks inſulting o'er his prey,
And ſo he comes to rend his limbs aſunder.
Ah, gentle Clifford, kill me with thy ſword,
And not with ſuch a cruel threat'ning look.
Third Part Henry VI. Act i. ſc. 5.

A man ſpent and diſpirited after loſing a battle is not diſpoſed to heighten or illuſtrate his diſcourſe by ſimiles.

York. With this we charg'd again: but out! alas,
We bodg'd again; as I have feen a fwan
With bootlefs labour fwim againft the tide,
And fpend her ftrength with over-matching waves.
Ah! hark, the fatal followers do purfue,
And I am faint and cannot fly their fury.
The fands are number'd that make up my life;
Here muft I ftay, and here my life muft end.
Third Part Henry VI. Act i. fc. 6.

Similes thus unfeafonably introduced are finely ridiculed in the Rehearfal.

"*Bayes.* Now here fhe muft make a fimile.
"*Smith.* Where's the neceffity of that, Mr Bayes?
"*Bayes.* Becaufe fhe's furprifed; that's a general
"rule; you muft ever make a fimile when you are fur-
"prifed; 'tis a new way of writing."

A comparifon is not always faultlefs, even where it is properly introduced. A comparifon, like other human productions, may fall fhort of its end; of which defect inftances are not rare even among good writers: and to complete the prefent fubject, it will be neceffary to make fome obfervations upon fuch faulty comparifons. Nothing can be more erroneous than to inftitute a comparifon too faint: a diftant refemblance or contraft fatigues the mind with its obfcurity, inftead of amufing it; and tends not to fulfil any one end of a comparifon. The following fimiles feem to labour under this defect.

K. Rich. Give me the crown.—Here, coufin, feize the crown,
Here on this fide, my hand; on that fide, thine.
Now is this golden crown like a deep well,
That owes two buckets, filling one another;
The emptier ever dancing in the air,
The other down, unfeen, and full of water;
That bucket down, and full of tears, am I,
Drinking my griefs, whilft you mount up on high.
Richard II. Act iv. fc. 3.

K. John Oh! coufin, thou art come to fet mine eye;
The tackle of my heart is crack'd and burnt;
And all the fhrouds wherewith my life fhould fail,
Are turned to one thread, one little hair:
My heart hath one poor ftring to ftay it by,
Which holds but till thy news be uttered.
K. John, Act iv. fc. 10.

York. My uncles both are flain in refcuing me:
And all my followers to the eager foe
Turn back, and fly like fhips before the wind,
Or lambs purfu'd by hunger-ftarved wolves.
Third Part Henry VI. Act i. fc. 6.

The latter of the two fimiles is good: the former, becaufe of the faintnefs of the refemblance, produces no good effect, and crowds the narration with an ufelefs image.

In an epic poem, or in any elevated fubject, a writer ought to avoid raifing a fimile upon a low image, which never fails to bring down the principal fubject. In general, it is a rule, that a grand object ought never to be refembled to one that is diminutive, however delicate the refemblance may be: for it is the peculiar character of a grand object to fix the attention, and fwell the mind; in which ftate, it is difagreeable to contract the mind to a minute object, however elegant. The refembling an object to one that is greater, has, on the contrary, a good effect, by raifing or fwelling the mind; for one paffes with fatisfaction from a fmall to a great object; but cannot be drawn down, without reluctance, from great to fmall. Hence the following fimiles are faulty.

Meanwhile the troops beneath Patroclus' care,
Invade the Trojans, and commence the war.
As wafps, provok'd by children in their play,
Pour from their manfions by the broad highway,
In fwarms the guiltlefs traveller engage,
Whet all their ftings, and call forth all their rage;
All rife in arms, and with a general cry
Affert their waxen domes and buzzing progeny:
Thus from their tents the fervent legion fwarms,
So loud their clamours, and fo keen their arms.
Iliad, xvi. 312.

So burns the vengeful hornet (foul all o'er)
Repuls'd in vain, and thirfty ftill of gore;
(Bold fon of air and heat) on angry wings
Untam'd, untir'd he turns, attacks, and ftings.
Fir'd with like ardour, fierce Atrides flew,
And fent his foul with every lance he threw.
Iliad, xvii. 642.

An error oppofite to the former, is the introducing a refembling image, fo elevated or great as to bear no proportion to the principal fubject. Their remarkable difparity, being the moft ftriking circumftance, feizes the mind, and never fails to deprefs the principal fubject by contraft, inftead of raifing it by refemblance: and if the difparity be exceeding great, the fimile takes on an air of burlefque: nothing being more ridiculous than to force an object out of its proper rank in nature, by equalling it with one greatly fuperior or greatly inferior. This will be evident from the following comparifon.

Loud as a bull makes hill and valley ring,
So roar'd the lock when it releas'd the fpring.
Odyffey, xxi. 51.

Such a fimile upon the fimpleft of all actions, that of opening a lock, is pure burlefque.

A writer of delicacy will avoid drawing his comparifons from any image that is naufeous, ugly, or remarkably difagreeable; for however ftrong the refemblance may be, more will be loft than gained by fuch comparifon. Therefore we cannot help condemning, though with fome reluctancy, the following fimile, or rather metaphor.

O thou fond many! with what loud applaufe
Didft thou beat heaven with bleffing Bolingbroke
Before he was what thou would'ft have him be?
And now being trimm'd up in thine own defires,
Thou, beaftly feeder, are fo full of him,
That thou provok'ft thyfelf to caft him up.
And fo, thou common dog, didft thou difgorge
Thy glutton bofom of the royal Richard,
And now thou wouldft eat thy dead vomit up,
And howl'ft to find it.
Second Part Henry IV. Act 1. fc. 6.

The

Compari-fon.

The ſtrongeſt objection that can lie againſt a comparifon is, that it conſiſts in words only, not in ſenſe. Such falſe coin, or baſtard-wit, does extremely well in burleſque; but it is far below the dignity of the epic, or of any ſerious compoſition.

> The noble ſiſter of Poplicola,
> The moon of Rome; chaſte as the icicle
> That's curdl'd by the froſt from pureſt ſnow,
> And hangs on Dian's temple.
>
> *Coriolanus*, Act v. ſc. 3.

There is evidently no reſemblance between an icicle and a woman, chaſte or unchaſte: but chaſtity is cold in a metaphorical ſenſe; and an icicle is cold in a proper ſenſe; and this verbal reſemblance, in the hurry and glow of compoſing, has been thought a ſufficient foundation for the ſimile. Such phantom ſimiles are mere witticiſms, which ought to have no quarter, except where purpoſely introduced to provoke laughter. Lucian, in his diſſertation upon hiſtory, talking of a certain author, makes the following compariſon, which is verbal merely.

> "This author's deſcriptions are ſo cold, that they "ſurpaſs the Caſpian ſnow, and all the ice of the "north."

> ———But for their ſpirits and ſouls
> This word *rebellion* had froze them up
> As fiſh are in a pond.
>
> *Second Part Henry IV.* Act i. ſc. 3.

Pope has ſeveral ſimiles of the ſame ſtamp.

> And hence one maſter paſſion in the breaſt,
> Like Aaron's ſerpent, ſwallows up the reſt.
>
> *Epiſt.* ii. 131.

And again talking of this ſame ruling or maſter paſſion;

> Nature its mother, habit is its nurſe:
> Wit, ſpirit, faculties, but make it worſe;
> Reaſon itſelf but gives it edge and pow'r;
> As heaven's bleſt beam turns vinegar more ſour.
>
> *Ibid.* 145.

Where the ſubject is burleſque or ludicrous, ſuch ſimiles are far from being improper. Horace ſays pleaſantly,

> *Quanquam tu levior cortice.* Lib. iii. od. 9.

And Shakeſpeare.

> In breaking oaths he's ſtronger than Hercules.

And this leads to obſerve, that beſides the foregoing compariſons, which are all ſerious, there is a ſpecies, the end and purpoſe of which is to excite gaiety or mirth. Take the following examples.

Falſtaff ſpeaking to his page:

> "I do here walk before thee, like a ſow that hath "overwhelmed all her litter but one."
>
> *Second Part Henry IV.* Act i. ſc. 10.

> "I think he is not a pick-purſe, nor a horſe-"ſtealer; but for his verity in love, I do think him "as concave as a covered goblet, or a worm-eaten "nut." *As you like it*, Act iii. ſc. 10.

> This ſword a dagger had his page,
> That was but little for his age;
> And therefore waited on him ſo,
> As dwarfs upon knight-errants do.
>
> *Hudibras*, canto 1.

> "Books, like men, their authors, have but one way "of coming into the world; but there are ten thou-"ſand to go out of it, and return no more."
>
> *Tale of a Tub.*

> "The moſt accompliſhed way of uſing books at pre-"ſent is, to ſerve them as ſome do lords, learn their "*titles*, and then brag of their acquaintance."
>
> *Ibid.*

> "He does not conſider, that ſincerity in love is as "much out of faſhion as ſweet ſnuff; nobody takes it "now." *Careleſs Huſband.*

Compariſon ‖ Compaſs.

COMPARTITION, in *Architecture*, denotes the uſeful and graceful diſpoſition of the whole ground-plot of an edifice, into rooms of office, and of reception or entertainment.

COMPARTMENT, in general, is a deſign compoſed of ſeveral different figures, diſpoſed with ſymmetry, to adorn a parterre, a ceiling, &c.

A compartment of tiles or bricks, is an arrangement of them, of different colours, and varniſhed, for the decoration of a building. Compartments in gardening, are an aſſemblage of beds, plots, borders, walks, &c. diſpoſed in the moſt advantageous manner that the ground will admit of. Compartments in heraldry, are otherwiſe called *partitions*.

COMPASS, or *Mariner's Steering COMPASS*, is an inſtrument uſed at ſea by pilots to direct and aſcertain the courſe of their ſhips. It conſiſts of a circular braſs box, which contains a paper card with the 32 points of the compaſs, fixed on a magnetic needle that always turns to the north, excepting a ſmall declination variable at different places. See VARIATION.

The needle with the card turns on an upright pin fixed in the centre of the box. In the centre of the needle is fixed a braſs conical ſocket or cap, whereby the card hanging on the pin turns freely round the centre.

The top of the box is covered with a glaſs that the card's motion may not be diſturbed by the wind. The whole is encloſed in another box of wood, where it is ſuſpended by braſs hoops or gimbals, to preſerve the card horizontal. The compaſs-box is to be ſo placed in the ſhip, that the middle ſection of the box, parallel to its ſides, may be parallel to the middle ſection of the ſhip along its keel.

The compaſs being of the utmoſt conſequence to navigation, it is reaſonable to expect that the greateſt attention ſhould be paid to its conſtruction, and every attempt to improve it carefully examined, and if proper, adopted. But ſo careleſs are the generality of commanders of this moſt uſeful inſtrument, that almoſt all the compaſſes uſed on board merchant-ſhips have their needles formed of two pieces of ſteel wire, each of which is bent in the middle, ſo as to form an obtuſe angle; and their ends being applied together, make an acute one; ſo that the whole repreſents the form of a lozenge; in the centre of which, and of the cards, is placed the braſs cap. Now, if we examine

mine a number of thefe cards, we fhall rarely, if ever, find them all in the fame direction, but they will all vary more or lefs, not only with regard to the true direction, but from one another.

Thefe irregularities are owing to the ftructure of the needle; for the wires of which it is compofed are only hardened at the ends; now, if thefe ends are not equally hard, or if one end be hardened up higher than the other, when they come to be put together, in fixing them to the card, that end which is hardeft will deftroy much of the virtue of the other; by which means the hardeft end will have the moft power in directing the card, and confequently make it vary towards its own direction: and, as the wires are difpofed in the form of a lozenge, thefe cards can have but little force, fo that they will often, when drawn afide, ftand at the diftance of feveral degrees on either fide the point from whence they are drawn: for all magnetical bodies receive an additional ftrength by being placed in the direction of the earth's magnetifm, and act proportionably lefs vigoroufly when turned out of it; wherefore, when thefe kind of needles are drawn afide from their true point, two of the parallel fides of the lozenge will confpire, more directly than before, with the earth's magnetifm; and the other two will be lefs in that direction; by which means the two fides will very much impede its return; and the two latter will have that impediment to overcome, as well as the friction, by their own force alone.

To remove thefe inconveniences, fome needles are made of one piece of fteel of a fpring temper, and broad towards the ends, but tapering towards the middle, where a hole is made to receive the cap. At the ends they terminate in an angle, greater or lefs according to the fkill or fancy of the workman. Thefe needles, though infinitely preferable to the other, are, however, far from being perfect; for every needle of this form hath fix poles inftead of two, one at each end, two where it becomes tapering, and two at the hole in the middle: this is owing to their fhape; for the middle part being very flender, it has not fubftance enough to conduct the magnetic ftream quite through from one end to the other: all thefe poles appear very diftinctly, when examined with a glafs that is fprinkled over with magnetic fand. This circumftance, however, does not hinder the needle from pointing true; but as it has lefs force to move the card than when the magnetic ftream moves in large curves from one end to the other, it is certainly an imperfection.

Thefe inconveniences induced the ingenious Dr Knight to contrive a new fea-compafs, which came into ufe on board all the fhips of war. The needle in this inftrument is quite ftraight, and fquare at the ends; and confequently has only two poles, though about the hole in the middle the curves are a little confufed. Needles of this conftruction, after vibrating a long time, will always point exactly in the fame direction; and if drawn ever fo little on one fide, will return to it again, without any fenfible difference. We may therefore conclude, that a regular parallelopiped is the beft form for a needle, as well as the fimpleft, the holes for the caps being as fmall as poffible.

And as the weight fhould be removed to the greateft diftance from the centre of motion, a circle of brafs, of the fame diameter of the card, may be added, which will ferve alfo to fupport the card, which may then be made of thin paper, without any thing to ftiffen it. This ring being fixed below the card, and the needle above it, the centre of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unneceffary.

The above obfervations will be eafily underftood from viewing the feveral parts of the inftrument as reprefented on Plate CL. where fig. 6. is the card with the needle KL, and its cap M, fixed upon it, being one-third of the diameter of the real card. Fig. 8. is a perfpective view of the backfide of the card, where AB reprefents the turning down of the brafs edge, C the under part of the cap, D and E two fliding weights to balance the card, and F, G, two fcrews that fix the brafs edge, &c. to the needle. Fig. 7. is the pedeftal that fupports the card, containing a fcrewing needle, fixed in two fmall grooves to receive it, by means of the collet C, in the manner of a port-crayon. D, the ftem, is filed into an octagon, that it may be the more eafily unfcrewed. For its further illuftration and application to ufe, fee NAVIGATION.

The invention of the compafs is ufually afcribed to Flavio da Melfi, or Flavio Gioia, a Neapolitan, about the year 1302; and hence it is, that the territory of Principato, which makes part of the kingdom of Naples, where he was born, has a compafs for its arms. Others fay that Marcus Paulus, a Venetian, making a journey to China, brought back the invention with him in 1260. What confirms this conjecture is, that at firft they ufed the compafs in the fame manner as the Chinefe ftill do; i. e. they let it float on a little piece of cork, inftead of fufpending it on a pivot. It is added, that their emperor Chiningus, a celebrated aftrologer, had a knowledge of it 1120 years before Chrift. The Chinefe only divide their compafs into 24 points. Fauchette relates fome verfes of Guoyot de Provence, who lived in France about the year 1200, which feem to make mention of the compafs under the name of *marinette*, or *mariner's ftone;* which fhow it to have been ufed in France near 100 years before either the Melfite or Venetian. The French even lay claim to the invention, from the *fleur de lys* wherewith all nations ftill diftinguifh the north point of the card. With as much reafon Dr Wallis afcribes it to the Englifh, from its name *compafs*, by which name moft nations call it, and which he obferves is ufed in many parts of England to fignify a circle.

Though the mariner's compafs has been long in ufe, the beft conftruction of it was attended with many inconveniences, till the improvements which it received from the invention and experiments of Dr Knight, and the farther emendation of Mr Smeaton.

The compafs is fometimes obferved to be difturbed by the electricity of its glafs cover; and this from fo flight an application of the finger as was barely neceffary to wipe off a little duft. The fame glafs, rubbed a little more with the finger, a bit of muflin, or paper, would attract either end of the needle fo as to hold it to the glafs for feveral minutes, far out of

of the due direction, according to that part of the glaſs which was moſt excited. And when the needle, after adhering to the glaſs, has dropped looſe, and made vibrations, thoſe would not be biſected as uſual by that point where the needle ſhould reſt, but would either be made all on one ſide, or be very unequally divided, by means of ſome remains of electrical virtue in that part of the glaſs which had attracted the needle, until at length, after 15 minutes or more, all the electricity being diſcharged, the magnetical power took place. The remedy for this inconvenience is to moiſten the ſurface of the glaſs; a wet finger will do it immediately and effectually. The mariner's compaſs with a chart is much leſs dangerouſly moved than the common compaſs with a bare needle; and the deeper, or farther diſtant, the needle hangs below the glaſs, the leſs diſturbance it is likely to receive.

Improved ſea-compaſſes have lately been conſtructed by Mr M'Culloch of London, for which he obtained a patent. The particulars are as follows.

Plate CLI. fig. 1.

Fig. 1. is a ſection of the ſteering compaſs. *a a a a a*, The common wooden box, with its lid. *b b*, The braſs compaſs-box. *c c*, The glaſs cover to ditto. *d d*, The hollow conical bottom. *e*, The prop upon which the compaſs is ſupported inſtead of gimbals; the ſpherical top of which is finely poliſhed, and the apex of the hollow cone is fitted in a peculiar manner to receive it. *f f*, A quantity of lead run round the bottom and cone of the compaſs-box, to balance and keep it ſteadily horizontal. *g g*, The card and the magnetical needle, bent in ſuch a manner that the point of the conical pivot on which it moves and is ſupported, may be brought very near to the centre of gravity, as well as to the centre of motion. *h h*, Two guards, which by means of two pins *i i*, affixed to the compaſs-box, prevent it from turning round and deceiving the ſteerſman.

Fig. 2.

Fig. 2. a perſpective view of the ſteering compaſs, with the lid off and the front laid open. *h h*, The guards. *b*, The compaſs-box. *e*, The prop, &c. as in fig. 1.

Fig. 3.

Fig. 3. a view of the azimuth compaſs. *b*, The compaſs-box. *h*, One of the guards. *e*, The prop, as in fig. 1. and 2, with this difference, that in an azimuth compaſs, inſtead of being ſcrewed to the bottom of the wood-box, it ſtands in a braſs ſocket, and may be turned round at pleaſure. 1. A braſs bar upon which the ſight-vanes are fixed. 2. A dark glaſs, which moves up and down on 3, the ſight-vane. 4. A magnifying glaſs, which is alſo moveable on the other vane. 5. The nonius or vernier. 6. A ſlide for moving the vernier ſo as to ſtop the card in taking the azimuth. 7. A double convex-glaſs, by which the diviſion on the vernier may be read with accuracy.

Fig. 4.

Fig. 4. is a ſection repreſenting another application of the magnetic needle and card, conſtructed by Mr M'Culloch. *a a a a*, The common wood-box. *b b*, The braſs compaſs-box. *c c*, The braſs ſupport for the circle and pendulum. *d*, The pendulum. *e*, The agate. *f f*, The magnetic needle and card. *g g*, The braſs circle. *h h*, The glaſs cover and braſs ring. *i*, The lead weight. *N. B.* All the centres of motion are in the ſame plane.

"In one particular this patent compaſs is conſidered as an improvement on the common compaſſes, in as far as the needle is both longer and broader; hence its magnetiſm muſt be ſtronger, and of courſe the line of its magnetic direction correſpondent with the card. In another particular, in order to prevent the motions of the veſſel from affecting the needle, which is the moſt deſirable object, the patent compaſs-box, inſtead of ſwinging in gimbals at right angles to each other, is ſupported in its very centre upon a prop; and whatever motion the other parts of the box may have, this centre being in the vertex of the hollow cone, may be conſidered as relatively at reſt; and therefore gives little or no diſturbance to the needle. Again, the pivot or centre upon which the needle turns, is ſo contrived as to ſtand always perpendicular over the centre of the compaſs-box, or apex of the hollow cone, as upon a fixed point; and is therefore ſtill leſs affected by the motions of the veſſel. Thus the centres of motion, gravity, and of magnetiſm, are brought almoſt all to the ſame point; the advantages of which will be readily perceived by any perſon acquainted with mechanical principles." *M'Culloch's Account.*

The following is a deſcription of Dr Knight's azimuth compaſs, with the improvements of Mr Smeaton. Plate CLI. fig. 6. is a perſpective view of the compaſs, when in order for obſervation; the point of view being the centre of the card, and the diſtance of the eye two feet. AB is the wooden box. C and D are two milled nuts; by means whereof the axes of the inner box and ring are taken from their edges on which they move, and the friction increaſed, when neceſſary. EF is the ring that ſupports the inner box. GH is the inner box; and I is one of its axes, by which it is ſuſpended on the ring EF. The magnet or needle appears paſſing through the centre together with a ſmall brace of ivory, that confines the cap to its place. The card is a ſingle varniſhed paper, reaching as far as the outer circle of figures, which is a circle of thin braſs; the edge whereof is turned down at right angles to the plane of the card, to make it grow ſtiff. O is a catgut line, drawn down the inſide of the box, for determining the degree upon a braſs edge. PQRS. is the index bar, with its two ſtiles and catgut threads; which being taken off from the top of the box, is placed in two pieces, T and V, notched properly to receive it. W is a place cut out in the wood, ſerving as a handle.

The uſe of the azimuth compaſs is for finding the ſun's magnetical azimuth, or amplitude; and thence the variation of the compaſs. If the obſervation be for an amplitude at ſun-riſing, or for an azimuth before noon, apply the centre of the index on the weſt point of the card, within the box; ſo that the four lines on the edge of the card, and thoſe on the inſide of the box, may meet. If the obſervation be for the ſun's amplitude ſetting, or an azimuth in the afternoon, turn the centre of the index right againſt the eaſt point of the card, and make the lines within the box concur with thoſe on the card: the inſtrument thus fitted for obſervation, turn the index *b c* towards the ſun, till the ſhadow of the thread *a e* fall directly on the ſlit of the ſight, and on the line that is along the middle of the index: then will the inner edge of the index cut the degree and minute of the ſun's magnetical azimuth from the north or ſouth. But note, that if, when the compaſs is thus placed, the azimuth is leſs than 54° from

from the fouth, and the index turned towards the fun, it will pafs off the divifions of the limb: the inftrument therefore in this cafe muft be turned juft a quarter of the compafs, i. e. the centre of the index muft be placed on the north or fouth point of the card, according as the fun is from you; and then the edge will cut the degree of the magnetic azimuth, or the fun's azimuth, from the north as before.

The fun's magnetical amplitude thus found, the variation of the needle is thus determined. Being out at fea the 15th of May, 1717, in 45° north latitude, the tables gave me the fun's latitude 19° north, and his eaft amplitude, 27° 25′ north; by the azimuth compafs, I find the fun's magnetical amplitude at his rifing and fetting; and find he rifes, *e. gr.* between the 62d and 63d degree, reckoning from the north towards the eaft point of the compafs, i. e. between the 27th and 28th degree, reckoning from the eaft. The magnetical amplitude, therefore, being here equal to the true one, the needle has no variation; but if the fun at his rifing fhould have appeared between the 52d and 53d degree from the north towards the eaft, his magnetical amplitude would then have been between 37 and 38 degrees, i. e. about ten degrees greater than the true amplitude: therefore the needle would vary about 10 degrees north-eafterly. If the magnetical eaft amplitude found by the inftrument fhould be lefs than the true amplitude, their difference would fhow the variation of the needle eafterly. If the true eaft amplitude be fouthward, as alfo the magnetical amplitude, and this laft be the greater; the variation of the needle will be north-weft; and *vice verfa.*

What has been faid of north-eaft amplitudes holds alfo of fouth-weft; and what of fouth-eaft amplitudes holds of north-weft. Laftly, if amplitudes be found of different denominations, *e. gr.* if the true amplitude be fix degrees north, and the magnetical amplitude be fix degrees fouth; the variation, which in this cafe is north-weft, will be equal to the fum of the magnetical and true amplitudes; underftand the fame for weft amplitudes.

The variation may likewife be found from the azimuth: but in that cafe the fun's declination, latitude of the place, and his altitude, muft be given, that his true azimuth may be found.

This inftrument is alfo ufeful for fettling the fhip's wake, in order to find the leeway; and alfo to find the bearings of headlands and other objects.

Experience evinces, that the needle of a compafs, like every other magnet, whether natural or artificial, continually lofes fomething of its magnetic powers, which frequently produces a difference of more than a point; and we may venture to affert, that the great errors in fhips reckonings more commonly originate from the incorrectnefs of the compafs than from any other caufe.

Steel cannot be too highly tempered for the needle of a fea-compafs, as the more it is hardened, the more permanent is the magnetifm it receives; but to preferve the magnetifm, and of courfe the polarity of the needle, it fhould be cafed with thin, well polifhed, foft iron. It has been found by repeated experiments, that the cafed needle preferves its magnetifm in a more perfect degree than a needle not cafed; and perhaps the magnetic power of the cafed needle may increafe, while that of the uncafed needle lofes of its polarity.

This is not an opinion haftily adopted, but the refult of a fair and judicious trial, as the gentleman from whom the above obfervations were in fubftance taken, placed a cafed and uncafed needle in a room for three months, having at firft exactly the fame direction, and about the fame degree of force. At the end of this period it was found that the cafed needle had not in the leaft changed its direction, while the uncafed had varied two degrees, and its magnetic power was confiderably diminifhed.

Thefe remarks have the air of novelty, and may perhaps contribute to the improvement of the compafs. But the defects of this inftrument are not confined to the needle. The heavieft brafs compaffes are not to be implicitly trufted in a hollow or high fea, as they have the box hanging in two brafs rings, thus allowing it to have only two motions, both vertical and at right angles with each other; by which confinement of the box, upon any fuccuffion, particularly fudden ones, the card is always too much agitated, and before it can recover itfelf, another jerk prevents it from pointing to the pole. It is even not uncommon to fee the card unfhipped by the violence of the fhip's pitching.

All thefe defects are abundantly fupplied by giving the box a vertical motion at every degree and minute of the circle, and combining thefe motions with a horizontal one of the box as well as of the card. By this difpofition of the box, the effects of the jerks on the card are avoided, and it will always with fteadinefs point to the pole. Mr Bernard Romans found by experience, that the card not only is not in the fmalleft degree affected by the hollow fea, but that, in all the violent fhocks and whirlings which it is poffible for the box to receive, the card lies as ftill as in a room unaffected by the leaft motion.

A compafs was recently invented and made in Holland having all thefe motions. It is about the fize of the brafs compafs commonly ufed. The bottom of the brafs box, inftead of being fhaped like a bowl, muft be a hollow cone refembling the bottom of a common glafs bottle; the vertex of it muft be raifed fo high as to leave only one inch between the card and the glafs; the box muft be of the ufual depth, and a quantity of lead muft be poured in the bottom of the box, round the bafe of the cone, which fecures it on the ftile whereon it traverfes.

This ftile is firmly fixed in the centre of a fquare wooden box, like the common compafs, but with a thicker bottom. The ftile is made of brafs about fix inches long, round, and one-third of an inch thick, having its head blunt like that of a fewing thimble, and of a fine polifh, and placed perpendicular. The inner vertex of the cone muft likewife be well polifhed. The vertical part of the cone ought to be fufficiently thick to allow a well-polifhed cavity for holding a fhort ftile, proceeding from the centre of the card on which it traverfes. "The compafs I faw, (fays Mr Romans), was fo conftructed; but I fee no reafon why the ftyle might not proceed from the centre of the vertex of the cone, and fo be received by the card the common way. The needle muft be a magnetic

Compass.

netic bar, blunt at each end; the glaſs and cover are put on in the common way."

The above gentleman informs us, that a ſimilar compaſs was ſubmitted to his inſpection by the captain of a ſloop of war, who declared, that during a hard gale of ſome days continuance, he had no other compaſs that was of the ſmalleſt uſe. In the opinion of Mr Romans the account was not exaggerated; in which concluſion we are diſpoſed to join iſſue with him.

Yet Mr Nicholſon in his intereſting journal is of an oppoſite ſentiment, who believes that the compaſs is very little diſturbed by tilting the box on one ſide, but very much by ſudden changes of place in a horizontal direction; that proviſion made againſt the latter in a ſcientific manner is the chief requiſite in a well conſtructed inſtrument of this nature; and that no other proviſion is neceſſary than good workmanſhip agreeably to the common conſtruction, and properly adjuſting the weight reſpecting the centres and axes of ſuſpenſion. He conceives it will improve the compaſs very much to make the needle flat and thin, and to ſuſpend it, not in the common way, with its flat ſide, but with its edge uppermoſt; for, as it is known that hard ſteel retains its magnetiſm longer than ſoft, it follows that, except both ſides of a needle be equally hard, the magnetic virtue will incline towards the harder ſide in proceſs of time.

The Chineſe compaſs has ſome advantages over the European, from which it differs in the length of the needle, and the manner of its ſuſpenſion. The needle of the Chineſe ſeldom exceeds an inch in length, and is ſcarcely a line in thickneſs. It is poiſed with great nicety, and is remarkably ſenſible. This is effected by the following contrivance.

A piece of thin copper is ſtrapped round the centre of the needle. This copper is rivetted by its edges to the upper part of a ſmall hemiſpherical cup of the ſame metal, turned downwards. The cup thus inverted ſerves as a ſocket to receive a ſteel pivot riſing from a cavity made in a round piece of light wood or cork, which forms the compaſs-box. The ſurfaces of the ſocket and pivot, intended to coincide, are highly poliſhed, to prevent friction as much as poſſible. The cup has a proportionably broad margin, which not only adds to its weight, but from its horizontal poſition tends to keep the centre of gravity, in every ſituation of the compaſs, nearly coinciding with the centre of ſuſpenſion. The cavity in which the needle is ſuſpended, is circular, and little more than capable to remove the needle, cup and pivot. A thin piece of tranſparent talc is placed over the cavity, which hinders the needle from being affected by the motion of the external air; but allows the apparent motion of the former to be eaſily obſerved. The ſmall ſhort needle of the Chineſe has a ſingular advantage over thoſe commonly uſed in Europe, in reſpect of the dip towards the horizon; which, in the latter, requires that one extremity of the needle ſhould be made ſo much heavier than the other as will ſufficiently counteract the magnetic attraction. This being different in different parts of the world, the needle can only be accurately true at the place for which it has been conſtructed. But in ſhort and light needles, ſuſpended after the Chineſe manner, the weight below the point of ſuſpenſion is more than ſufficient to overcome the magnetic dip in all ſituations of the globe; and conſequently ſuch needles will never deviate from their horizontal poſition.

Compass is alſo an inſtrument of conſiderable uſe in ſurveying land, dialing, &c.

Its ſtructure, in the main, is the ſame with that of the mariner's compaſs; conſiſting like that of a box and needle: the principal difference conſiſts in this, that inſtead of the needle's being fitted into the card, and playing with it on a pivot, it here plays alone; the card being drawn on the bottom of the box, and a circle divided into 360 degrees on the limb. See fig. 5. This inſtrument is of obvious uſe to travellers, to direct them in their road; and to miners, to ſhow them what way to dig, with other conſiderable uſes.

Plate CL. fig. 5.

1. *To take the declination of a wall by the Compaſs.* Apply that ſide of the compaſs whereon the north is marked along the ſide of the wall; the number of degrees over which the north end of the needle fixes will be the declination of the wall, and on that ſide; e. gr. if the north point of the needle tends towards the north, that wall may be ſhone on by the ſun at noon; if it fix over fifty degrees, counting from the north towards the eaſt, the declination is ſo many degrees from north towards eaſt.

But ſince the needle itſelf declines from the north towards the weſt, with us, 13°; it muſt be noted, that to retrieve the irregularity, 13° are always to be added to the degrees ſhown by the needle, when the declination of the wall is towards the eaſt; on the contrary, when the declination is towards the weſt, the declination of the needle is to be ſubtracted.

2. *To take an angle with the Compaſs.* Suppoſe the angle required be DAE, fig. 4. apply that ſide of the compaſs whereon the north is marked to one of the lines AD: when the needle reſts, obſerve the degrees at which its north point ſtands, which ſuppoſe 80: ſo many degrees does the line decline from the meridian. In the ſame manner take the declination of the line AE, which ſuppoſe 215°; ſubtract 80° from 215°, the remainder is 135°; which ſubtracted from 180°, there will remain 45°; the quantity of the angle required. But if the difference between the declination of the two lines exceed 180°; in that caſe, 180° muſt be ſubtracted from that difference; the remainder then is the angle required.

Fig. 4.

In meaſuring angles by the compaſs, there needs not any regard be had to the variation; that being ſuppoſed the ſame in all the lines of the angles.

3. *To take a plot of a field by the Compaſs.* Suppoſe the field A, B, C, D, E, fig. 10. for the greater accuracy let there be two ſights fitted to the meridian line of the compaſs; place it horizontally, and through the ſights look along the ſide AB, or a line parallel to it; applying the eye to the ſight at the ſouth point of the compaſs. Draw a rough ſketch of the field by the eye, and on the correſponding line enter down the degree to which the needle points, which ſuppoſe 90°; meaſure the length of the ſide, and enter that too, which ſuppoſe 10 chains.

Fig. 10.

In this manner proceed with all the reſt of the ſides and angles of the field; the ſides, which ſuppoſe 70, 65, 70, 44, 50 fathom; and the angles, which ſuppoſe 30, 100, 130, 240, 300 degrees. To protract the field, ſet down the ſeveral angles obſerved, one after

Compafs, Compaffes.

after another, and fubtract the leffer from the next greater: thus will you have the quantity of the feveral angles, and the length of the lines that include them. For the reft, fee GEOMETRY.

Note. All the angles of the figure taken together, muft make twice as many right angles; abating two if no miftake has been committed.

Azimuth COMPASS. See AZIMUTH.

COMPASS-Dials, are fmall horizontal dials, fitted in brafs or filver boxes, for the pocket, to fhow the hour of the day, by the direction of a needle that indicates how to place them right, by turning the dial about till the cock or ftyle ftands directly over the needle; but thefe can never be very exact, becaufe of the variation of the needle itfelf. See COMPASS and DIALING.

COMPASSES, or *Pair of COMPASSES*, a mathematical inftrument for defcribing circles, meafuring figures, &c.

The common compaffes confift of two fharp-pointed branches or legs of iron, fteel, brafs, or other metal, joined together at the top by a rivet, whereon they move as on a centre. Thofe compaffes are of the beft fort in which the pin or axle on which the joint turns, and alfo half the joint itfelf, is made of fteel, as the oppofite metals wear more equably. The perfection of them may be known by the eafy and uniform opening and fhutting of their legs; one of which is fometimes made to take in and out, in order to make room for two other points to defcribe with ink, black-lead or other materials.

There are now ufed compaffes of various kinds and contrivances, accommodated to the various ufes they are intended for; as,

COMPASSES of three legs, or *Triangular Compaffes*, are, fetting afide the excefs of a leg, of the fame ftructure with the common ones; their ufe being to take three points at once, and fo to form triangles; to lay down three pofitions of a map, to be copied at once, &c.

Beam-COMPASSES confift of a long branch, or beam, made of brafs or wood, carrying two brafs curfors, the one fixed at one end, the other fliding along the beam, with a fcrew to faften it occafionally. To the curfors may be fcrewed points of any kind, whether fteel for pencils, or the like. It is ufed to draw large circles, to take great extents, &c. To the fixed curfor is fometimes applied an adjufting or micrometer fcrew, by which an extent is obtained to extreme nicety. Mr Jones of Holborn has made beam-compaffes to adjuft to the $\frac{1}{5000}$dth of an inch.

Calibre-COMPASSES. See CALIBER.

Clockmaker's COMPASSES are joined like the common compaffes, with a quadrant, or bow, like the fpring compaffes; only of different ufe, ferving here to keep the inftrument firm at any opening. They are made very ftrong, with the points of their legs of well tempered fteel, as being ufed to draw lines on pafteboard or copper.

Cylindrical and Spherical COMPASSES, confift of four branches, joined in a centre, two of which are circular, and two flat, a little bent on the ends: their ufe is to take the diameter, thicknefs, or caliber of round or cylindric bodies; fuch as cannons, pipes, &c.

Plate CL. fig. 9.

Elliptic COMPASSES. Their ufe is to draw ellipfes, or ovals of any kind: they confift of a beam AB about a foot long, bearing three curfors; to one of which may be fcrewed points of any kind: to the bottom of the other two are rivetted two fliding dove-tails, adjufted in grooves made in the crofs branches of the beam. The dove-tails having a motion every way by turning about the long branch, go backwards and forwards along the crofs; fo that when the beam has gone half-way about, one of thefe will have moved the whole length of one of the branches; and when the beam has got quite round, the fame dove-tail has got back the whole length of the branch. Underftand the fame of the other dove-tail.

Note. The diftance between the two fliding dove-tails is the diftance between the two foci of the ellipfis; fo that by changing that diftance, the ellipfis will be rounder or flender. Under the ends of the branches of the crofs are placed four fteel points to keep it faft.

The ufe of this compafs is eafy; by turning round the long branch, the ink, pencil, or other point, will draw the ellipfis required. Its figure fhows both its ufe and conftruction.

German COMPASSES have their legs a little bent outwards, towards the top; fo that when fhut, the points only meet.

Hair COMPASSES are fo contrived within fide, by a fmall adjufting fcrew to one of the legs, as to take an extent to a hair's breadth.

Lapidary's COMPASSES are a piece of wood, in form of the fhaft of a plane, cleft at top, as far as half its length; with this they meafure the angles, &c. of jewels and precious ftones, as they cut them. There is in the cleft a little brafs rule, faftened there at one end by a pin; but fo that it may be moved in the manner of a brafs level: with this kind of fquare they take the angles of the ftones, laying them on the fhaft as they cut them.

Proportional COMPASSES are thofe whofe joint lies between the points terminating each leg: they are either fimple or compound. In the former fort the centre is fixed, fo that one pair of thefe ferves only for one proportion.

Plate CLI. fig. 6.

Compound proportional COMPASSES confift of two parts or fides of brafs, which lie upon each other fo nicely as to appear but one when they are fhut. Thefe fides eafily open, and move about a centre, which is itfelf moveable in a hollow canal cut through the greateft part of their length. To this centre on each fide is affixed a fliding piece A of a fmall length, with a fine line drawn on it ferving as an index, to be fet againft other lines or divifions placed upon the compaffes on both fides. Thefe lines are, 1. A line of lines. 2. A line of fuperfices, areas, or planes. 3. A line of folids. 4. A line of circles, or rather of polygons to be infcribed in circles. Thefe lines are all unequally divided; the three firft from 1 to 20, the laft from 6 to 20. Their ufes are as follow:

By the line of lines you divide a given line into any number of equal parts; for by placing the index A againft 1, and fcrewing it faft, if you open the compaffes, then the diftance between the points at each end will be equal. If you place the index againft 2, and open the compaffes, the diftance between the points of the longer legs BB, will be twice the diftance between the fhorter ones CC; and thus a line is bifected, or divided into two equal parts. If the index be placed againft

COINING. PLATE CL.

Fig. 1.

Fig. 2.

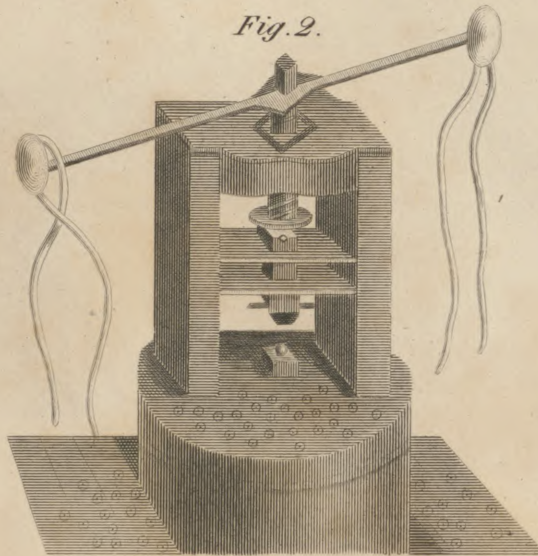
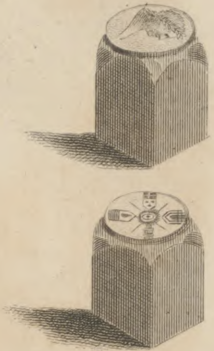


Fig. 3.



COMPASS.

Fig. 8.

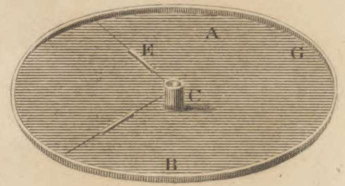
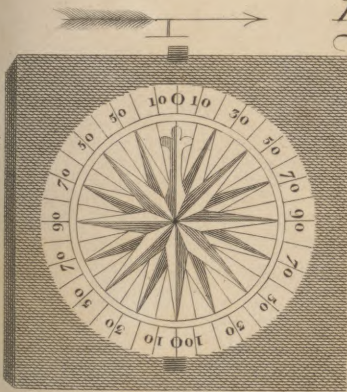


Fig. 4.



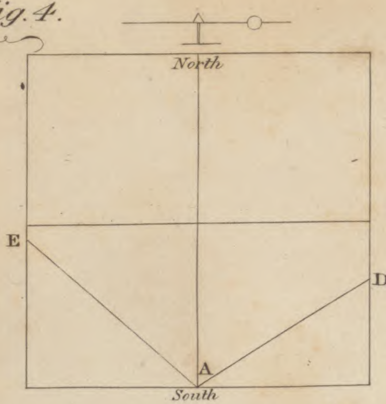


Fig. 7.

Fig. 9.

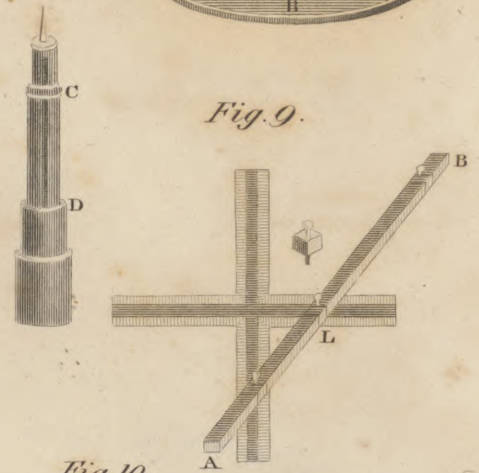


Fig. 5.

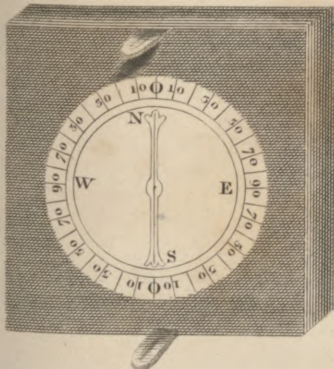


Fig. 6.

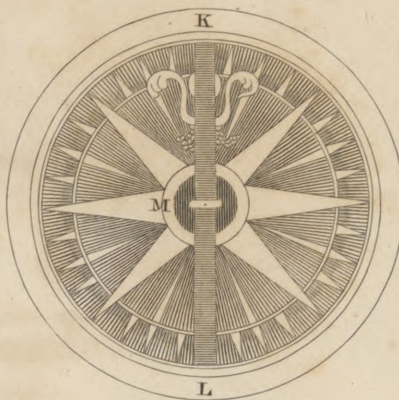


Fig. 10.

E. Mitchell sculp.t

Fig. 1.

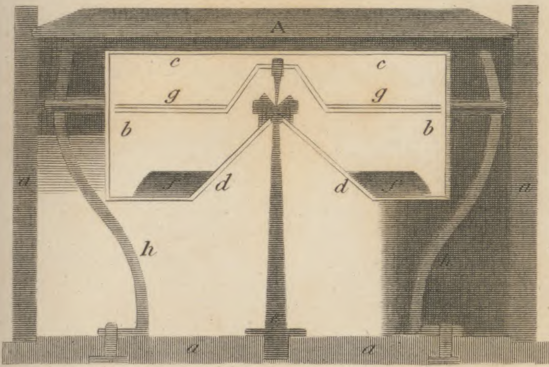


Fig. 2.

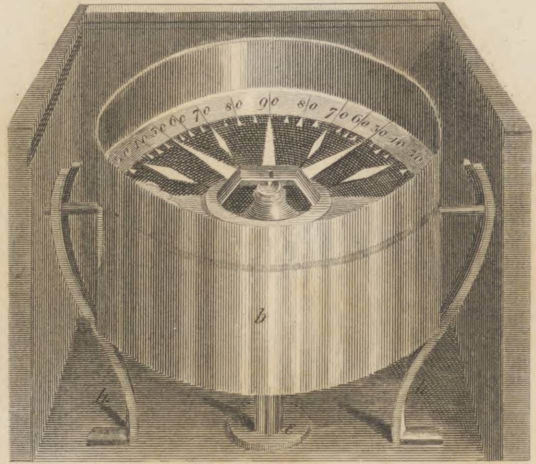


Fig. 3.

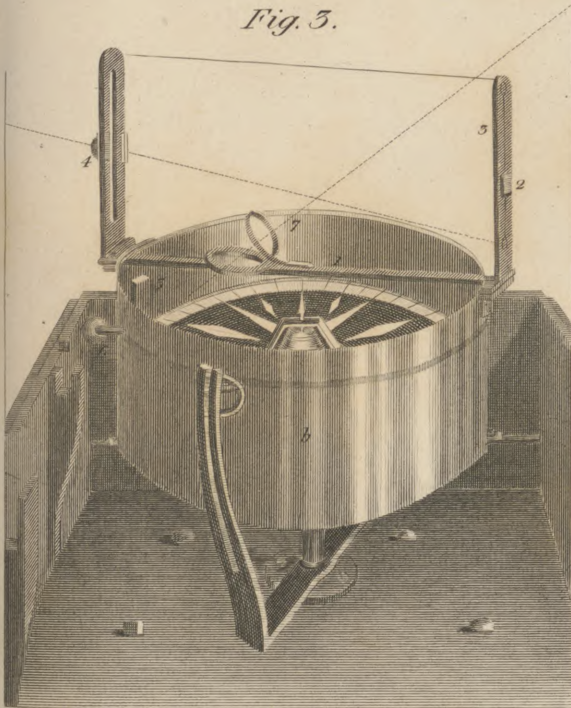


Fig. 4.

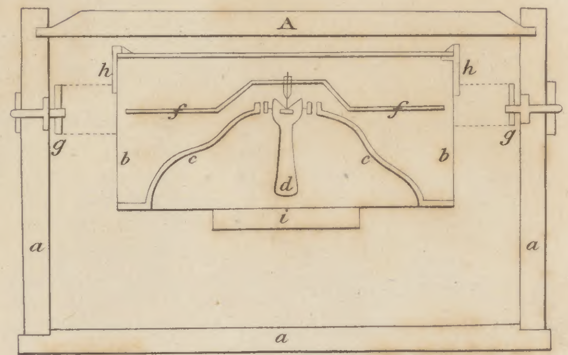


Fig. 6.

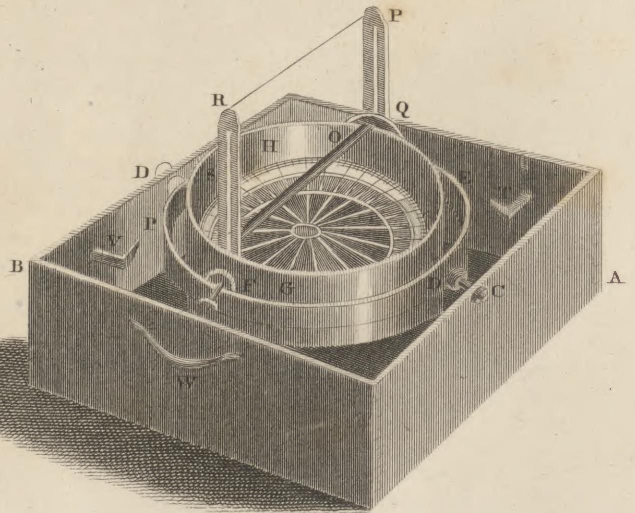
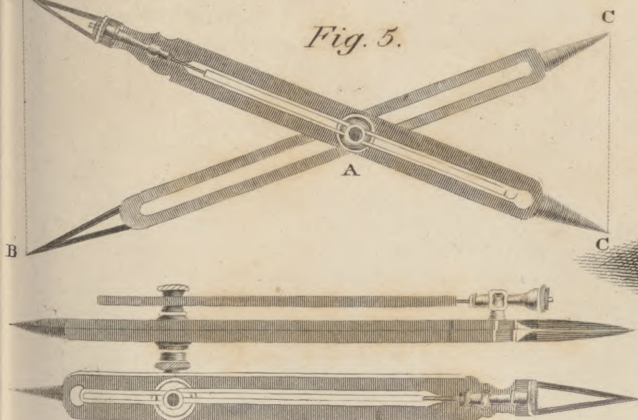


Fig. 5.



E. Mitchell sculp.

againft 3, and the compaffes opened; the diftance between the points will be as 3 to 1, and fo a line is divided into 3 equal parts; and fo you proceed for any other number of parts under 10.

The numbers of the line of planes anfwer to the fquares of thofe in the line of lines; for becaufe fuperfices or planes are to each other as the fquares of their like fides; therefore, if the index be placed againft 2 in the line of planes, the diftance between the fmall point will be the fide of a plane whofe area is one; but the diftance of the larger points will be the like fide of a plane whofe area is two; or twice as large. If the index be placed at 3, and the compaffes opened, the diftances between the points at each end will be the like fide of planes whofe areas are as 1 to 3; and fo of others.

The numbers of the line of folids anfwer to the cubes of thofe of the line of lines; becaufe all folids are to each other as the cubes of their fides or diameters; therefore, if the index be placed to number 2, 3, 4, &c. in the line of folids, the diftance between the leffer and larger points will be the like fides of folids, which are to each other as 1 to 2, 1 to 3, 1 to 4, &c. For example; If the index be placed at 10, and the compaffes be opened fo that the fmall points may take the diameter of a bullet whofe weight is one ounce, the diftance between the large points will be the diameter of a bullet or globe of 10 ounces, or which is 10 times as large.

Laftly, The numbers in the line of circles are the fides of polygons to be infcribed in a given circle, or by which a circle may be divided into the equal parts, from 6 to 20. Thus, if the index be placed at 6, the points of the compaffes at either end, when opened to the radius of a given circle, will contain the fide of a hexagon, or divide the circle into fix equal parts. If the index be placed againft 7, and the compaffes opened fo that the larger points may take in the radius of the circle, then the fhorter points will divide the circle into feven equal parts for infcribing a heptagon. Again, placing the index to 8, and opening the compaffes, the larger points will contain the radius, and the leffer points divide the circle into eight equal parts for infcribing an octagon or fquare. And thus you may proceed for others.

Proportional COMPASSES *with the fector lines.* The ftructure of thefe is fo like that of the common proportional compaffes, only a little nicer, that it needs no particular defcription. The lines on the firft face are the line of lines, marked *lines;* it is divided into 100 equal parts, every tenth numbered; and the line of chords, which goes to 60°, is marked *chords.* On the other face are a line of fines to 90°, and a line of tangents to 45°. On one fide are the tangents from 45° to 71° 34′; on the other, fecants from 0° to 70° 30′.

For the ufe of thefe compaffes: 1. To divide a line into any number of equal parts lefs than 100: divide 100 by the number of parts required; flip the curfor till the line on the fliding dove-tail be againft the quotient on the line of lines: then, the whole line being taken between the points of the compaffes moft remote from the centre, the aperture of the other will fhow the divifion required. 2. A right line given, fuppofed to be divided into 100 parts, to take any number of thofe parts; flip the line on the fliding dove-tail to the number of parts required: the whole line being taken between the points fartheft from the centre, the aperture of the other two will include the number of divifions required. 3. The radius being given, to find the chord of any other under 60°; flip the line on the fliding dove-tail to the degrees required on the line of chords: the radius being taken between the points fartheft from the centre of the curfor; the aperture of the other line will be the chord required, provided the number of degrees be greater than 29: if it be lefs, the aperture taken from the radius will leave the chord required. 4. If the chord of an arch under 60° be given, and the radius required; flip the line on the dove-tail to the degrees given on the line of chords: the given chord being taken between the two points next the curfor, the aperture of the other will be the radius required. 5. The radius being given, to find the fine of any number of degrees; flip the line on the dove-tail to the degree on the line of fines whofe fine is required: the radius taken between the points furtheft from the curfor, the aperture of the other will give the fine of the angle required. But if the fine fought be lefs than 30°, the difference of the apertures of the oppofite points will be the fine required. 6. The radius being given, to find the tangent of any number of degrees under 71; if the tangent required be under 26° 30′, then flip the line on the dove-tail to the degree propofed on the tangent line; the radius taken between the points fartheft from the curfor, the aperture of the others will be the tangent of the degrees required; if the tangent required be above 26° 30′, but under 45°, the line on the curfor muft be flipped to the degrees given on the tangent line; then the radius being taken between the points furtheft from the curfor, the aperture of the others will be the tangent. If the tangent required be greater than 45°, but lefs than 56° 20′, flip the notch on the tangent fide of the turned cheek to the degree 0 in the tangent line on the fide of the compafs; the radius taken between the points furtheft from the curfor; the difference between the aperture of the other and thefe, added together, will be the tangent required. Thus, for the tangents of the degrees under 71. After the like manner may the fecant of any number of degrees under 71 be found.

Mr Heath, a mathematical inftrument-maker in London, conftructed a pair of proportional compaffes, in 1746, with a curious and ufeful contrivance for preventing the fhorter legs from changing their pofition, when thefe compaffes were ufed. It confifted of a fmall beam foldered to a fcrew, and running parallel to the leg of the compaffes nearly of the length of the groove; in this beam a flit was made, which admitted of a fliding-nut, the other end of which fell into a hole in the bottom of the fcrew, belonging to the great nut of the compaffes. The fcrew-pin of the beam paffed through an adjufter, by means of which the mark on the flider might be brought exactly to any divifion. But the proportional compaffes have been much out of ufe fince the invention of the fector.

Spring COMPASSES, or dividers; thofe with an arched head, which by its fpring opens the legs; the opening being directed by a circular fcrew faftened to one of the legs and let through the other, worked

with a nut. Thefe compaffes are made of hardened fteel.

Trifecting COMPASSES confift of two central rules, and an arch of circles of 120 degrees, immoveable, with its radius, which is faftened with one of the central rules like the two legs of a fector, that the central rule may be carried through all the points of the circumference or the arch. The radius and rule fhould be as thin as poffible: and the rule faftened to the radius fhould be hammered cold, to attain the greater elafticity; and the breadth of the central rule fhould be triple that of the radius; there muft alfo be a groove in this rule, with a dove-tail faftened on it for its motion, and a hole in the centre of each rule. The ufe of this inftrument is to facilitate the trifection of angles geometrically; and it is faid to have been invented by M. Targen for that purpofe.

Turn-up-COMPASSES. The body of this inftrument is like the common compaffes; but towards the bottom of the legs, without-fide, are added two other points befides the ufual ones; the one whereof carries a drawing pen point, and the other a port-crayon, both adjufted fo as to turn round, and be in the way of ufe, or out of it, as occafion requires. Thefe compaffes have been contrived to fave the trouble of changing the points.

COMPASSION, or COMMISERATION, in *Ethics*, a mixed paffion compounded of love and forrow, and excited by the fight or recital of diftrefs. Hobbes makes this a merely felfifh paffion, and defines it as being fear for ourfelves; Hutchefon refolves it into inftinct; but Dr Butler, much more properly, confiders compaffion as an original, diftinct, particular affection in human nature.

COMPATIBLE, fomething that may fuit or confift with another. See INCOMPATIBLE.

COMPEIGNE, a handfome town of France, in the department of Oife, with a palace or caftle, where the king often refided. The maid of Orleans was taken prifoner here in 1430. It is feated on the river Oife, near a large foreft. E. Long. 2. 55. N. Lat. 49. 25. It ftands about 45 miles north-eaft of Paris.

COMPENDIUM, in matters of literature, denotes much the fame as epitome or abridgement. See ABRIDGEMENT.

COMPENSATION, in a general fenfe, an action whereby any thing is admitted as an equivalent to another.

COMPENSATION, in *Law*. When the fame perfon is debtor and creditor to another, the mutual obligations, if they are for equal fums, are extinguifhed by compenfation; if for unequal, the leffer obligation is extinguifhed, and the greater diminifhed, as far as the concourfe of debt and credit goes.

COMPETENCE, or COMPETENCY, in a general fenfe, fuch a quantity of any thing as is fufficient.

COMPETENCY, in *Law*, the right or authority of a judge, whereby he takes cognizance of any thing.

COMPETENTES, an order of catechumens, in the primitive Chriftian church, being the immediate candidates for baptifm. See CATECHUMEN.

COMPETITION, in a general fenfe, is the fame with rivalfhip, or when two or more perfons contend for the fame thing.

COMPETITION, in *Scots Law*. In efcheats, fee LAW, Part III. N° clxvi. 17, &c. In confirmations by the fuperior, in refignations, and in perfonal rights of lands, *ibid.* clxviii. 5—9. In inhibitions, in adjudication, amongft affignees, arrefters, and poinders, *ibid.* clxxi. 6. clxxii. 3. clxxvii. 2. clxxviii. 8, 9, 10. Amongft creditors of a defunct, clxxxi. 19.

COMPETALIA, or COMPITALITA, feafts held among the ancients in honour of the *lares*. The word comes from the Latin, *compitum*, a crofs-way; becaufe the feaft was held in the meeting of feveral roads. The *compitalia* are more ancient than the building of Rome. Dionyfius Halicarnaffeus, and Pliny, indeed fay, they were inftituted by Servius Tullius; but this only fignifies that they were then introduced into Rome. The feaft being moveable, the day whereon it was to be obferved was proclaimed every year. It was ordinarily held on the 4th of the nones of February, i. e. on the 2d of that month. Macrobius obferves, that they were held not only in honour of the *lares*, but alfo of *mania*, madnefs. The priefts who officiated at them were flaves and liberti, and the facrifice a fow. They were re-eftablifhed, after a long neglect, by Tarquin the Proud, on occafion of an anfwer of the oracle, *that they fhould facrifice heads for heads*; i. e. that for the health and profperity of each family, children were to be facrificed: but Brutus, after expelling the kings, in lieu of thofe barbarous victims fubftituted the heads of garlic and poppy; thus fatisfying the oracle which had enjoined *capita*, heads. During the celebration of this feaft, each family placed at the door of their houfe the ftatue of the goddefs *Mania*: they alfo hung up at their doors figures of wool, reprefenting men and women; accompanying them with fupplications that the lares and mania would be contented with thofe figures, and fpare the people of the houfe.

COMPLEMENT, in *Geometry*, is what remains of the quadrant of a circle, or 90°, after any certain arch has been taken away from it. Thus, if the arch taken away be 40°, its complement is 50; becaufe $50+40=90$. The fine of the complement of an arch is called the *cofine*, and that of the tangent the *cotangent*, &c.

COMPLETUS FLOS, in *Botany*. A flower is faid to be complete, which is provided with both the covers, viz. the calyx or flower-cup, and the petals. The term was invented by Vaillant, and is fynonymous with *calyculatus flos* in Linnæus. Berkenhout erroneoufly confounds it with the *auctus* and *calyculatus calyx* of the fame author.

COMPLEX, in a more general fenfe, a term fynonymous with compound; though in ftrictnefs of fpeech there is fome difference.

COMPLEX is properly applied where a thing contains many others, or confifts of different parts not really diftinct from each other, but only imaginarily, or in our conceptions. In this fenfe the foul may be faid to be complex, in refpect of the underftanding and will, which are two things that our reafon alone diftinguifhes in it.

COMPLEX Term, or *Idea*, is a term compounded of feveral fimple or incomplex ones. Thus, in the propofition, *a juft God cannot leave crimes unpunifhed;* the fubject of this propofition, viz. *a juft God*, is a complex

plex term, or ſtands for a complex idea compoſed of two ſimple or incomplex ones, viz. *God* and *juſt*.

COMPLEXION, among phyſicians, the temperament, habitude, and natural diſpoſition, of the body; but more often the colour of the face and ſkin.

Few queſtions in philoſophy have engaged the attention of naturaliſts more than the diverſities among the human ſpecies, among which that of colour is the moſt remarkable. The great differences in this reſpect have given occaſion to ſeveral authors to aſſert, that the whole human race have not ſprung from one original; but that as many different ſpecies of men were at firſt created as there are now different colours to be found among them. Under the article America, N° 81—100, we have ſhown that all the arguments which can be brought for ſpecific differences among mankind, whether drawn from a difference of colour, ſtature, or diſpoſition, muſt neceſſarily be inconcluſive. It remains, however, a matter of no ſmall difficulty to account for the remarkable variations of colour that are to be found among different nations. On this ſubject Dr Hunter has publiſhed a theſis, in which he conſiders the matter more accurately than has commonly been done, and determines abſolutely againſt any ſpecific difference among mankind. He introduces his ſubject by obſerving, that when the queſtion has been agitated, whether all the human race conſtituted only one ſpecies or not, much confuſion has ariſen from the ſenſe in which the term *ſpecies* has been adopted. He therefore thinks it neceſſary to ſet out with a definition of the term. He includes under the ſame ſpecies all thoſe animals which produce iſſue capable of propagating others reſembling the original ſtock from whence they ſprung. This definition he illuſtrates by having recourſe to the human ſpecies as an example. And in this ſenſe of the term he concludes, that all of them are to be conſidered as belonging to the ſame ſpecies. And as, in the caſe of plants, one ſpecies comprehends ſeveral varieties depending upon climate, ſoil, culture, and ſimilar accidents; ſo he conſiders the diverſities of the human race to be merely varieties of the ſame ſpecies, produced by natural cauſes. Of the different colours obſervable among mankind, he gives the following view:

Black. Africans under the line.
Inhabitants of New Guinea.
Inhabitants of New Holland.

Swarthy. The Moors in the northern parts of Africa.
The Hottentots in the ſouthern parts of it.

Copper coloured. The Eaſt Indians.

Red coloured. The Americans.

Brown coloured. Tartars.
Perſians.
Arabs.
Africans on the coaſt of the Mediterranean.
Chineſe.

Brownish. The inhabitants of the ſouthern parts of Europe; as Sicilians, and Spaniards; as well as the Abyſſinians in Africa.

Brownish. Turks, and likewiſe the Samoiedes and Laplanders.

White. Moſt of the European nations; as
Swedes,
Danes,
Engliſh,
Germans,
Poles, &c.
Kabardinſki,
Georgians,
Inhabitants of the iſlands in the Pacific ocean.

In attempting to inveſtigate the cauſes of theſe differences, our author obſerves, that there can be no diſpute of the ſeat of colour being placed in the ſkin; that it is not even extended over the whole of this, but confined to that part named the cuticle, conſiſting of the epidermis and reticulum; and that it chiefly occupies the latter of theſe. The cuticle is much thicker and harder in black people than in white ones; the reticulum in the latter being a thin mucus, in the former a thick membrane. He concludes that this ſeat of colour in whites is tranſparent, and either totally deprived of veſſels, or only furniſhed with very few; as the yellow colour appearing in jaundice vaniſhes on the cauſe of the diſeaſe being removed; which is not the caſe with ſtains in the cuticle from gunpowder, or ſimilar cauſes. He next points out three cauſes deſtroying the pellucidity of the cuticle, giving it a brown colour, and rendering it thicker. Theſe are, acceſs of air, naſtineſs, and the heat of the ſun. The influence of each of theſe he proves by many examples; and from them he is inclined to conſider the laſt as by much the moſt powerful. If, however, it be admitted that theſe cauſes have this effect, he thinks that all the diverſity of colour which is to be obſerved among mankind, may be thus accounted for. He remarks, that all the inhabitants of the torrid zone incline more or leſs to a black colour. When we obſerve the differences which occur among them, we muſt at the ſame time remember, that a black colour is not referred to heat alone, but to the other cauſes alſo: and when we attend to the diverſity of temperature that occurs even in the torrid zone, the exiſtence of a white nation there would by no means deſtroy the argument. He is farther of opinion, that the exiſtence of a brown colour, and of conſiderable varieties from white, in the northern and coldeſt parts of Europe, may very eaſily be explained. This he accounts for from the manner of life of the inhabitants, by which they are either expoſed to the inclemency of the air, or to conſtant naſtineſs from ſmoky houſes.

Having thus attempted to account, from natural cauſes, for the varieties which occur among mankind with reſpect to colour, our author obſerves, that, to all this reaſoning, an objection will naturally be made, from conſidering that infants bring theſe marks into the world along with them, before they can be expoſed to any ſuch cauſes. Dr Hunter imagines, however, that this may readily be explained upon the ſuppoſition that many peculiarities acquired by parents are tranſmitted to their poſterity; and of this, he thinks, no one can entertain the leaſt doubt who attends

tends to hereditary difeafes. Thus, gout, fcrophula, mania, and many other affections, although at firft induced by particular accidents, will continue to affect families for many generations. In the fame manner a parent expofed to caufes deftroying the natural whitenefs of his complexion, will beget fwarthy children; and the fame caufes continuing to operate upon the fon, the blacknefs will be increafed. Thus all the different fhades may have been at firft induced, and afterwards continued.

The objection here obviated, however, might have been fhortly anfwered by denying the fact; for it is now generally known, that the children of the blackeft negroes are abfolutely *born white*, as will be afterwards noticed.

This fubject of complexion has been very well illuftrated by Mr Clarkfon, in a differtation introduced in his Effay on the commerce and flavery of the human fpecies. The firft point that occurs to be afcertained, is "What part of the fkin is the feat of colour?" The old anatomifts ufually divide the fkin into two parts or laminæ; the exterior and thinneft, called by the Greeks *epidermis*, by the Romans *cuticula*, and hence by us *cuticle;* and the interior, called by the former *derma*, and by the latter *cutis*, or *true fkin*. Hence they muft neceffarily have fuppofed, that, as the true fkin was in every refpect the fame in all human fubjects, however various their external hue, fo the feat of colour muft have exifted in the cuticle or upper furface.

Malpighi, an eminent Italian phyfician of the laft century, was the firft perfon who difcovered that the fkin was divided into three laminæ or parts; the cuticle, the true fkin, and a certain coagulated fubftance fituated between both, which he diftinguifhed by the title of *rete mucofum;* which coagulated fubftance adhered fo firmly to the cuticle, as, in all former anatomical preparations, to have come off with it; and, from this circumftance, to have led the ancient anatomifts to believe, that there were but two laminæ, or divifible portions in the human fkin. See ANATOMY *Index*.

This difcovery was fufficient to afcertain the point in queftion; for it appeared afterwards that the cuticle, when divided according to this difcovery from the other lamina, was femitranfparent; that the cuticle of the blackeft negro was of the fame tranfparency and colour as that of the pureft white; and hence the true fkins of both being invariably the fame, that the rete mucofum was the feat of colour.

This has been farther confirmed by all fubfequent anatomical experiments; by which it appears, that whatever is the colour of this intermediate coagulated fubftance, nearly the fame is the apparent colour of the upper furface of the fkin. Neither can it be otherwife; for the cuticle, from its tranfparency, muft neceffarily tranfmit the colour of the fubftance beneath it, in the fame manner, though not in the fame degree, as the cornea tranfmits the colour of the iris of the eye. This tranfparency is a matter of ocular demonftration in white people. It is confpicuous in every blufh; for no one can imagine that the cuticle becomes red as often as this happens: nor is it lefs difcoverable in the veins, which are fo eafy to be difcerned; for no one can fuppofe that the blue ftreaks, which he conftantly fees in the faireft complexions, are painted, as it were, on the furface of the upper fkin. From thefe, and a variety of other obfervations, no maxim is more true in phyfiology, than that on the rete mucofum depends the colour of the human body; or, in other words, that the rete mucofum being of a different colour in different inhabitants of the globe, and appearing through the cuticle or upper furface of the fkin, gives them that various appearance which ftrikes us fo forcibly in contemplating the human race.

As this can be incontrovertibly afcertained, it is evident, that whatever caufes co-operate in producing this different appearance, they produce it by acting upon the rete mucofum; which, from the almoft incredible manner in which the cuticle is perforated, is as acceffible as the cuticle itfelf. Thefe caufes are probably thofe various qualities of things, which, combined with the influence of the fun, contribute to form what we call *climate*. For when any perfon confiders, that the mucous fubftance before mentioned is found to vary in its colour, as the climates vary from the equator to the poles, his mind muft be inftantly ftruck with the hypothefis, and he muft adopt it without any hefitation, as the genuine caufe of the phenomenon.

This fact, of the variation of the mucous fubftance, according to the fituation of the place, has been clearly afcertained in the numerous anatomical experiments that have been made; in which fubjects of all nations have come under confideration. The natives of many of the kingdoms and ifles of Afia are found to have their rete mucofum black: thofe of Africa, fituated near the line, of the fame colour; thofe of the maritime parts of the fame continent, of a dufky brown, nearly approaching to it; and the colour becomes lighter or darker in proportion as the diftance from the equator is either greater or lefs. The Europeans are the faireft inhabitants of the world. Thofe fituated in the moft fouthern regions of Europe, have in their rete mucofum a tinge of the dark hue of their African neighbours: hence the epidemic complexion prevalent among them, is nearly of the colour of the pickled Spanifh olive; while in this country, and thofe fituated nearer the north pole, it appears to be nearly, if not abfolutely, white.

Thefe are facts which anatomy has eftablifhed; and we acknowledge them to be fuch, that we cannot diveft ourfelves of the idea, that climate has a confiderable fhare in producing a difference of colour.

The only objection of any confequence that has ever been made to the hypothefis of climate, is this, that people under the fame parallels are not exactly of the fame colour. But this is no objection in fact; for it does not follow that thofe countries which are at an equal diftance from the equator, fhould have their climates the fame. Indeed nothing is more contrary to experience than this. Climate depends upon a variety of accidents. High mountains in the neighbourhood of a place make it cooler, by chilling the air that is carried over them by the winds. Large fpreading fucculent plants, if among the productions of the foil, have the fame effect; they afford agreeable cooling fhades, and a moift atmofphere from their continual exhalations, by which the ardour of the fun is confiderably abated. While the foil, on the other hand, if of a fandy nature, retains the heat in an uncommon degree,

Complexion.

degree, and makes the ſummers conſiderably hotter than thoſe which are found to exiſt in the ſame latitude where the ſoil is different. To this proximity of what may be termed *burning ſands*, and to the ſulphureous and metallic particles which are continually exhaling from the bowels of the earth, is aſcribed the different degrees of blackneſs by which ſome African nations are diſtinguiſhed from each other, though under the ſame parallels. To theſe obſervations we may add, that though the inhabitants of the ſame parallel are not exactly of the ſame hue, yet they differ only by ſhades of the ſame colour; or, to ſpeak with more preciſion, that there are no two people, in ſuch a ſituation, one of whom is white and the other black. To ſum up the whole——Suppoſe we were to take a common globe; to begin at the equator; to paint every country along the meridian line in ſucceſſion from thence to the poles; and to paint them with the ſame colour which prevails in the reſpective inhabitants of each, we ſhould ſee the black, with which we had been obliged to begin, inſenſibly changing to an olive, and the olive, through as many intermediate colours, to a white; and if, on the other hand, we ſhould complete any one of the parallels according to the ſame plan, we ſhould ſee a difference perhaps in the appearance of ſome of the countries through which it ran, though the difference would conſiſt wholly in ſhades of the ſame colour.

The argument, therefore, which is brought againſt the hypotheſis, is ſo far from being an objection, that it may be conſidered as one of the firſt arguments in its favour; for if the climate has really an influence on the mucous ſubſtance of the body, it is evident that we muſt not only expect to ſee a gradation of colour in the inhabitants from the equator to the poles, but alſo different ſhades of the ſame colour in the inhabitants of the ſame parallel.

To this argument may be added one that is incontrovertible, which is, that when the black inhabitants of Africa are tranſplanted to colder, or the white inhabitants of Europe to hotter climates, their children, born there, are of a different colour from themſelves; that is, lighter in the firſt, and darker in the ſecond inſtance.

As a proof of the firſt, we ſhall give the words of the Abbé Raynal, in his admired publication. "The children," ſays he, "which they (the Africans) procreate in America, are not ſo black as their parents were. After each generation the difference becomes more palpable. It is poſſible, that after a numerous ſucceſſion of generations, the men come from Africa would not be diſtinguiſhed from thoſe of the country into which they may have been tranſplanted."

This circumſtance we have had the pleaſure of hearing confirmed by a variety of perſons who have been witneſſes of the fact; but particularly by many intelligent Africans, who have been parents themſelves in America, and who have declared, that the difference is ſo palpable in the northern provinces, that not only they themſelves have conſtantly obſerved it, but that they have heard it obſerved by others.

Neither is this variation in the children from the colour of the parents improbable. The children of the blackeſt Africans are born white. In this ſtate they continue for about a month, when they change to a pale yellow. In proceſs of time they become brown. Their ſkin ſtill continues to increaſe in darkneſs with their age, till it becomes of a dirty ſallow black; and at length, after a certain period of years, gloſſy and ſhining. Now, if climate has any influence on the mucous ſubſtance of the body, this variation in the children from the colour of their parents is an event which muſt be reaſonably expected; for being born white, and not having equally powerful cauſes to act upon them in colder, as their parents had in the hotter climes which they left, it muſt neceſſarily follow, that the ſame effect cannot poſſibly be produced.

Hence alſo, if the hypotheſis be admitted, may be deduced the reaſon why even thoſe children who have been brought from their country at an early age into colder regions, have been obſerved to be of a lighter colour than thoſe who have remained at home till they arrived at a ſtate of manhood. For having undergone ſome of the changes which we mentioned to have attended their countrymen from infancy to a certain age, and have been taken away before the reſt could be completed, theſe farther changes which would have taken place had they remained at home, ſeem either to have been checked in their progreſs, or weakened in their degree, by a colder climate.

We come now to the ſecond and oppoſite caſe; for a proof of which we ſhall appeal to the words of Dr Mitchell in the Philoſophical Tranſactions, N° 476. ſect. 4. "The Spaniards who have inhabited America under the torrid zone for any time, are become as dark coloured as our native Indians of Virginia, of which I myſelf have been a witneſs; and were they not to intermarry with the Europeans, but lead the ſame rude and barbarous lives with the Indians, it is very probable, that, in a ſucceſſion of many generations, they would become as dark in complexion."

To this inſtance we ſhall add one, which is mentioned by a late writer, who, deſcribing the African coaſt and the European ſettlements there, has the following paſſage. "There are ſeveral other ſmall Portugueſe ſettlements, and one of ſome note at Mitomba, a river in Sierra Leone. The people here called *Portugueſe* are principally perſons bred from a mixture of the firſt Portugueſe diſcoverers with the natives, and now become, in their complexion and woolly quality of their hair, perfect negroes, retaining, however, a ſmattering of the Portugueſe language."

Theſe facts with reſpect to the coloniſts of the Europeans are of the higheſt importance in the preſent caſe, and deſerve a ſerious attention. For when we know to a certainty from whom they are deſcended; when we know that they were, at the time of their tranſplantation, of the ſame colour as thoſe from whom they ſeverally ſprung; and when, on the other hand, we are credibly informed that they changed it for the native colour of the place which they now inhabit: the evidence in ſupport of theſe facts is as great as if a perſon, on the removal of two or three families into another climate, had determined to aſcertain the circumſtance; as if he had gone with them and watched their children; as if he had communicated his obſervations at his death to a ſucceſſor; as if his ſucceſſor had proſecuted

prosecuted the plan; and thus an uninterrupted chain of evidence had been kept up from their first removal to any determined period of succeeding time.

But though these facts seem sufficient of themselves to confirm our opinion, they are not the only facts which can be adduced in its support. It can be shown, that the members of the very same family, when divided from each other, and removed into different countries, have not only changed their family complexion, but that they have changed it to as many different colours as they have gone into different regions of the world. We cannot have, perhaps, a more striking instance of this than in the Jews. These people are scattered over the face of the whole earth. They have preserved themselves distinct from the rest of the world by their religion; and as they never intermarry with any but those of their own sect, so they have no mixture of blood in their veins that they should differ from each other; and yet nothing is more true, than that the English Jew is white, the Portuguese swarthy, the Armenian olive, and the Arabian copper; in short, that there appear to be as many different species of Jews as there are countries in which they reside.

To these facts we shall add the following observation, that if we can give credit to the ancient historians in general, a change from the darkest black to the purest white must have actually been accomplished. One instance, perhaps, may be thought sufficient. Herodotus relates, that the Colchi were black, and that they had crisped hair. These people were a detachment of the Æthiopian army under Sesostris, who followed him in his expedition, and settled in that part of the world where Colchis is usually represented to have been situated. Had not the same author informed us of this circumstance, we should have thought it strange that a people of this description should have been found in such a latitude. Now, as they were undoubtedly settled there, and as they were neither so totally destroyed, nor made any such rapid conquests, as that history should notice the event, there is great reason to presume that their descendants continued in the same, or settled in the adjacent country; from whence it will follow, that they must have changed their complexion to that which is observed in the inhabitants of this particular region at the present day; or, in other words, that the black inhabitants of Colchis must have been changed into the fair Circassian. Suppose, without the knowledge of any historian, they had made such considerable conquests as to have settled themselves at the distance of 1000 miles in any one direction from Colchis, still they must have changed their colour: For had they gone in an eastern or western direction, they must have been of the same colour as the Circassians; if to the north whiter; if to the south, of a copper-colour. There are no people within that distance of Colchis who are black.

From the whole of the preceding observations on the subject, we may conclude, that as all the inhabitants of the earth cannot be otherwise than the children of the same parents, and as the difference of their appearance must have of course proceeded from incidental causes, these causes are a combination of those qualities which we call *climate:* that the blackness of the Africans is so far engrafted in their constitution, in the course of many generations, that their children wholly inherit it, if brought up in the same spot; but that it is not so wholly interwoven in their nature, that it cannot be removed if they are born and settled in another.

The same principles with the above we find adopted and further illustrated by Professor Zimmerman of Brunswick, in his celebrated work, The Geographical History of Man, &c. He there proves in the most satisfactory manner, That the complexion of the human species is uniformly correspondent with the degree of heat or cold to which they are habitually exposed. In maintaining this position, he makes a very proper distinction with regard to climate. By *climates* we are to understand, not simply or solely those distinguished by the geographical divisions of the globe, to the exclusion of what he terms *physical* climate, or that which depends on the changes produced in any given latitude by such adventitious circumstances as the lower or more elevated situations of a country, its being encompassed by water or large tracts of land, overspread or surrounded with forests, placed in an extensive plain, or environed by lofty mountains. Peculiarities of the like kind, as has been already noticed, frequently prevent the *physical* climate from corresponding entirely with the *geographical*, as a country influenced by them is often much warmer or colder than other regions placed under the same degree of latitude. The influence of these secondary or modifying circumstances has been already adverted to, and need not be further enlarged upon: we shall here only observe, that the erroneous reasoning of Lord Kames on this subject seems to have been owing to this inattention to the difference above mentioned. At Senegal, and in the adjacent lands, the thermometer is often at 112 or 117 degrees in the shade; and here we find the inhabitants jet black with woolly hair. The heat is equally great in Congo and Loango, and these countries are inhabited by negroes only; whereas in Morocco, to the north of these regions, and at the Cape of Good Hope, to the south, the heat is not so intense, nor are the inhabitants of so deep a hue. Lord Kames asks, Wherefore are not the Abyssinians and the inhabitants of Zaara of as dark a complexion as the Moors on the coast of Guinea? M. Zimmerman answers, that "these countries are much cooler. The desert is not only farther from the equator, but the winds blowing over the Atlas mountains, which like the Alps are covered with snow, and the westerly wind coming from the sea, must considerably mitigate the heat. Nor is Abyssinia so warm as either Monomotapa or Guinea. The north-east winds from the side of Persia and Arabia are cooled by their passage over the Red sea: the northern winds from Egypt lose much of their heat on the chain of mountains that is extended between the countries; the winds from the south and the west are sea winds. Thus, the only quarter from which they can derive excessive heat is from the east, as the air on this side must pass over tracts of heated lands." For a similar reason it is that negroes are not found either in Asia or South America under the equator. The situations of these countries, our author observes, expose them to sea-breezes and cooling winds from the continent. He confirms this hypothesis by observing, that the mountaineers of warm climates, as in Barbary and Ceylon, are much fairer than the inhabitants of the valleys: that

that the Saracens and Moors who conquered the north-east part of Africa in 1700, from being brown, are become like the negroes near the equator: that the Portuguese, who settled at Senegal in 1400, became blacks; and Tudela the Jew asserts, that his countrymen in Abyssinia acquired the dark complexion of the original natives.

Upon the whole, colour and figure may be styled habits of the body. Like other habits, they are created, not by great and sudden impressions, but by continual and almost imperceptible touches. Of habits both of mind and body, nations are susceptible as well as individuals. They are transmitted to offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a succession of ages. They become, however, fixed at last; and if we can ascertain any effect produced by a given state of weather or of climate, it requires only repetition during a sufficient length of time to augment and impress it with a permanent character. The sanguine countenance will, for this reason, be perpetual in the highest latitudes of the temperate zone; and we shall for ever find the swarthy, the olive, the tawny, and the black, as we descend to the south.

The uniformity of the effect in the same climate, and on men in a similar state of society, proves the power and certainty of the cause. If the advocates of different human species suppose that the beneficent Deity hath created the inhabitants of the earth of different colours, because these colours are best adapted to their respective zones; it surely places his benevolence in a more advantageous light to say, he has given to human nature the power of accommodating itself to every zone. This pliancy of nature is favourable to the union of the most distant nations, and facilitates the acquisition and the extension of science, which would otherwise be confined to few objects and to a very limited range. It opens the way particularly to the knowledge of the globe which we inhabit; a subject so important and interesting to man. It is verified by experience. Mankind are for ever changing their habitations by conquests or by commerce; and we find them in all climates, not only able to endure the change, but so assimilated by time, that we cannot say with certainty whose ancestor was the native of the clime, and whose the intruding foreigner.

All the foregoing observations have been well recapitulated, illustrated by new facts, and enforced by additional reasoning founded on experience, by the Reverend Dr S. S. Smith, professor of moral philosophy in the college of New Jersey, in his *Essay on the Causes of the variety of Complexion and Figure in the Human species*; to which the reader who wishes for further satisfaction on the subject is referred.

COMPLEXUS; and *COMPLEXUS Minor*, or *Trachelo-mastoidæus*; two muscles in the posterior part of the trunk. See ANATOMY, *Table of the Muscles.*

COMPLICATION, in general, denotes the blending, or rather interweaving, of several different things together: thus, a person afflicted with several disorders at the same time, is said to labour under a complication of disorders.

COMPLINE, the last division of the Romish breviary. It was instituted to implore God's protection during the night, as the *prime* is for the day. It is recited after sunset; and is so called, because it completes the office for the day.

COMPLUTENSIAN BIBLE. See BIBLE (*Greek.*)

COMPONE, or COMPONED, or *Gobony*, in *Heraldry*. A bordure compone is that formed or composed of a row of angular parts, or chequers of two colours.

COMPONED, or COMPOSED, is also used in general for a bordure, a pale, or a fess, composed of two different colours or metals disposed alternately, separated and divided by fillets, excepting at the corners; where the junctures are made in form of a goat's foot.

COMPOSITE, in general, denotes something compounded, or made up of several others united together: thus,

COMPOSITE Numbers, are such as can be measured exactly by a number exceeding unity; as 6 by 2 or 3, or 10 by 5, &c. so that 4 is the lowest composite number. Composite numbers, between themselves, are those which have some common measure besides unity; as 12 and 15, as being both measured by 3.

COMPOSITE Order, in *Architecture*, the last of the five orders of columns; so called because its capital is composed out of those of the other columns, borrowing a quarter round from the Tuscan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its corniche has simple modillions, or dentils. It is also called the *Roman* or *Italic* order, as having been invented by the Romans. By most authors it is ranked after the Corinthian, either as being the next richest, or the last invented. See ARCHITECTURE, N° 48.

COMPOSITION, in a general sense, the uniting or putting together several things, so as to form one whole, called a *compound*.

COMPOSITION of Ideas, an act of the mind, whereby it unites several simple ideas into one conception or complex idea.

When we are provided with a sufficient stock of simple ideas, and have by habit and use rendered them familiar to our minds, they become the component parts of other ideas still more complicated, and form what we may call a second order of compound notions. This process may be continued to any degree of composition we please, mounting from one stage to another, and enlarging the number of combinations.

COMPOSITION, in *Grammar*, the joining of two words together; or prefixing a particle to another word, to augment, diminish, or change its signification.

COMPOSITION, in *Logic*, a method of reasoning, whereby we proceed from some general self-evident truth to other particular and singular ones.

In disposing and putting together our thoughts, there are two ways of proceeding equally within our choice; for we may so suppose the truths, relating to any part of knowledge, as they presented themselves to the mind in the manner of investigation: carrying on the series of proofs in a reverse order, till they at last terminate in first principles: or beginning with these principles, we may take the contrary way; and from them deduce, by a direct train of reasoning, all the several propositions we want to establish.

This diversity in the manner of arranging our

 thoughts

Composition.

thoughts gives rise to the twofold division of method established among logicians; the one called *analytic* method, or the method of *resolution*, inasmuch as it traces things back to their source, and resolves knowledge into its first and original principles. This method stands in contradistinction to the method of composition; or, as it is otherwise called, the *synthetic* method; for here we proceed by gathering together the several scattered parts of knowledge, and combining them into one system, in such a manner as that the understanding is enabled distinctly to follow truth through all the different stages of gradation.

Composition, in *Music*, is the art of inventing and writing airs; of accompanying them with a suitable harmony; in short, of forming a complete piece of music in all its parts.

The knowledge of melody, harmony, and its rules, is the foundation of composition. Without doubt, it is necessary to know in what manner chords should be filled, how to prepare and resolve dissonances, how to find the fundamental bass, and how to put in practice all the other minutiæ of elementary knowledge: but with the mechanical rules of harmony alone, one is by no means better qualified to understand the art, and operate in the practice of composition, than to form himself for eloquence upon all the rhetorical precepts exhibited in grammar. We need not say, that besides this, it is necessary to understand the genius and compass of voices and instruments; to judge what airs may be of easy, and what of difficult, execution; to observe what will, and what will not, be productive of any effect; to feel the character of different movements, as well as that of different modulations, that both may be always suitably applied; to know the different rules established by convention, by taste, by caprice, or by pedantry, as fugues, imitations, or in pieces where the subject is confined to uniform laws in its harmony, melody, rhythmus, &c. All these acquisitions are still no more than preparatives for composition; but the composer must find in his own genius the sources of beautiful melody, of sublime harmony, the picturesque, and the expressive in music; he must, in short, be capable of perceiving, and of forming, the order of the whole piece; to follow the relations and aptitudes of which it is susceptible in every kind; to inflame his soul with the spirit and enthusiasm of the poet, rather than childishly amuse himself with punning in harmony, or adapting the music to each particular word. It is with reason that our musicians have given the name of *words* to the poems which they set to music. It appears evident from their manner of expressing them, that, in their apprehension, they seemed words, and words alone. One would be tempted to imagine, particularly during some of these last years, that the rules for the formation and succession of chords have caused all the rest to be neglected or forgotten; and that harmony has made no acquisitions but at the expence of what is general and essential in the musical art. All our artists know how to fill a chord with its constituent sounds, or a piece of harmony with its constituent parts; but not a soul amongst them feels a ray of composition. As to what remains, though the fundamental rules of counterpoint, or music in parts, continues still the same, they are more or less rigorous and inflexible in proportion as the parts increase in number; for according as the parts are multiplied, the difficulty of composition is heightened, and the rules are less severe. Compositions in two parts are called *duettos* when the two performers sing equally; that is to say, when the subject is no further extended; but divided between them: but if the subject is in one part alone, and the subordinate harmony no more than an accompanyment, the first part is then either called a *recitative* or a *solo;* and the other an *accompanyment*, or *continued bass*, if it is a bass. It is the same case with the *trio*, with compositions in three, in four, or in five parts.

The name of *composition* is likewise given to such pieces of music themselves as are formed according to the rules of the art. For this reason the *duets*, *trios*, *quartettos*, which have just been mentioned, are called *compositions*.

Compositions are either formed for the voice alone, or for instruments, or for voices and instruments joined. Full choruses and songs are the only compositions principally intended for the voice, though sometimes instruments are joined with it to support it. Compositions for instruments are intended to be executed by a band in the orchestra, and then they are called *symphonies*, *concertos;* or for some particular species of instruments, and then they are called *pieces* or *sonatas*.

Such compositions as are destined both for voices and instruments, have been generally divided into two capital species, viz. the *sacred* and the *secular*. The compositions destined for the church, whether psalms, hymns, anthems, or responsives, are in general distinguished by the name of *church-music*, and characterised by their intention to be sung with words. Secular music in general may likewise be divided into two kinds; *theatrical* and *chamber* music. Of the first kind is that used in the operas; the subdivisions of the second are endless. Solos, concertos, cantatas, songs, and airs, almost of every kind, which are not adapted to the church or the stage, may be included in the idea of *chamber-music*.

In general, it is thought, that sacred music requires deeper science, and a more accurate observation of rules; the secular species gives more indulgence to genius, and subsists in greater variety.

But we must here observe, that the ecclesiastical music now used, or rather profaned and murdered, amongst us, though regular in its harmony, is simple in its composition, and demands not that profound knowledge in the art, either to form or comprehend it, which Rousseau, whom till now we have followed in this article, seems to imagine. His assertion can only be applicable to the church-music of Italy. That which is now established amongst us seems not to be indigenous, but transferred with the Calvinistical liturgy from Geneva; and as it is intended for popular use, it can by no means be esteemed a high exertion of the musical art; yet, however simple, it is pleasing; and, when properly performed, might elevate the soul to a degree of devotion, and even of rapture, which at present we are so far from feeling, that we rather seem to sleep or to howl, than to sing the praise of God. Perhaps our clergy may find more advantage in cultivating their farms; but they would surely feel a higher and diviner pleasure in cultivating the tastes and voices

voices of their people. The one, however, is not incompatible with the other. An hour of relaxation in a winter evening might ſerve for the accompliſhment of this pious purpoſe; and one ſhould imagine, that, independent of religious conſiderations, the ſpirit of the craft might dictate ſuch a meaſure, as calculated to produce popular entertainment and gain popular affection.

In compoſition, the author either confines himſelf, as a ſubject, to the mere mechanical modulations and arrangements of ſound, and, as his end, to the pleaſure of the ear alone; or otherwiſe he ſoars a nobler height; he aſpires to imitative muſic; he endeavours to render the hearts and ſouls of his auditors ductile by his art, and thus to produce the nobleſt emotions and moſt ſalutary effects. In the firſt view, it is only neceſſary that he ſhould look for beautiful ſounds and agreeable chords; but in the ſecond he ought to conſider muſic in its conformity with the accents of the human voice, and in the expreſſive powers of notes harmonically combined to ſignify or paint ſuch objects as are ſuſceptible of imitation. In Rouſſeau's article *opera*, ſome ideas may be found by which the art may be ennobled and elevated, by forming muſic into a language more powerful and pathetic than eloquence itſelf. See OPERA.

COMPOSITION, in literature, the art of forming and arranging ſentiments, and clothing them with language ſuitable to the nature of the ſubject or diſcourſe. See the articles LANGUAGE, ORATORY, POETRY, DIALOGUE, EPISTLE, and HISTORY.

COMPOSITION, in *Chemiſtry*, is the union and combination of two or more ſubſtances of different natures, from which a compound body reſults. From this union of bodies of different natures, a body is formed, of a different nature, which Becker and Stahl have called a *mixture*, and which may be called a *combination*, or *chemical compoſition*, to avoid the equivocal ſenſe of the word *mixture*. By this laſt, we underſtand only a mere appoſition of parts; and which would therefore give a very falſe idea of chemical compoſition, in which a mutual adheſion takes place between the combined ſubſtances. See *Affinity* under CHEMISTRY.

COMPOSITION, in *Painting*, includes the invention as well as diſpoſition of the figures, the choice of attitudes, &c.

Compoſition, therefore, conſiſts of two parts; one of which finds out, by means of hiſtory, proper objects for a picture; and the other diſpoſes them to advantage. See PAINTING.

COMPOSITION, in *Pharmacy*, the art or act of mixing divers ingredients together into a medicine, ſo as they may aſſiſt each other's virtues, ſupply each other's defects, or correct any ill qualities thereof. See PHARMACY.

COMPOSITION, in *Commerce*, a contract between an inſolvent debtor and his creditors, whereby the latter accept of a part of the debt in compoſition for the whole, and give a general acquittance accordingly.

COMPOSITION, in *Printing*, commonly termed *compoſing*, the arranging of ſeveral types or letters in the compoſing-ſtick, in order to form a line; and of ſeveral lines arranged in order, in the galley, to make a page; and of ſeveral pages to make a form. See PRINTING.

COMPOSITÆ, in *Botany*, the name of a claſs in Hermannus and Royen; as likewiſe of an order in Linnæus's fragments of a natural method, conſiſting in general of the plants which have the characters enumerated in the following article. A particular deſcription of this order is given under the article SYNGENESIA, which includes all the compound flowers.

COMPOSITUS FLOS, in *Botany*, an aggregate flower, compoſed of many *floſculi ſeſſiles*, on a common entire receptaculum, with a common perianthium, and whoſe antheræ being five in number unite in the form of a cylinder; the floſculi are monopetalous, and under each of them is a monoſpermous germen. Compound flowers are either *ligulati*, *tubuloſi*, or *radiati*.

COMPOST, in *Agriculture*, denotes a certain kind of mixture deſigned to aſſiſt the ſoil in the way of vegetation, inſtead of dung. The requiſites for a compoſt are, 1. That it ought to be cheaper than the quantity of dung required for an equal extent of ſoil. 2. It ought to be leſs bulky; and, 3. It ought to produce equal effects.

Under the article AGRICULTURE we have endeavoured to ſhow, that the true vegetable food conſiſts in reality of the putrid effluvia proceeding from decayed animal and vegetable ſuſtances. If this theory is admitted, the hope of making compoſts as a ſuccedaneum for dung is but very ſmall, unleſs they are made of putrefied animal and vegetable ſubſtances; in which caſe, unleſs in very ſingular circumſtances, they will prove much dearer than dung itſelf. Several attempts, however, have been made by thoſe who had other views concerning the nature of the true vegetable food. An oil compoſt is recommended in the Georgical Eſſays, upon a ſuppoſition that the food of vegetables is of an oily nature. It is made as follows: "Take of North American potaſh 12 lb. Break the ſalt into ſmall pieces, and put it into a convenient veſſel with four gallons of water. Let the mixture ſtand 48 hours: then add coarſe train oil 14 gallons. In a few days the ſalt will be diſſolved, and the mixture, upon ſtirring, will become nearly uniform. Take 14 buſhels of ſand, or 20 of dry mould: upon theſe pour the above liquid ingredients. Turn this compoſition frequently over, and in ſix months it will be fit for uſe. When the liquid ingredients are put to one or two hogſheads of water, a liquid compoſt will be formed, which muſt be uſed with a water cart."

This compoſt, however, the inventor himſelf owns to be inferior to rotten dung, as indeed may very naturally be ſuppoſed; yet in ſome caſes it ſeems capable of doing ſervice, as will appear from ſome of the following experiments which we extract from the eſſays above mentioned.

Exp. I. By the author of the eſſays. "I took four pots, N° 1, 2, 3, 4. N° 1. contained 12 lb. of barren ſand, with 1 oz. of the ſand oil-compoſt. N° 2. contained 12 lb. of ſand without any mixture. N° 3. had 12 lb. of ſand with half an ounce of ſlaked lime. N° 4. had 12 lb. of ſand with 4 oz. of the ſand oil-compoſt. In the month of March I put ſix grains of wheat into each pot, and during the ſummer I occaſionally watered

Compost.

watered the plants with filtrated water. All the time the plants were consuming the farina, I could observe very little difference in their appearance. But after one month's growth, I remarked that N° 1. was the best; N° 2. the next; N° 3. the next; and N° 4. much the worst." The same differences were observed in August, when N° 1. the best, had five small ears, which contained a few poor grains of wheat."

Exp. II. By the same. "In the month of June, I selected four lands of equal goodness in a field intended for turnips. The soil was a light sand, with a tolerable quantity of vegetable earth amongst it. It was ploughed out of sward in November, and had not borne a crop for many years. I shall distinguish my experimental lands by N° 1, 2, 3, 4. N° 1. was manured with rotten dung; N° 2. with oil compost; N° 3. with lime; N° 4. was left without any dressing. On the 20th of June they were all sown with turnip seed broadcast, and during the course of the season were twice hoed. In November I viewed the field, and made the following remarks. N° 1. the best; N° 2. the next; N° 3. the worst; N° 4. better than N° 3." Here the oil compost appears in a favourable light; but other trials, made with equal accuracy, seem rather to prove, that it is not proper for turnips, barley, or quick-growing vegetables. It requires being meliorated by the atmosphere, and therefore is better adapted for winter crops."

Exp. III. By the same. "In the month of May, I planted 12 alleys that lay between my asparagus beds with cauliflower plants. Each alley took up about 30 plants. One of the alleys I set apart for an experiment with the oil-compost, prepared according to the directions already given. About an handful of the compost was put to the root of each cauliflower plant. In all other respects the alley was managed like the rest. The plants in general flowered very well; but those to which I applied the compost sprung up hastily with small stalks, and produced very poor flowers. I imputed this unfavourable appearance to the freshness of the compost, which was only a few weeks old. In the September following this unsuccessful experiment, I planted the same alleys with early cabbages. The necessity of meliorating the compost was in this trial fully confirmed: For the cabbages that grew upon the alley, which in May had received the compost, were larger and in all respects finer than the others."

Exp. IV. by James Stovin, Esq. of Doncaster. "In the year 1769, I made the following trial with the oil-compost, prepared as above directed. One acre sown with barley, and manured with oil compost at 18s. produced five quarters five bushels. An acre adjoining, sown with barley, and manured with 12 loads of rotten dung at 3l. produced four quarters three bushels and two pecks. The compost barley was bolder and better corn than the other. In the year 1770, the dunged acre produced of rye, three quarters. The compost acre of ditto, two quarters six bushels. In the year 1771, the same lands were sown with oats, and the produce was greatly in favour of the dunged acre. These experimental lands were in a common field that had been long under the plough."

Exp. V. by Richard Townley, Esq. of Belfield. "In the spring 1770, I prepared a piece of ground for onions. It was laid out into six beds of the same size, and which were all sown at the same time. Over two of them, the oil-compost was scattered in a very moderate quantity. Over other two, pigeon's dung; and over the remaining two, some of my *weed-compost* (formed of putrified vegetables), which I esteem one of the best manures, for most vegetables, that can be made. The onions came up very well in all the beds; but in about six weeks, those that were fed with the oil compost, plainly discovered the advantage they had over the rest by their luxuriancy and colour, and at the end of the summer perfected the finest crop I had ever seen, being greatly superior to the others both in quantity and size. The same spring I made an experiment upon four rows of cabbages, set at the distance of four feet every way. Two were manured with oil-compost, and two with my own. All the plants were unluckily damaged, just before they began to form, by some turkeys getting into the field and plucking off the greatest part of the leaves. However, they so far recovered, in the September following, from 22 to 28lb. a-piece. The rows proved so equal in goodness, that I could not determine which had the advantage. The same year, one part of a field of wheat exposed to the north-east winds, which that spring continued to blow for a month or five weeks, appeared very poor and languid at the time of tillering. Over it I ordered some of the oil-compost to be sown with the hand; which not only recovered, but also pushed forwards the wheat plants in that part of the field, so as to make them little inferior, if any, to the rest. The same spring, I made a comparative experiment, upon four contiguous lands of oats, between the oil-compost and my own weed-compost. The latter had manifestly the advantage, though the other produced a very large and fine crop. I also tried the oil-compost upon carrots, and it answered exceedingly well. I did the same this year (1771) both upon them and my onions, and have the finest crops of these vegetables I ever saw anywhere upon the same compass of ground."

Exp. VI. by Mr J. Broadbent of Berwick, in Elmet near Leeds.——"On the first of October 1771, I sowed two acres of a light channelly soil with wheat, and harrowed in the compost with the grain. Being at a considerable distance from a large town, we find it very difficult and expensive to procure rotten dung in sufficient quantity for our tillage lands, for which reason we have recourse to land dressings both for our winter and spring corn. Rape-dust and soot are principally used; but the present price of both these articles is a heavy tax upon the farmer. To obviate that inconvenience, I resolved to make trial of the oil-compost; and from what I have observed in this one experiment, I am encouraged to make a more extensive use of it the next year. Being well acquainted with the nature and efficacy of soot, I am satisfied, that the above two acres produced as good a crop of wheat as if they had been dressed with that excellent manure."

On the supposition that vegetables are supported by matters of a saline nature, composts formed of different sorts of salts have been contrived, but with less success than the one above treated of. A famous composition

position of this kind was lately sold by patent, under the name of *Baron Van Haak's Compost*. The following experiment is mentioned in the Georgical Essays, as made with a view to determine the virtues of it compared with the oil-compost and soot mixed with ashes.—" In the beginning of April 1773, an acre of land was sown with early oats. I pitched upon one land in the middle of the piece, which I esteemed better than any of the rest, and upon this I scattered Baron Van Haak's compost, in the quantity directed in his instructions. On one side I manured a land with the oil-compost, but rather with a less quantity than directed; and, on the other side, I manured two lands with dry coal-ashes sifted fine, and an equal quantity of soot. The lands upon which this experiment was made, were much worn out with a long succession of crops. The lands which had the benefit of the ashes and soot produced an exceeding fine crop; the oil-compost produced a tolerable good one; but that which had only the assistance of the baron's compost, produced a very poor one. It could not have been worse had it been left destitute of every assistance."

Composts, made with putrified animal substances will no doubt answer much better, in most cases, than any other kind of manure, but they are difficult to be procured. The following is recommended by Dr Hunter of York.—" Take a sufficient quantity of saw-dust, incorporate it with the blood and offal of a slaughter-house, putting a layer of one and a layer of the other till the whole becomes a moist and fetid composition. Two loads of this compost, mixed with three loads of earth, will be sufficient for an acre of wheat or spring-corn. Being a kind of top-dressing, it should be put on at the time of sowing, and harrowed in with the grain. The present year I have a field of wheat manured in this manner, and have the pleasure to say, that it is extremely clean, and has all the appearance of turning out an excellent crop. As this kind of compost lies in a small compass. it seems well adapted for the use of such farmers as are obliged to bring their manures from a distance. It is besides extremely rich, and will probably continue in the land much longer than fold-yard or stable-dung. I apprehend that it is capable of restoring worn-out land to its original freshness; and I am induced to be of that opinion, from the appearance of the above crop, which is now growing upon land much impoverished by bad management."

Another compost, prepared from whales flesh, is recommended by Mr Charles Chaloner.—" I have a particular pleasure (says he) in describing and making public the best method of forming a compost from whales flesh, as recommended to me by Dr Hunter. Having marked out the length and breadth of your intended dung-hill, make the first layer of earth about a foot in thickness. Moor-earth, or such as is taken from-ant hills, is the best for this purpose. Over the earth lay one layer of long litter, from the fold-yard or stable, above 12 inches in thickness, then a layer of whale-flesh, and over that another layer of dung. Repeat the operations till the head be raised about six feet, then give it a thick covering of earth, and coat the heap with sods. In this manner each layer of flesh will be placed between two layers of dung. In about a month turn the whole in the usual manner, which will occasion a strong degree of heat and fermentation. When turned, coat with earth as before, with a view to confine the putrid steam which would otherwise escape. In a month or two the heap will be found to be considerably fallen, when it should have a second turning as before. The operation of turning must be repeated at proper intervals, till the whole becomes an uniformly putrid mass. The whale-flesh is of different degrees of firmness, some of it being almost liquid; and, in proportion to its firmness, the heap will become sooner or later fit for use. In general, the compost should not be used till 12 months old; but that depends upon circumstances. Guard the heap from dogs, pigs, badgers, and vermin, as these animals are remarkably fond of whale-flesh. This animal compost may with great advantage be applied to all purposes where good rotten dung is required. I have used it with great success for cabbages, and find it an excellent dressing for meadow-ground. According to the best computation, one hogshead of whale refuse, will make eight loads of dung; which when we consider the great facility with which this basis of our dung-hill may be carried, is a momentous concern to such farmers as lie remote from a large town." See *Manure*, under AGRICULTURE, where the method of preparing it from peat earth, is particularly detailed. We may here recommend a most ingenious thermometer, invented by Mrs Lovi of Edinburgh, for regulating the temperature of compost dunghills, which the farmer will find of great use in managing the process.

COMPOST, in *Gardening*, is a mixture of several earthy substances and dungs, either for the improvement of the general soil of a garden, or for that of particular plants. Almost every plant delights in some peculiar mixture of soils or compost, in which it will thrive better than in others.

COMPOSTELLA, a celebrated town of Spain, and capital of Galicia, with an archbishop's see, and an university. The public squares, and the churches, particularly the metropolitan church, are very magnificent. It has a great number of monasteries, for both sexes, and about 2000 houses. It is pretended that the body of St James was buried here, which draws a great number of pilgrims from most parts of Christendom. They walk in procession to the church, and visit his wooden image, which stands on the great altar, and is illuminated with 40 or 50 wax candles. They kiss it three times with a very respectful devotion, and then put their hats on its head. In the church there are 30 silver lamps always lighted, and six chandeliers of silver five feet high. The poor pilgrims are received into an hospital, built for that purpose, which stands near the church; and round it are galleries of free-stone, supported by large pillars. The archbishop is one of the richest prelates in Spain, having 70,000 crowns a-year. From this town the military order of St Jago, or St James, had its origin. It is seated in a peninsula, formed by the rivers Tambra and Ulla, in a pleasant plain, 265 miles north-west of Madrid. W. Long. 8. 17. N. Lat. 42. 52.

New COMPOSTELLA, a town of North America, in New Spain, and province of Xalisco, built in 1531. It is situated near the South sea. W. Long. 109. 42. N. Lat. 21. 20.

COMPOUND, in a general sense, an appellation given

given to whatever is compofed or made up of different things; thus we fay, a compound word, compound found, compound tafte, &c.—*Compound* differs from *complex*, and ftands oppofed to *fimple*. See COMPLEX and SIMPLE.

COMPOUND Flower. See *COMPOSITUS Flos*.

COMPOUND Intereft, called alfo *intereft upon intereft*, is that which is reckoned not only upon the principal, but upon the intereft itfelf forborne; which hereby becomes a fort of fecondary principal. See INTEREST.

COMPOUND Motion, that motion which is effected by feveral confpiring powers. Powers are faid to confpire if the direction of the one be not quite oppofite to that of the other, as when the radius of a circle is conceived to revolve about a centre, and at the fame time a point to move ftraight along it.

COMPOUND Numbers, thofe which may be divided by fome other number befides unity, without leaving any remainder; fuch as 18, 20, &c. the firft being meafured by the number 2, 6, 9 and the fecond by the number 2, 4, 5, 10.

COMPOUND Quantities. See ALGEBRA.

COMPOUND Ratio, is that which the product of the antecedents of two or more ratios has to the product of their confequents. Thus, 6 to 72 is in a ratio compounded of 2 to 6, and of 3 to 12.

COMPOUND (fubftantive), the refult or effect of a compofition of different things; or a mafs formed by the union of many ingredients.

COMPREHENSION, in Englifh church-hiftory, denotes a fcheme propofed by Sir Orlando Bridgman in 1667 8, for relaxing the terms of conformity in behalf of Proteftant diffenters, and admitting them into the communion of the church. A bill for this purpofe was drawn up by Lord Chief-Baron Hale, but difallowed. The attempt was renewed by Tillotfon and Stillingfleet in 1674, and the terms were fettled to the fatisfaction of the nonconformifts; but the bifhops refufed their affent. This fcheme was likewife revived again immediately after the Revolution; the king and queen expreffed their defire of an union: however, the defign failed after two attempts; and the act of toleration was obtained.

COMPREHENSION, in *Metaphyfics*, is that act of the mind whereby it apprehends or knows any object that is prefented to it, on all the fides whereon it is capable of being apprehended or known. To comprehend a thing is defined by the fchoolmen, *rem aliquam totam et totaliter cognofcere*.

COMPREHENSION, in *Rhetoric*, a trope or figure whereby the name of a whole is put for a part; or that of a part for a whole; or a definite number of any thing for an indefinite.

COMPRESS, in *Surgery*, a bolfter of foft linen cloth, folded in feveral doubles, frequently applied to cover a plafter, in order not only to preferve the part from the external air, but alfo the better to retain the dreffings or medicines.

COMPRESSION, the act of preffing or fqueezing fome matter together, fo as to fet its parts nearer to each other, and make it poffefs lefs fpace. *Compreffion* properly differs from *condenfation*, in that the latter is performed by the action of cold, the former by fome external violence.

COMPROMISE, a treaty or contract, whereby two contending parties eftablifh one or more arbitrators to judge of and terminate their difference in an amicable manner.

COMPTON, HENRY, bifhop of London, was the youngeft fon of Spencer earl of Northampton, and born in 1632. After the reftoration of Charles II. he became cornet of a regiment of horfe; but foon after quitting the army for the church, he was made bifhop of Oxford in 1674; and about a year after tranflated to the fee of London. He was entrufted with the education of the two princeffes Mary and Anne, whom he alfo afterwards married to the princes of Orange and Denmark; and their firmnefs in the Proteftant religion was in a great meafure owing to their tutor, to whom, when Popery began to prevail at court, it was imputed as an unpardonable crime. He was fufpended from his ecclefiaftical function by James II. but was reftored by him again on the prince of Orange's invafion. He and the bifhop of Briftol made the majority for filling the vacant throne with a king: he performed the ceremony of the coronation; was appointed one of the commiffioners for revifing the liturgy; and laboured with much zeal to reconcile diffenters to the church. His fpirit of moderation made him unpopular with the clergy, and in all probability checked his further promotion. He died in 1713; but living in bufy times, did not leave many writings behind him.

COMPTROLLER. See CONTROLLER.

COMPULSOR, an officer under the Roman emperors difpatched from court into the provinces, to compel the payment of taxes, &c. not paid within the time prefcribed. The word is formed of the verb *compellere*, "to oblige, conftrain." Thefe were charged with fo many exactions, under colour of their office, that Honorius cafhiered them by a law in 412.

The laws of the Vifigoths mention military compulfors; which were officers among the Goths, whofe bufinefs was to oblige the tardy foldiers to go into the fight, or to run to an attack, &c.

Caffian mentions a kind of monaftic compulfors, whofe bufinefs was to declare the hours of canonical office, and to take care the monks went to church at thefe hours.

COMPUNCTION, in *Theology*, an inward grief in the mind for having offended God. The word comes from *compungere*, of *pungere*, "to prick,"—The Romanifts own their confeffion infignificant unlefs attended with compunction or pricking of heart.

Among fpiritualifts, compunction bears a more extenfive fignification; and implies not only a grief for having offended God, but alfo a pious fenfation of grief, forrow, and difpleafure, on other motives.—Thus, the miferies of life, the danger of being loft in the world, the blindnefs of the wicked, &c. are to pious people motives of compunction.

COMPURGATOR, one that, by oath, juftifies another perfon's innocence. Compurgators were introduced as evidences in the jurifprudence of the middle ages. Their number varied according to the importance of the fubject in difpute, or the nature of the crime with which a perfon was charged.

COMPUTATION, in a general fenfe, the manner

ner of estimating time, weights, measure, moneys, or quantities of any kind.—The word is sometimes also used among mathematicians in the like sense as calculation.

COMUM, in *Ancient Geography*, a town of the Orobii, of an ancient standing, and formerly powerful, daring to dispute with the Romans; *Comenses*, the people; *Comensis Ager*, the epithet. It became afterwards no inconsiderable municipium, to which Julius Cæsar added 5000 new colonists (Strabo); whence it was generally called *Novocomum*, and the people *Novocomenses*. But in time it recovered its ancient name, *Comum*; Pliny the younger, a native of that place, calling it by no other name. Now *Como*, in the duchy of Milan, at the south end of the lake of that name. E. Long. 9. 37. N. Lat. 46. It is about 80 miles N. E. of Turin.

COMUS, in *Mythology*, the god of jollity or festivity. There is great reason to believe he was the Chamos of the Moabites; Beel-Phegor, Baal-Peor, Priapus, and Bacchus. He is represented under the appearance of a young man, with an inflamed red countenance, his head inclined, and crowned with flowers; his air drowsy; leaning on a huntsman's spear in his left hand, and holding an inverted torch in his right. His statue was placed at the chamber doors of new married persons; his pedestal crowned with flowers.

CON, or COND. See COND.

CONANT, DR JOHN, a learned English divine, born in 1608. He took his degrees at Exeter college Oxford; was, by the parliament, constituted one of the assembly of divines, though he seldom, if ever, sat with them; and in 1657 was admitted vice-chancellor of the university. On the restoration he was one of the commissioners, and assisted at the conferences in the Savoy; but was deprived by the act of uniformity; after eight years he was confirmed, and was made archdeacon of Norwich, and prebendary of Worcester. In 1686 he lost his sight; and died in 1693; leaving a number of admired sermons, afterwards published in six volumes.

CONARION, or CONOIDES, a name for the pineal gland. See ANATOMY *Index*.

CONATUS, a term frequently used in philosophy and mathematics, defined by some to be a quantity of motion, not capable of being expressed by any time or length; as the *conatus recedendi ab axe motus*, is the endeavour which a body, moved circularly, makes to recede, or fly off, from the centre or axis of its motion.

CONCA, SEBASTIAN, called *Cavalier*, a celebrated history and portrait painter, was born at Gaeta in 1679, and placed as a disciple with Francesco Solimena, an incomparable master. Under his direction Conca exerted his utmost industry to obtain a proper knowledge of the true principles of the art of painting; nor did he permit any kind of amusement to withdraw his attention from his studies. Solimena soon perceived in his disciple such talents, and such a disposition, as would qualify him to make a very great progress; and on that account he conceived so strong an affection for him, that he not only afforded him the best instructions, but often employed him to sketch after his own designs; took him along with him to Monte Cassino, where he was to paint a chapel in fresco; and there made Conca acquainted with every thing relative to that manner of painting. At his return to Naples with Solimena, he was, if possible, still more assiduous to improve himself to the utmost; and entered on a project that might at once advance his income, and add to his expertness in his profession. That project was, to paint portraits in a small size and at a low rate; by which scheme all ranks of persons crowded to him; and beside the pecuniary advantages resulting from it, he acquired an extraordinary freedom of hand in penciling and colouring; a good habit of imitating nature with an elegant choice; and likewise great diversity of airs of heads, which were of extraordinary use to him in his future beautiful compositions. As he had a great desire to see Rome, he obtained permission from Solimena to indulge his inclination; and although he was near thirty years of age when he visited that city, yet he spent eight years in constant study after the antiques, after Buonaroti, Raphael, and the Carracci, and perfected himself in every part of his profession. The fame of his works soon spread throughout Rome, and procured him the patronage of Cardinal Ottobuoni, who was a princely encourager of artists; and Conca having shown an elegant proof of his abilities in a composition representing Herod inquiring of the wise men the place of the birth of the Messiah, the figures being as large as life, the Cardinal thought it so excellent a performance, that he rewarded him in a munificent manner, entertained him in his own palace, and introduced him to Pope Clement XI. who appointed Conca to paint the picture of the prophet Jeremiah in the church of St John Lateran; which he executed with universal applause. On that occasion the pope was desirous of giving him some particular mark of his esteem; and therefore, in a general assembly of the academicians of St Luke, he conferred on him the order of knighthood, and the cardinal presented him with a rich diamond cross, which Conca, out of respect to his patron, always wore at his bosom. From that time he was incessantly employed, and his works were solicited by most of the princes of Europe. The churches and chapels of every part of Italy are enriched with some of his compositions; of which he painted an incredible number, as he lived to a very advanced age, and never discontinued his labours. He was earnestly invited by Philip V. of Spain to visit his court, but he could not be prevailed on to leave Rome. He painted two admirable pieces for the king of Poland, with figures as large as life; in one was represented Alexander presenting Bucephalus to Philip, after he had managed him; a grand composition, with a multitude of figures, correctly designed, and charmingly grouped and disposed; the whole being adorned with most elegant architecture, in true and beautiful perspective. The other was the marriage of Alexander with Roxana, the daughter of Darius, which was in every respect equal to the former. He was at last so strongly pressed to go to Naples, that he undertook the journey; and was received in that kingdom with all the respect and honour due to his merit; and there he finished several noble designs, as also at Gaeta his native city. While he continued at Naples, he received in the royal presence a snuff-box of very great value, presented

presented to him in the king's name by the marquis of Tanucci, at that time prime minister; and in the year 1757, the king was pleased to ennoble him and all his descendants. At that time he was 78, and it is confidently said, that he died in 1761, aged 82, which is very probable, though not positively certain. He understood perspective and architecture thoroughly, and added to it a fine understanding of the chiaro-scuro. His style of composition is grand and elegant; his design very correct; his disposition ingenious; his attitudes and expression full of truth, nature, and variety; and his colouring is excellent. The history of Diana and Actæon, by Conca, is in the possession of the earl of Pembroke at Wilton.

CONCALE BAY, is on the coast of France in Brittany, where the British forces landed in June 1758, in order to go to St Maloes; which they did, and burnt all the ships in that harbour, which were above 100, of all sorts. Concale is the town which gives name to the bay, and is famous for oysters. It is 18 miles east of St Maloes, and 197 west of Paris. W. Long. 1. 47. N. Lat. 48. 41.

CONCARNEAU, a town of France, in the department of Finisterre, with a harbour and a castle. E. Long. 4. 2. N. Lat. 47. 46.

CONCATENATION, a term chiefly used in speaking of the mutual dependence of second causes upon each other.

CONCAVE, an appellation used in speaking of the inner surface of hollow bodies, but more especially of spherical ones.

CONCAVE Glasses, such as are ground hollow, and are usually of a spherical figure, though they may be of any other, as parabolical, &c. All objects seen through concave glasses appear erect and diminished.

CONCENTRATION, in general, signifies the bringing things nearer a centre. Hence the particles of salt, in sea-water, are said to be concentrated; that is, brought nearer each other, by evaporating the watery part.

CONCENTRIC, in *Mathematics*, something that has the same common centre with another: it stands in opposition to *excentric*.

CONCEPTION, in *Logic*, the simple apprehension or perception which we have of any thing, without proceeding to affirm or deny any thing about it. Some writers, as Lord Kames, distinguish between conception and perception; making the latter to denote the consciousness of an object when present, or to include the reality of its object; whereas conception expresses the forming an idea of an object whether present or absent, or without any conviction of its reality.

CONCEPTION, in *Medicine*, denotes the first formation of the embryo, or fœtus in the womb.

Conception is no other than such a concourse and commixture of the prolific seed of the male with that of the female, in the cavity of the uterus, as immediately produces an embryo.

The symptoms of conception or pregnancy are, when, in a few days after the conjugal act, a small pain is perceived about the navel, and is attended with some gentle commotions in the bottom of the abdomen; and within, one, two, three, or even four months, the menses cease to flow, or prove in less quantity than usual. Upon the first failure of this kind, the woman begins to count the series of her weeks, without taking any notice of the time before elapsed; after this, or between the second or third months, but generally about the third, the motions of the embryo become perceivable to the mother; who hereupon becomes troubled with a nausea, vomiting, loathing, longing, &c. About this time the breasts begin to swell, grow hard and painful, and contain a little milk; the nipples also become larger, firmer, and darker coloured, a livid circle appearing round them; the eyes seem sunk and hollow. During the two first months of pregnancy, the woman grows thinner and slenderer; the abdomen being also depressed; though it afterwards distends, and grows gradually larger.

The manner wherein conception is effected is thus laid down by the modern writers: In the superfices of the ovaries of women, there are found little pellucid spherules, consisting of two concentric membranes filled with a lymphatic humour, and connected to the surface of the ovaria underneath the tegument, by a thick calyx, contiguous to the extremities of the minute ramifications of the Fallopian tubes.

These spherules, by the use of venery, grow, swell, raise and dilate the membrane of the ovary into the form of papillæ; till, the head propending from the stalk, it is at length separated from it; leaving behind it a hollow cicatrix in the broken membrane of the ovary; which, however, soon grows up again.

Now, in these spherules, while still adhering to the ovary, fœtuses have been frequently found; whence it appears, that these are a kind of ova, or eggs, deriving their structure from the vessels of the ovary, and their liquor from the humours prepared therein.

Hence also it appears, that the Fallopian tubes being swelled and stiffened by the act of venery, with their muscular fimbriæ, like fingers, may embrace the ovaries, compress them, and by that compression expand their own mouths: and thus the eggs, now mature, and detached as before, may be forced into their cavities, and thence conveyed into the cavity of the uterus; where they may either be cherished and retained, as when they meet with the male seed: or, if they want that, again expelled.

Hence the phenomena of false conceptions, abortions, fœtuses found in the cavity of the abdomen, the Fallopian tubes, &c. For in coition, the male seed, abounding with living animalcules, agitated with a great force, a brisk heat, and probably with a great quantity of animal spirits, is violently impelled through the mouth of the uterus, which on this occasion is opener, and through the valves of the neck of the uterus, which on this occasion are laxer than ordinary, into the uterus itself; which now, in like manner, becomes more active, turgid, hot, inflamed, and moistened with the flux of its lymph and spirits, by means of the titillation excited in the nervous papillæ by the attrition against the rugæ of the vagina.

The semen thus disposed in the uterus, is retained, heated, and agitated, by the convulsive constriction of the uterus itself; till meeting with the ova, the finest and most animated part enters through the dilated pores of the membranula of the ovum, now become glandulous; is there retained, nourished, and dilated; grows to its umbilicus, or navel; stifles the other less lively animalcules; and thus is conception effected.

Hence it appears, that conception may happen in any part where the ſemen meets with an ovum: thus whether it be carried through the Fallopian tube to the ovary, and there caſt upon the ovum; or whether it meet with it in ſome receſs of the tube itſelf; or, laſtly, whether it join it in the cavity of the uterus, it may ſtill have the ſame effect, as it appears from obſervation actually to have had. But it is probable, that conception is then moſt perfect when the two, viz. the ſemen and ovum, are carried at the ſame time into the uterus, and there mixed, &c.

According to other phyſiologiſts the male ſeed is taken up, before it arrives in the uterus, by the veins which open into the vagina, &c. and thus mixed with the blood; by which, in the courſe of circulation, it is carried, duly prepared, into the ovary, to impregnate the eggs.

It has been advanced by ſeveral writers, that women may poſſibly conceive in their ſleep, and be with child without any knowledge of the occaſion of it. As ridiculous and abſurd as this doctrine may appear to the generality of the world, no leſs an author than Genſili has thought it worthy a particular diſſertation.

CONCEPTION, Immaculate, of the Holy Virgin, is a feaſt eſtabliſhed in honour of the holy virgin, particularly with regard to her having been conceived and born *immaculate*, i. e. without original ſin, held in the Romiſh church on the 8th of December. The immaculate conception is the great head of controverſy between the Scotiſts and Thomiſts; the former maintaining, and the latter impugning it. In the three Spaniſh military orders, of St James of the ſword, Calatrava, and Alcantara, the knights take a vow at their admiſſion to defend the immaculate conception. This reſolution was firſt taken in 1652. Peter d'Alva has publiſhed 48 huge volumes in folio on the myſteries of the conception.

CONCEPTION, an epiſcopal town of Chili in South America. It is ſituated in W. Long. 72. 50. S. Lat. 36. 40; and is the oldeſt European ſettlement in Chili, and the ſecond in point of dignity. On their firſt ſettlement here, the Spaniards were repeatedly driven off by the Indians, ſo that they were obliged to take up their reſidence at St Jago. Since that time both the cities of Conception and St Jago have been frequently deſtroyed by earthquakes. In the year 1751 both of them were laid in ruins by a dreadful ſhock, the firſt concuſſions of which were attended with an unuſual ſwelling of the ſea, that overturned the few houſes which had eſcaped the ravages of the earthquake. The harbour is good, and pretty much frequented; on which account the city is regarded as a place of conſequence. The king allows annually 350,000 pieces of eight for the ſupport of a garriſon of 3500 men; a corps that is ſeldom complete. None of the fortifications are conſiderable; but thoſe towards the land are wretched. The Spaniards now live in tolerable ſecurity with reſpect to the Indians, and have no notion of any attack from the land ſide. It is ſaid indeed, that not only this but all the ſettlements in Chili and Peru would fall an eaſy prey to the attacks of a foreign enemy; the fortifications being in ruins, and the garriſons ſcarce half the number required by the king: owing to the avarice, ignorance, and ſupine negligence of the governors, who ſtudy nothing but to enrich themſelves.

CONCEPTION, a town of North America in New Spain, and in the audience of Guatimala. It is ſeated near the ſea coaſt, 100 miles weſt of Porto-bello, and a ſmall river that runs into the ſea. W. Long. 81. 45. N. Lat. 10. 0.

CONCERT, or CONCERTO, in *Muſic*, a number or company of muſicians, playing or ſinging the ſame piece of muſic or ſong at the ſame time.

CONCERTATO intimates the piece of muſic to be compoſed in ſuch a manner, as that all the parts may have their recitativos, be it for two, three, four, or more voices or inſtruments.

CONCERTO GROSSI, the grand chorus of a concert, or thoſe places where all the ſeveral parts perform or play together.

CONCESSION, in general, ſignifies either the act of granting or yielding any thing, or the thing itſelf which is ſo granted or yielded.

CONCESSION, in *Rhetoric*, a figure, whereby ſomething is freely allowed, that yet might bear diſpute, to obtain ſomething that one would have granted to him, and which he thinks cannot fairly be denied, as in the following conceſſion of Dido, in Virgil:

"The nuptials he diſclaims, I urge no more;
"Let him purſue the promis'd Latian ſhore.
"A ſhort delay is all I aſk him now;
"A pauſe of grief, an interval from wo."

CONCHA, in *Zoology*, a ſynonyme of the MYTILUS, SOLEN, and other ſhell-fiſh.

CONCHES, a town of Normandy, with a Benedictine abbey, which carries on a conſiderable trade. It is ſeated on the top of a mountain, in the territory of Ouche, 45 miles north-weſt of Paris. E. Long. 0. 51. N. Lat. 48. 58.

CONCHITES MARMOR, a name given by the ancients to a ſpecies of marble dug near Megara, and remarkable for containing a great number of ſea-ſhells, and other marine bodies immerſed in it.

CONCHOID, in *Geometry*, the name of a curve, given to it by its inventor Nicomedes. See FLUXIONS.

CONCHOLOGY,

1 Introduction.

IS that department of natural hiſtory which treats of teſtaceous animals. In the Linnæan arrangement it conſtitutes the third order of the claſs of Vermes. This is the order *teſtacea*, of which we propoſe to lay before our readers a pretty full view in the preſent treatiſe. The peculiarity and extent of this order of animals have induced us to conſider it in a ſeparate treatiſe, by which means we ſhall avoid ſwelling out to an

History.

an inconvenient magnitude, the clafs of Vermes, which will be treated of in its proper place in the courfe of the work.

2 Importance of conchology.

The fine polifh, fplendid colours, and elegant form of fhells, have been long admired, and have procured for them a confpicuous place in the cabinets of the curious. Indeed in this refpect, mankind have difcovered no fmall degree of folly and extravagance, in the high price which has been given for rare and beautiful fhells, and often only on account of their rarity. But the ftudy of conchology acquires a higher degree of importance and utility in another view. In many parts of the world, different kinds of teftaceous animals are employed as an excellent and nutritious food; and fome tribes fupply the table with a delicate luxury. Different fhells furnifh employment to ingenuity and art, in the manufacture of mother-of-pearl for various purpofes; and the pearl itfelf, fo much fought after as an ornament of drefs, and often the rival of the richeft gems, in the eftimation of mankind, is the production of teftaceous animals. Its nature and mode of formation, therefore, cannot fail to be objects of curious inveftigation. But teftaceous animals and their productions are not only beneficial and ornamental; fome are found to be highly pernicious. The fnail ravages the garden and the field, and marks its progrefs with the deftruction of fome of the faireft of the vegetable tribes; while the fhip-worm is juftly the dread of the mariner: fecure, as it were, in its infignificance, it humbles the glory and pride of man; and labouring in fecret, demolifhes the nobleft efforts of ingenuity. In thefe views, then, the economy and habits of teftaceous animals, which at firft fight might appear a barren and ufelefs purfuit, become an important and beneficial fubject of inveftigation. The following chapters, therefore, fhall be occupied in the claffification and natural hiftory of this tribe of animals.

CHAP. I. HISTORY OF CONCHOLOGY.

3 Cultivated by the ancients.

THE few fcattered fragments concerning the natural hiftory of fhells, or teftaceous animals, which are to be found in the writings of the ancients, when compared with the more extended and fyftematic labours of the moderns, are fo unimportant and inaccurate, that it would be altogether fuperfluous to trouble our readers with an account of the information which they contain. It appears, however, from the works of Ariftotle and Pliny, the great naturalifts of Greece and Rome, that the ftudy of conchology was not entirely neglected in their time. It appears too, that admirers and collectors of fhells were not then wanting. Scipio and Lælius, we are informed, found a relaxation from the toils and cares of war and government, by indulging in this elegant amufement (A).

4 By the moderns.

Nor will it be attended with much advantage, to give a particular account of the works of the earlier writers on this fubject, among the moderns. Thefe are Gefner, Johnfton, Rondeletius, Aldrovandus, Bellonius, Wormius, and fome other authors, who cultivated this department of natural hiftory, and accompanied their defcriptions with figures, illuftrative of the objects which they defcribed.

The firft author who attempted a fyftematic divifion of fhells, according to their external form and character, was John Daniel Major, profeffor of medicine in the univerfity of Kiel in Holftein. His method is publifhed at the end of his curious and interefting remarks on the treatife concerning the *purpura* of Fabius Columna, printed at Kiel in 1675. The fyftem of the German naturalift was followed by that of our countryman Dr Lifter, on a more extended and improved plan, which was publifhed ten years after. Succeeding naturalifts turned their attention to the ftudy of conchology, and to the improvement of the claffification of the numerous objects of this department of natural hiftory. Such were Buonanni, Rumfius, Langius, Breynius, Tournefort, Gualtieri, D'Argenville, Klein, Linnæus, Adanfon, Geoffroy, and Muller.

We fhall here exhibit fome of the moft celebrated fyftems of conchology which have been propofed by writers on this fubject. This, we truft, will not be unacceptable to our readers, and particularly as the works of thefe authors are in few hands, and therefore become lefs acceffible.

5 Syftem of Lifter.

I. The firft general arrangement of fhells is that publifhed by Dr Lifter in a work with the following title. *Martini Lifter, M. D. Hiftoriæ five Synopfis methodicæ Conchyliorum libri quatuor, continentes* 1057 *figuras ære nitidiffime infculptas, a Sufanna et Anna Lifter depictas.* Londini, 1685—1688, folio. A fecond edition of the fame work was publifhed at Oxford in 1770, with additional figures.

SYSTEM of LISTER.

Lib. I. *De Cochleis Terreftribus.*

Pars I. De Buccinis et Turbinibus terreftribus.

Sect. 1. De Buccinis terreftribus a finiftra dextrorfum tortilibus, lævibus, edentulis.

Sect. 2. De Buccinis terreftribus a finiftra dextrorfum tortilibus, edentulis, ftriatis.

Sect. 3. De Buccinis terreftribus a finiftra dextrorfum tortilibus, apertura dentata.

Sect. 4. De Buccinis terreftribus a dextra finiftrorfum tortilibus, apertura plana.

Sect. 5. De Buccinis terreftribus a dextra finiftrorfum tortilibus, apertura dentata.

Sect. 6. De Turbinibus terreftribus cochleæformibus, id eft compactiore figura.

Sect.

(A) Lælium et Scipionem conchas et umbilicos ad Cajetam et ad Laurentum legere confueffe, et ad omnem animi remiffionem ludumque defcendere. *Cic. de Orat.* lib. ii.

History.

Sect. 7. Trochilus.

Sect. 8. De Turbinibus terrestribus, compressis edentulis, ipso ambitu acuto.

Sect. 9. De Turbinibus compressis, ambitu obtusiore, apertura edentula.

Sect. 10. De Turbinibus terrestribus compressis, a sinistra dextrorsum tortilibus, apertura dentata.

Sect. 11. De Turbinibus terrestribus compressis, apertura dentata, a dextra sinistrorsum tortilibus apice inverso ex ipsa aperturæ parte.

Pars II. Cochleæ nudæ terrestres, limaces quibusdam dictæ.

Lib. II. *De Turbinibus et Bivalvibus aquæ dulcis.*

Pars I. De Turbinibus.

Sect. 1. De Buccinis fluviatilibus.

Sect. 2. De Cochleis fluviatilibus.

Sect. 3. De Cochleis fluviatilibus compressis.

Pars II. De Testaceis bivalvibus fluviatilibus.

Sect. 1. De Musculis fluviatilibus, cardine dentato.

Sect. 2. De Musculis fluviatilibus, cardine lævi.

Sect. 3. De Pectunculis fluviatilibus.

Lib. III. *De Testaceis bivalvibus marinis.*

Pars I. De Testaceis bivalvibus, imparibus testis.

Sect. 1. Cap. 1. De Pectinibus ex utraque parte æqualiter auritis, striatis. Cap. 2. De Pectinibus æqualiter auritis, lævibus. Cap. 3. De Pectinibus inæqualiter auritis, non dentatis. Cap. 4. De Pectinibus inæqualiter auritis dentatis.

Sect. 2. Cap. 1. De Ostreis apophysi plana longa recurva, angulo acuto desinente. Cap. 2. De Ostreis apophysi brevi, subter et quasi in occulto posita.

Sect. 3. De Spondylis.

Pars II. De Testaceis bivalvibus, paribus testis.

Sect. 1. Cap. 1. De Pectinibus margaritiferis. Cap. 2. De Pectinibus, binis apophysibus longis conjunctis. Cap. 3. De Pectinibus margaritiferis polyginglymis.

Sect. 2. Cap. 1. De Pectunculis polyleptoginglymis, margine ex altera parte productiore. Cap. 2. De Pectunculis polyleptoginglymis, margine rotunda, striatis. Cap. 3. De Pectunculis polyleptoginglymis, margine rotunda, lævibus.

Sect. 3. Cap. 1. De Pectunculis lævibus, triquetris fere, cervice angustiore. Cap. 2. De Pectunculis lævibus, triquetris, cervice latiore. Cap. 3. De Pectunculis lævibus, rostro recurvo.

Sect. 4. Cap. 1. De Pectunculis fasciatis, lunula notatis, margine striata. Cap. 2. De Pectunculis fasciatis, lunula quadam notatis, margine lævi. Cap. 3. De Pectunculis fasciatis, ad rostrum integris.

Sect. 5. Cap. 1. De Pectunculis striatis productioribus, striis a rostro ad medium usque dorsum concurrentibus. Cap. 2. De Pectunculis striatis diversimode exaratus, sive dissimilibus. Cap. 3. De Pectunculis striatis, striis similibus, dorso ad alterum latus paululum eminente. Cap. 4. De Pectunculis striatis, dorso in aciem compresso. Cap. 5. De Pectunculis striatis, muricatis asperisve. Cap. 6. De Pectunculis striatis, striis a rostro tantum deductis lævibus. Cap. 7. De Pectunculis cancellatis. Cap. 8. De Pectunculis striatis, ex latere multo magis diffusis, latioribus. Cap. 9. De Pectunculis striatis, ex latere diffusis angustioribus. Cap. 10. De Pectunculis striatis imbricatis.

Sect. 6. Cap. 1. De Musculis marinis, cardine lævi minimeque dentato. Cap. 2. De Musculis marinis polyleptoginglymis.

Sect. 7. Cap. 1. De Pinnis, margine velut præcisa obtusave. Cap. 2. De Pinnis, margine producta et auctiore.

Sect. 8. Cap. 1. De Tellinis, id est conchis fere cuneiformibus, ambitu serrata. Cap. 2. De Tellinis quibus ambitus ex interna parte lævis est.

Sect. 9. De Solenis, id est conchis tenuibus longissimisque ab utraque parte naturaliter hiantibus.

Sect. 10. Cap. 1. De Chamis, ab altero tantum latere fere naturaliter hiantibus. Cap. 2. De Chamis pholadibus.

Pars II. De Testaceis multivalvibus.

Sect. 1. Cap. 1. De Pholadibus triumve testarum conchis, cardinibus loculis quibusdam quasi perforatis. Cap. 2. De Pholadibus, cardine integro.

Sect. 2. De Conchis quinque testarum anatiferis plerisque dictis.

Sect. 3. De Balanis, id est, duodecim testarum conchis præter operculum mitratum.

Sect. 4. Sive appendix ad librum tertium de conchitis iisve lapidibus, qui quandum similitudinem cum conchis marinis habeant.

Lib. IV. *De Buccinis marinis, quibus etiam vermiculi dentalia et patellæ, numerantur.*

Sect. 1. Cap. 1. De Patellis, vertice perforato. Cap. 2. De Patellis, vertice integro, lævibus. Cap. 3. De Patellis, vertice integro, striatis, margine quasi radiata. Cap. 4. De Patellis, vertice adunco margine æquali. Cap. 5. De Patellis, vertice adunco, margine obliqua. Cap. 6. De Patellis, vertice adunco, quibus ex interna parte cavitas quædam quasi arcuata, longis compressis. Cap. 7. De Patellis, vertice acuto, stilo quodam interno donatis.

Sect. 2. De Dentalibus.

Sect. 3. De Vermiculis.

Sect. 4. Cap. 1. De Nautilis caudatis, sive e plurimis tabulatis confectis. Cap. 2. De Nautilis vacuis, sive non tabulatis.

Sect. 5. Cap. 1. De Cochleis marinis, apice brevi, umbilicatis, sinu aurito. Cap. 2. De Cochleis marinis, apice brevi, umbilico simplici. Cap. 3. De Cochleis marinis, apice brevi, centro minime sinuato. Cap. 4. De Cochleis marinis, basi brevi, apice ad oris initium parum elato. Cap. 5. De Cochleis marinis, apice mediocriter producto, ore dentato. Cap. 6. De Cochleis marinis, apice mediocriter producto, ore edentulo, lævibus. Cap. 7. De Cochleis marinis, apice mediocriter producto, striatis. Cap. 8. De Cochleis marinis, clavicula tenui et longissima, striatis. Cap. 9. De Cochleis marinis, clavicula tenui et longissima, lævibus.

Sect. 6. Cap. 1. De Neritis dentatis, clavicula paululum prominente. Cap. 2. De Neritis dentatis, clavicula compressa, striatis. Cap. 3. De Neritis dentatis, clavicula compressa, lævibus. Cap. 4. De Neritis ad columellam dentatis, labio productiore edentulo,

History.

edentulo. Cap. 5. De Neritis edentulis lævibus. Cap. 6. De Neritis edentulis muricatis.

Sect. 7. De Auribus marinis.

Sect. 8. Cap. 1. De Trochis pyramidalibus, apertura sive basi leviter tumida. Cap. 2. De Trochis pyramidalibus, basi paululum cava sive sinuata. Cap. 3. De Trochis, apertura sive basi plana. Cap. 4. De Trochis brevioribus, umbilicatis, dentatis. Cap. 5. De Trochis cochleæformibus, umbilicatis, edentulis. Cap. 6. De Trochis clavicula breviore, columella paulo erectiore integra. Cap. 7. De Trochis, basi media leviter tumida, quasi altera clavicula. Cap. 8. De Trochis, unico dente ad columellam acuto.

Sect. 9. Cap. 1. De Conchis venereis unicoloribus. Cap. 2. De Conchis venereis, lineis nigris secundum longitudinem depictis. Cap. 3. De Conchis undatim depictis. Cap. 4. De Conchis venereis fasciatis, immaculatis; et de conchis venereis fasciatis et maculatis, aut alias cum fasciis variegatis. Cap. 5. De Conchis venereis, punctis nigris distinctis. Cap. 6. De Conchis venereis, maculis albis nigrisve interspersis insignitis; et de conchis venereis maculis albis quasi reticulatim depictis. Cap. 7. De Conchis venereis, striis eminentibus conspicuis. Cap. 8. De Conchis venereis, punctis elatis exasperatis, nodisve inæqualibus. Cap. 9. De Conchis venereis, apertura non dentata, basi integra. Cap. 10. De Conchis venereis, basi umbilicata cochleata.

Sect. 10. Cap. 1. De Rhombis cylindraceis columella dentata, crassis, unius coloris. Cap. 2. De Rhombis cylindraceis dentatis, maculosis. Cap. 3. De Rhombis cylindraceis dentatis, fasciatis. Cap. 4. De Rhombis cylindraceis dentatis, undatis. Cap. 5. De Rhombis cylindraceis dentatis, dorso gibboso. Cap. 6. De Rhombis cylindraceis edentulis, ore strictiore. Cap. 7. De Rhombis edentulis tenuibus, ore patulo, clavicula paululum exserta. Cap. 8. De Rhombis edentulis, ore patulo, clavicula compressa.

Pars II. Cap. 1. De Rhombis cylindrico pyramidalibus, unius coloris. Cap. 2. De Rhombis cylindrico-pyramidalibus, quibus lineæ maculatæ circum injiciuntur. Cap. 3. De Rhombis cylindrico-pyramidalibus, striatis. Cap. 4. De Rhombis cylindrico-pyramidalibus, undatis. Cap. 5. De Rhombis cylindrico-pyramidalibus, fasciatis. Cap. 6. De Rhombis cylindrico-pyramidalibus, reticulatis. Cap. 7. De Rhombis cylindrico-pyramidalibus, dentatis.

Sect. 11. Cap. 1. De Buccinis persicis dictis. Cap 2. De Buccinis musicis dictis. Cap. 3. De Buccinis columella dentata, clavicula longissima et tenuissima.

Sect. 12. Cap. 1. De Buccinis bilinguibus, lævibus. Cap. 2. De Buccinis bilinguibus, striatis. Cap. 3. De Buccinis bilinguibus, aspersis et muricatis. Cap. 4. De Buccinis bilinguibus, digitatis.

Sect. 13. Cap. 1. De Buccinis ampullaceis lævibus, aut certe minus asperis. Cap. 2. De Buccinis ampullaceis, muricatis. Cap. 3. De Buccinis ampullaceis, ad sinistram convolutis.

Sect. 14. Cap. 1. De Buccinis utrinque productioribus, lævibus. Cap. 2. De Buccinis utrinque productioribus, striis densis et tenuioribus exasperatis. Cap. 3. De Buccinis utrinque productioribus, striis paucioribus donatis, labro simplici. Cap. 4. De Buccinis utrinque productioribus, striis paucioribus, labro duplicato donatis. Cap. 5. De Buccinis utrinque productioribus, muricatis.

Sect. 15. Cap. 1. De Buccinis brevirostris, nodosis. Cap. 2. De Buccinis brevirostris, striatis. Cap. 3. De Buccinis brevirostris, lævibus, fere clavicula productiore. Cap. 4. De Buccinis brevirostris, labro repando, tenuibus. Cap. 5. De Buccinis brevirostris, labro repando, crassis. Cap. 6. De Buccinis brevirostris, compressis. Cap. 7. De Buccinis auritis, sive rostro recurvo donatis, ventriculosis. Cap. 8. De Buccinis brevirostris, sinu reflexo, lævibus. Cap. 9. De Buccinis brevirostris, rostro reflexo, clavicula productiore.

Sect. 16. Seu appendix de buccinitis, iisve lapidibus que buccina omnigena valde referant.

6 Of Langius.

II. In 1722, Langius presented to the world the following work on conchology. *Caroli Nicolai Langii Lucernen. Helvet. Phil. et Med. &c. Methodus nova et facilis, testacea marina plæraque, quæ huc usque nobis nota sint, in suas debitas et distinctas classes, genera, et species, distribuendi, nominibusque suis propriis, structuræ potissimum accommodatis nuncupandi, &c. Lucernæ,* 1722, 4to, p. 102.

SYSTEM of LANGIUS.

Pars Prima. *Testacea marina univalvia non turbinata.*

Classis Prima. Testacea marina univalvia non turbinata, et in se non contorta.

Sect. 1. Testacea marina univalvia non turbinata, et in se non contorta nullo modo, vel solummodo in summo apice tantillum incurvata. Gen. 1. Patellæ. Gen. 2. Balani.

Sect. 2. Tubuli marini, seu testacea marina univalvia, non turbinata, et in se non contorta, elongata tubuli instar concava. Gen. 1. Penicilla. Gen. 2. Dentales. Gen. 3. Tubuli radiciformes. Gen. 4. Tubuli vermiculares.

Classis Secunda. Testacea marina univalvia, non turbinata, sed ita in se contorta, ut eorum spiræ non promineant.

Sect. 1. Testacea marina univalvia ita in se transversim, vel oblique secundum longitudinem contorta, ut eorum circumvolutiones vix appareant. Gen. 1. Nautili. Gen. 2. Nuces marinæ.

Sect. 2. Porcellanæ, seu testacea marina univalvia non turbinata. Gen. 1. Porcellanæ vulgares. Gen. 2. Porcellanæ fimbriatæ. Gen. 3. Porcellanæ spirales. Gen. 4. Porcellanæ thoracicæ. Gen. 5. Porcellanæ minores integræ.

Sect. 3. Divis. 1. Cornua ammonis, quæ sunt testacea marina univalvia non turbinata, et serpentum in modum in se contorta, ut eorum circumvolutiones nulla ex parte promineant, et tamen ex utroque latere omnes appareant. Gen. 1. Cornua ammonis unita. Gen. 2. Cornua ammonis anomala. Divis. 2. Gen. 1. Cornua ammonis simpliciter divisa. Gen. 2. Cornua ammonis integra divisa.

Par

Pars Secunda. *Cochleæ marinæ, seu testacea marina univalvia turbinata, quæ unica tantum constant valva et figura sua cochlearum in modum intorta sunt, ita ut intima eorum spira aliquo saltem modo promineat et producatur.*

Classis Prima. Cochleæ marinæ longæ, seu cochleæ marinæ ore admodum elongato et superius aperto.

Sect. I. Cochleæ marinæ longæ ore labiis rectis. Gen. 1. Cochleæ pyramidales. Gen. 2. Cochleæ cylindroideæ.

Sect. 2. Cochleæ longæ pyriformes, seu cochleæ marinæ longæ ore labiis leviter incurvatis, ideoque etiam leviter ventricosis. Divis. 1. Cochleæ longæ pyriformes minores. Gen. 1. Cochleæ longæ pyriformes minores, vulgares. Gen. 2. Cochleæ longæ pyriformes minores intortæ integræ. Gen. 3. Cochleæ longæ pyriformes minores intortæ et insulcatæ. Divis. 2. Cochleæ longæ pyriformes majores. Gen. 1. Cochleæ longæ pyriformes majores vulgares. Gen. 2. Cochleæ longæ pyriformes majores, intortæ integræ. Gen. 3. Cochleæ longæ pyriformes majores intortæ cylindroideæ.

Classis Secunda. Cochleæ canaliculatæ, seu cochleæ marinæ ore elongato et superius in canaliculum abeunte.

Sect. 1. Cochleæ marinæ canalicula recta. Gen. 1. Cochleæ canaliculatæ rectæ tenuiores. Gen. 2. Cochleæ canaliculatæ rectæ crassiores. Gen. 3. Purpuræ rectirostræ.

Sect. 2. Cochleæ marinæ canaliculatæ incurvatæ. Gen. 1. Cochleæ canaliculatæ introrsum incurvatæ. Gen. 2. Cochleæ canaliculatæ extrorsum incurvatæ. Gen. 3. Murices. Gen. 4. Cochleæ muriciformes insigniter incrispatæ. Gen. 5. Purpuræ curvirostræ. Gen. 6. Cochleæ cassidiformes umbilicatæ. Gen. 7. Cassidæ.

Classis Tertia. Buccina sunt cochleæ marinæ ore et mucrone simul elongatis, primaque spira notabiliter ventricosa.

Sect. 2. Buccina parva mucrone mediocriter elongato et tenuiter acuminato. Gen. 1. Buccina parva pruniformia acuminata. Gen. 2. Buccina parva pruniformia canaliculata. Gen. 3. Buccina parva curvirostra. Gen. 4. Buccina parva sulcata. Gen. 5. Buccina parva sulcata et canaliculata. Gen. 6. Buccina parva integra ore perpendiculari. Gen. 7. Buccina parva integra ore obliquo.

Sect. 2. Buccina majora, quæ sunt Buccina mucrone admodum elongato et acuminato. Gen. 1. Buccina majora canaliculata rostrata ore simplici. Gen 2. Buccina majora canaliculata, ore labioso. Gen. 3. Buccina majora canaliculata rostrata, ore labioso, fimbriata. Gen. 4. Buccina majora canaliculata et sulcata.

Classis Quarta. Strombi, qui sunt cochleæ marinæ ore et mucrone simul insigniter elongatis, et prima spira notabiliter angustiore quam in Buccinis.

Sect. 1. Strombi ore superius aperto. Gen. 1. Strombi canaliculati acuminati. Gen. 2. Strombi canaliculati rostrati, ore simplici. Gen. 3. Strombi canaliculati rostrati, ore anguloso. Gen. 4. Strombi canaliculati rostrati, ore labioso. Gen. 5. Strombi sulcati vulgares. Gen. 6. Strombi sulcati, ore labioso.

Sect. 2. Strombi integri, ore superius clauso, seu integro. Gen. 1. Strombi integri vulgares, ore simplici. Gen. 2. Strombi integri, ore labioso. Gen. 3. Strombi integri, ore fimbriato et dentato.

Classis Quinta. Cochleæ marinæ, ore admodum brevi seu parvo, mucrone vero insigniter elongato.

Sect. 1. Turbines aperti, seu cochleæ marinæ, ore admodum brevi seu parvo superius aperto, mucrone longissimo. Gen. 1. Turbines aperti lati. Gen. 2. Turbines aperti acuminati. Gen. 3. Turbines aperti canaliculati recte rostri. Gen. 4. Turbines aperti canaliculati oblique incurvati. Gen. 5. Turbines aperti sulcati.

Sect. 2. Turbines integri, ore superius clauso seu integro. Gen. 1. Turbines integri vulgares. Gen. 2. Turbines integri acuminati. Gen. 3. Turbines integri fimbriati.

Sect. 3. Trochi seu cochleæ marinæ ore admodum brevi, seu parvo e basi lata et quasi plana in mucronem quasi rectilineam conoideum insigniter elongatum abeuntes. Gen. 1. Trochi ore angusto et horisontaliter compresso. Gen. 2. Trochi ore ampliore et subrotundo.

Classis Sexta. Cochleæ marinæ breviores, seu cochleæ marinæ ore et mucrone breviores, magisque contracto.

Sect. 1. Cochleæ breviores proportionatæ. Gen. 1. Cochleæ trochiformes breviores proportionatæ et mucronatæ. Gen. 2. Cochleæ marinæ terrestriformes breviore proportionatæ. Gen. 3. Cochleæ depressæ.

Sect. 2. Cochleæ marinæ breviores perpendiculariter anomalæ. Gen. 1. Neritæ. Gen. 2. Cochleæ umbilicatæ foramine spirarum semicirculari. Gen. 3. Cochleæ umbilicatæ foramine spirarum rotundo.

Sect. 3. Cochleæ marinæ breviores horisontaliter anomalæ. Gen. 1. Cochleæ planæ. Gen. 2. Aures marinæ.

Sect. 4. Varia hucusque enarratarum cochlearum opercula quæ aut propter usum aut propter singularem structuram, magis nota sunt. Gen. 1. Opercula cochlearum marinarum subrotunda. Gen. 2. Ungues marini, seu opercula cochlearum marinarum oblonga.

Pars Tertia. *Conchæ marinæ, id est testacea marina bivalvia quæ duabus constant valvis in cardine, articulatione quadam inter se conjunctis, ut commode claudi et aperiri queant.*

Sect. 1. Conchæ marinæ notabiliter umbonatæ et rectæ incurvatæ. Gen. 1. Conchæ marinæ valvis æqualibus æquilateræ. Gen. 2. Conchæ cordiformes umbone cardinum deducto. Gen. 3. Conchæ marinæ cordiformes æquilateræ, umbone cardinum unito.

Sect. 2. Conchæ marinæ valvis æqualibus æquilateræ leviter umbonatæ. Gen. 1. Conchæ crassæ. Gen. 2. Pectines

History.

Pectines tenues. Gen. 3. Pectunculi. Gen. 4. Conchæ pectiniformes æquilateræ subrotundæ. Gen. 5. Conchæ pectiniformes æquilateræ.

Sect. 3. Conchæ marinæ valvis æqualibus æquilateræ, notabiliter umbonatæ et oblique incurvatæ. Gen. 1. Conchæ marinæ incurvatæ subrotundæ vulgares. Gen. 2. Chamæ æquilateræ.

Sect. 4. Conchæ marinæ, valvis æqualibus æquilateræ levitur umbonatæ et oblique incurvatæ. Gen. 1. Conchæ marinæ valvis æqualibus subrotundæ. Gen. 2. Tellinæ æquilateræ.

Sect. 5. Pinnæ, seu conchæ marinæ valvis æqualibus æquilateræ, cardine umbone destituta. Gen. 1. Pinnæ rectæ. Gen. 2. Pinnæ incurvatæ.

Classis Secunda. Conchæ inæquilateræ, seu conchæ marinæ valvis æqualibus ex utroque cardinis latere inæqualiter effusæ.

Sect. 1. Conchæ marinæ valvis æqualibus inæquilateræ notabiliter umbonatæ, et rectæ incurvatæ. Gen. 1. Conchæ marinæ valvis æqualibus inæquilateræ subrotundæ. Gen. 2. Conchæ marinæ cordiformes inæquilateræ, umbone cardine deducto. Gen. 3. Conchæ marinæ cordiformes inæquilateræ, umbone cardinum unito.

Sect. 2. Conchæ marinæ valvis æqualibus inæquilateræ, leviter umbonatæ et rectæ incurvatæ. Gen. 1. Conchæ marinæ leviter umbonatæ et rectæ incurvatæ subrotundæ.

Sect. 3. Conchæ marinæ valvis æqualibus inæquilateræ, notabiliter umbonatæ et oblique incurvatæ, subrotundæ vulgares. Gen. 1. Chamæ inæquilateræ. Gen. 2. Conchæ rhomboidales.

Sect. 4. Conchæ marinæ valvis æqualibus inæquilateræ leviter umbonatæ et oblique incurvatæ. Gen. 1. Conchæ marinæ, &c. subrotundæ. Gen. 2. Conchæ pectiniformes inæquilateræ triangulares. Gen. 3. Tellinæ inæquilateræ. Gen. 4. Conchæ tellinæformes. Gen. 5. Musculi. Gen. 6. Conchæ longærugosæ. Gen. 7. Conchæ soleniformes. Gen. 8. Mytili.

Sect. 5. Conchæ marinæ valvis æqualibus inæquilateræ leviter umbonatæ et oblique incurvatæ, structura et striis peculiaribus. Gen. 1. Conchæ imbricatæ. Gen. 2. Pholades. Gen. 3. Dactyli. Gen. 4. Hysteroconchæ. Gen. 5. Conchæ alæformes. Gen. 6. Conchæ quadratæ.

Sect. 6. Conchæ inæquilateræ non umbonatæ, seu conchæ marinæ valvis æqualibus inæquilateræ, cardine umbone destituto. Gen. 1. Solenes. Gen. 2. Conchæ marinæ, &c. structura peculiari.

Classis Tertia. Conchæ anomalæ, seu conchæ marinæ valvis inæqualibus.

Sect. 1. Conchæ marinæ anomalæ umbonatæ et auritæ. Gen. 1. Pectines anomali. Gen. 2. Spondyli.

Sect. 2. Ostreæ, seu conchæ marinæ anomalæ omnino non vel irregulariter tantum umbonatæ rugosæ. Gen. 1. Ostrea vulgaris. Gen. 2. Ostrea denticulata. Gen. 3. Ostrea rostrata. Gen. 4. Ostrea peculiaris.

7 Of Breynius.

III. A different system was proposed for the classification of testaceous animals by Breynius, in the following work, which was published in the year 1732. *Joannis Philippi Breynii dissertatio physica de polythalamiis, nova testaceorum classe, cui quædam præmittuntur de methodo testacea in classes et genera distribuendi: huic adjicitur commentatiuncula de belemnitis prussicis, tandemque schediasma de Echinis methodice disponendis; Gedani,* 1732, 4to.

SYSTEM of BREYNIUS.

In this system the author has divided shells into the eight following classes, viz. 1. Tubulus. 2. Cochlidium. 3. Polythalamium. 4. Lepas. 5. Concha. 6. Conchoides. 7. Balanus. 8. Echinus.

1. *Tubulus*, est testa tubulosa monothalamia, vel in lineam rectam extensa, vel incurva, vel contorta, vel aliquando ad spiram, sed irregulariter, accedens. Huic pertinent dentalia, entalia, solenes univalvi, &c.

2. *Cochlidium*, est testa tubulosa, monothalamia, conica, inspirans constanter regularem, convoluta aliquando opercula prædita, sepius vero eo destituta. Ad hanc classem spectant nautili tenues sive vacui vulgo dicti; aures marinæ, neritæ, cochleæ, buccina, murices, cassides, cylindri, volutæ, porcellanæ, et omnes testæ turbinatæ, exceptis nautilo et anomia, ad classem tertiam referendis.

3. *Polythalamium*, est testa tubulosa polythalamia, conica, recta, vel in spiram regularem convoluta, cum syphunculo thalamos transeunte: huic reducendi nautili anomia, litui, et orthocerata.

4. *Lepas*, est testa vasculosa simplex, referens vasculum magis minusve cavum, orificio multum patenta, ut patellæ similesque.

5. *Concha*, est testa vasculosa composita bivalvis, id est quæ ex duabus componitur valvis, sive vasculis magis minusve concavis in cardine articulatione quadam inter se junctis ut aperiri et claudi queant; ut chamæ, mytili, tellinæ, pinnæ, ostreæ, pectines anomiæ.

6. *Conchoides*, est testa vasculosa composita bivalvis, sed quæ præterea et aliquot minoribus portiunculis testaceis componitur, ut pholades anatiferæ.

7. *Balanus*, est testa vasculosa composita, que præter unicam testam majorem alias portiones minores habet ex quibus componitur, ut balanus vulgo dictus.

8. *Echinus*, est testa vasculosa composita, undique clausa; magis minusve concava, duobus tantum foraminibus seu aperturis pro ore et ano perforata, externe aculeis vel claviculis mobilibus testaceis armata.

8 Of Tournefort.

IV. The system of Tournefort appeared for the first time, and was published from the author's manuscript, in the treatise on conchology by Gualtieri. In this system shells are divided into three classes, viz. Monotoma, Ditoma, and Polytoma.

SYSTEM of TOURNEFORT.

Testacea dicuntur quorundam animalium integumenta, quæ testæ seu lateris duritiem habent, et in quibus tantum, in testa animalia vivant.

Testacea autem omnia quæ hucusque in musæis curiosorum adversari et congeri solent, ad tres classes facile revocari possunt. Hæc enim vel monotoma sunt, vel ditoma, vel polytoma.

Monotoma testacea appellantur ea quorum testa indivisa est; ditoma quæ geminis constant testis ad cardinem

History.

dinem connixis; polytoma vero quæ ex pluribus ſimul adnexis compinguntur.

Classis Prima. Quæ teſtacea monotoma complectitur. Teſtacea monotoma quorum teſta indiviſa eſt, in tres familias abeant: alia enim univalvia ſunt, alia ſpiralia, alia fiſtuloſa.

Familia I. *Teſtaceorum univalvium.* Monotoma univalvia dicimus quorum teſta ſimplex eſt, in os amplius effuſa. Gen. 1. Lepas. Gen. 2. Eruca.

Familia II. *Teſtaceorum ſpiralium.* Monotoma ſpiralia dicimus teſtacea quorum pars inferior in ſpiram contorquetur: horum autem ſpiræ ſeu helices exterius patent, et ſimpliciter ſpiralia dicuntur, vel eorum ſpira intus reconditur, et convoluta dicuntur.

Divis. 1. Teſtacea monotoma ſimpliciter ſpiralia, ſeu quorum ſpira exterior eſt. Gen. 1. Murex. Gen. 2. Murex alatus. Gen. 3. Murex aporrhais. Gen. 4. Murex venereus. Gen. 5. Murex pyramidalis. Gen. 6. Buccinum. Gen. 7. Buccino-murex. Gen. 8. Purpura. Gen. 9. Buccino-purpura. Gen. 10. Peribolus. Gen. 11. Turbo. Gen. 12. Verticillus. Gen. 13. Cochlea. Gen. 14. Cochlea terreſtris. Gen. 15. Ceratites. Gen. 16. Cochlea marina. Gen. 17. Nerita. Gen. 18. Auris marina.

Divis. 2. Teſtacea monotoma ſpiralia convoluta, quæ cochleam interiorem habent vix foris conſpicuam. Gen. 1. Concha venerea. Gen. 2. Concha perſica. Gen. 3. Nautilus. Gen. 4. Conchilium.

Familia III. *Teſtaceorum fiſtuloſorum.* Teſtacea monotoma fiſtuloſa ſeu tubuloſa, ut ex nomine patet, fiſtulæ in modum tenuantur. Gen. 1. Dentale. Gen. 2. Entale. Gen. 3. Tubuli marini.

Classis Secunda, quæ teſtacea ditoma continet. Teſtacea ditoma ſemper ex duabus teſtis ad cardinem articulatis compinguntur, et vel arcte undique clauduntur, vel utrinque hiant; unde in duas familias dividi poſſunt.

Familia I. Teſtaceorum ditomorum quæ arcte clauduntur. Gen. 1. Concha. Gen. 2. Conchula. Gen. 3. Oſtreum. Gen. 4. Mytilus. Gen. 5. Pinna. Gen. 6. Perna. Gen. 7. Pholas. Gen. 8. Pecten. Gen. 9. Pectunculus.

Familia II. Teſtaceorum ditomorum quæ ſemper hiant. Gen. 1. Chamæ. Gen. 2. Solen.

Classis Tertia, quæ teſtacea polytoma continet. Polytoma teſtacea dicuntur quorum teſtæ ex pluribus partibus vel articulatis, vel per cartilaginem connexis compinguntur; unde in duas familias abeunt.

Familia I. Eorum quorum partes articulantur. Gen. 1. Echinus.

Familia II. Eorum quorum partes per cartilaginem connectuntur. Gen. 1. Balanus.

9 D'Argenville.

V. M. D'Argenville in 1742, publiſhed at Paris a treatiſe on Conchology with 33 plates. A ſecond edition of the ſame work appeared at Paris in 1757. In this edition the number of the plates was increaſed to 41. A more ſplendid edition was publiſhed after the death of the author, by M. M. de Favanne de Montcerville father and ſon. This edition is extended to 3 volumes, two of which conſiſt of letter preſs, and the 3d contains the engravings, which are 80 in number, and are executed with great accuracy and elegance. But the deſcriptions of the genera and ſpecies only reach the 19th plate; ſo that the work which was publiſhed in 1780 is ſtill unfiniſhed.

SYSTEM of D'ARGENVILLE.

In this ſyſtem ſhells are divided into four parts. I. Sea-ſhells. II. Freſh-water ſhells. III. Land-ſhells. IV. Foſſil-ſhells.

Part I. Sea-ſhells are divided into 3 Claſſes. 1. Univalves. 2. Bivalves. 3. Multivalves.

Claſs I. contains 15 families, viz. 1. Lepas. 2. Oreilles de mer. 3. Tuyaux et Vermiſſeaux de mer. 4. Nautiles. 5. Limaçons à bouche ronde. 6. Limaçons à bouche demi-ronde. 7. Limaçons à bouche aplatie. 8. Cornets ou Volutes. 9. Olives ou Cylindres. 10. Rochers ou Murex. 11. Tonnes. 12. Porcelaines. 13. Buccins. 14. Pourpres. 15. Vis.

Claſs II. contains 7 families, viz. 1. Huitres. 2. Cames. 3. Tellines. 4. Moules. 5. Cœurs. 6. Peignes. 7. Manches de couteaux.

Claſs III. conſiſts of 7 families, viz. 1. Oſcabrions, ou lepas à huit pieces. 2. Ourſins. 3. Glands de mer. 4. Pouſſe-pieds. 5. Conques anatiferes. 6. Pholades. 7. Tuyaux de mer multivalves.

Part II. Freſh-water ſhells are divided into 2 Claſſes. 1. Univalves. 2. Bivalves.

Claſs I. contains 8 families, viz. 1. Lepas. 2. Nautiles ou cornes d'ammon. 3. Limaçons à bouche ronde. 4. Limaçons à bouche demi-ronde. 5. Limaçons à bouche triangulaire. 6. Tonnes. 7. Buccins. 8. Vis.

Claſs II. is compoſed of two families. 1. Cames. 2. Tellines.

Part III. Land ſhells, conſtituting a ſingle claſs, viz. Univalves, which contains 6 families; viz. 1. Lepas. 2. Limaçons à bouche ronde. 3. Limaçons à bouche demi-ronde. 4. Limaçons à bouche aplatie. 5. Buccins. 6. Vis.

Part IV. Foſſil ſhells, which conſiſt of 3 claſſes. 1. Univalves. 2. Bivalves. 3. Multivalves.

Claſs I. is compoſed of 15 families having the ſame names as the firſt claſs of ſea-ſhells.

Claſs II. contains 7 families ſimilar to the 2d claſs of ſea-ſhells.

Claſs III. conſiſts of 5 families, viz. 1. Ourſins. 2. Glands de mer. 3. Pouſſe-pieds. 4. Pholades. 5. Tuyaux multivalves.

10 Of Klein.

IV. A ſyſtem of Conchology was publiſhed by Klein in 1753, and illuſtrated with engravings. In the ſame work the author enters into an inveſtigation concerning the formation, increaſe, and colours of ſhells. The following is an abridged view of this arrangement.

SYSTEM

History.

SYSTEM of KLEIN.

In this ſyſtem, ſhells are divided into 6 parts.

Part I. which is entitled Cochlis, is divided into 2 ſections, viz. Cochlis ſimplex, and Cochlis compoſita.

Sect. I. conſiſts of 8 claſſes, viz. Cochlis plana, containing 4 genera. 2. Cochlis convexa, 6 genera. 3. Cochlis fornicata, 5 genera. 4. Cochlis elliptica, 6 genera. 5. Cona cochlis, 16 genera. 6. Cochlea, 8 genera. 7. Buccinum, 5 genera. 8. Turbo, 14 genera.

Sect. II. Conſiſts of five claſſes, viz. 1. Cochlis roſtrata, 7 genera. 2. Voluta longa, 15 genera. 3. Voluta ovata, 8 genera. 4. Alata, 6 genera. 5. Murex, 2 genera.

Part II. Concha, is alſo divided into two ſections, viz. Monoconchæ and Diconchæ æquales.

Sect. I. contains 2 claſſes, viz. 1. Patella, 2 genera. 2. Anſata, 4 genera.

Sect. II. conſiſts of three ſubdiviſions, viz. 1. Diconchæ conniventes. 2. Diconchæ interruptæ. 3. Diconchæ inæquales.

Subdiv. 1. is compoſed of 6 claſſes, viz. 1. Diconchæ figuratæ, 4 genera. 2. Oſtreum, 6 genera. 3. Muſculus, 3 genera. 4. Cyclas. 5. Diconcha aurita, 9 genera. 6. Diconchæ cordiformes, 3 genera.

Subdiv. 2. conſiſts of 5 claſſes, viz. 1. Diconcha ſulcata. 2. Diconchæ umbilicatæ, 3 genera. 3. Diconchæ ſinu profundo, ſeu chamæ, 3 genera. 4. Diconchæ ſinu prominulo, ſeu tellinæ, 6 genera. 5. Pyloris, 9 genera.

Subdiv. 3. Diconchæ inæquales, 7 genera.

Part III. Polyconcha, conſiſts only of one genus.

Part IV. Niduli Teſtacei, comprehends one claſs, viz. Balanus, which includes 4 genera.

Part V. Echinus marinus, ſeu echinodermata, is divided into 3 ſections, viz. 1. Anocyſti. 2. Catocyſti. 3. Pleurocyſti.

Sect. I. contains 2 claſſes, viz. 1. Cidaris, 9 genera. 2. Clipeus, 1 genus.

Sect. II. is compoſed of four claſſes, viz. 1. Fibula, 2 genera. 2. Claſſis, 2 genera. 3. Scutum, 2 genera. 4. Placenta, 3 genera.

Sect. III. conſiſts of 3 claſſes, viz. 1. Arachnoides, 1 genus. 2. Cor marinum, 2 genera. 3. Ovum marinum, 2 genera.

Part VI. Tubulus marinus is compoſed of 11 genera.

In the ſyſtems of Conchology which we have now exhibited, the characters are taken from the ſhells. In the three following, the marks of diſcrimination are derived from the animal as well as from the ſhell. The firſt by M. Adanſon was publiſhed in 1757.

11 Of Adanſon.

SYSTEM of ADANSON.

This ſyſtem conſiſts of 3 claſſes, viz. 1. Limaçons. 2. Les conques. 3. Les conques multivalves.

Class I. Limaçons. Sect. I. Limaçons univalves. Sect. II. Limaçons operculés.

Sect. I. Famille 1. Les limaçons univalves qui n'ont ni yeux ni cornes. Gen. 1. La gondole, *cymbium*. Famille 2. Les limaçons univalves qui ont deux cornes, et les yeux places à leur racine et ſur leur côte interne. Gen. 2. Le bulin, *bulinus*. Gen. 3. Le coret, *coretus*. Gen. 4. Le pietin, *pedipes*. Famille 3. Les limaçons univalves qui ont quatres cornes, dont les deux exterieures portent les yeux ſur leur ſommet. Gen. 5. Le limaçon, *cochlea*. Gen. 6. L'ormier, *haliotis*. Famille 4. Les limaçons univalves qui ont deux cornes, et les yeux placés à leurs racines, et ſur le côte externe, ou par derrière. Gen. 7. Le lepas, *lepas*. Gen. 8. L'yet *yetus*. Gen. 9. La vis, *terebra*. Famille 5. Les limaçons univalves qui ont deux cornes et les yeux poſés un peu au-deſſus de leur racine, et ſur leur côte externe. Gen. 10. La porcellaine, *porcellana*. Gen. 11. Le pucelage, *cypræa*. Gen. 12. Le mantelet, *peribolus*.

Sect. II. Famille 1. Limaçons operculés qui ont deux cornes, avec un renflement, et qui portent les yeux ordinairement au-deſſus de leur racine, et à leur côté externe. Gen. 1. Le rouleau, *ſtrombus*. Gen. 2. La pourpre, *purpura*. Gen. 3. Le buccin, *buccinum*. Gen. 4. Le cerite, *cerithium*. Famille 2. Limaçons opercules, qui ont deux cornes ſans renflement, et les yeux places à leur racine, et ſur leur côte externe. Gen. 5. Le vermet, *vermetus*. Gen. 6. La toupie, *trochus*. Gen. 7. La natice, *natica*. Famille 3. Les limaçons operculés, qui ont quatre cornes, dont les deux exterieures portent les yeux ſur leur ſommet. Gen. 8. Le ſabot, *turbo*. Gen. 9. La nerite, *nerita*.

Class II. Les conques. Sect. I. Les conques bivalves. Famille 1. Les conques bivalves, qui ont les deux lobes du manteau ſeparés, dans tout leur contour. Gen. 1. L'huitre, *oſterum*. Famille 2. Les conques bivalves dont les deux lobes du manteau forment trois ouvertures ſans aucun tuyau. Gen. 2. Le jataron, *jataronus*. Gen. 3. Le jambonneau, *perna*. Famille 3. Les conques bivalves dont les deux lobes du manteau forment trois ouvertures dont deux prennent la figure d'un tuyau aſſez long. Gen. 4. La came, *chama*. Gen. 5. La telline, *tellina*. Gen. 6. Le pectoncle, *pectunculus*. Gen. 7. Le ſolen, *ſolen*.

Class III. Les conques multivalves. Famille 1. Les conques multivalves, dont aucune des pieces de la coquille ne prend la forme d'un tuyau. Gen. 1. La pholade, *pholas*. Famille 2. Les conques multivalves, dont une des pièces de la coquille prend la forme d'un tuyau qui enveloppe entierement toutes les autres. Gen. 2. Le taret, *teredo*.

12 Of Geoffroy.

VIII. The method of Geoffroy, formed on ſimilar principles with the laſt, was publiſhed at Paris in 1767, in a work entitled "A Summary Treatiſe on the Teſtaceous Animals found in the vicinity of Paris." The following is a view of this method.

SYSTEM of GEOFFROY.

Sect. I. Coquilles univalves.

Gen. 1. Le limax, *cochlea*. Quatre tentacules, dont deux plus grands portent des yeux à leur extremité. Coquille univalve en ſpirale.

Gen.

History.

Gen. 2. Le buccin, *buccinum*. Deux tentacules plats en formes d'oreilles. Les yeux placés à la base des tentacules du côté interieur. Coquille univalve en spirale et conique.

Gen. 3. Planorbe, *planorbis*. Deux tentacules filiformes. Les yeux placés à la base des tentacules du côté interieur. Coquille univalve en spirale, et ordinairement applatie.

Gen. 4. La nerite, *nerita*. Deux tentacules. Les yeux placés à la base des tentacules du côté exterieur. Opercule à la coquille. Coquille univalve en spirale et presque conique.

Gen. 5. Ancile, *ancylus*. Deux tentacules. Les yeux placés à la base des tentacules du côté inferieur. Coquille univalve concave et unie.

SECT. II. Coquilles univalves.

Gen. 1. La câme, *chama*. Deux siphons simples et alongées. Charniere de la coquille dentelle. Coquille arondée.

Gen. 2. La moule, *mytilus*. Deux siphons courts et frangés. Charniere de la coquille membraneuse et sans dents. Coquille alongée.

13 Of Muller.

IX. The system of Muller first published in 1773, and afterwards extended in a different work which appeared in 1776, arranges testaceous animals into three families. The following is a view of this arrangement taken from the latter work on the zoology of Denmark and Norway.

SYSTEM OF MULLER.

FAMILIA I. *Testacea Univalvia.*

SECT. I. Testacea univalvia, testa pervia.

Gen. 1. *Echinus*. Testa crustacea, ano verticali, tentaculis simplicibus.

Gen. 2. *Spatagus*. Testa crustacea, ano infero, tentaculis penicillatis.

Gen. 2. *Dentalium*. Testa calcarea, testa rudi, tentaculis nullis.

SECT. II. Testacea univalvia, testa patula.

Gen. 4. *Akera*. Apertura effusa, tentaculis nullis.

Gen. 5. *Argonauta*. Apertura profunda, tentaculis binis.

Gen. 6. *Bulla*. Apertura repanda, tentaculis binis setaceis, colliculo extrinsecus oculatis.

Gen. 7. *Buccinum*. Apertura ovata, tentaculis binis triangularibus, angulo intrinseco oculatis.

Gen. 8. *Carychium*. Apertura ovata, tentaculis binis truncatis conspicuis, angulo intrinseco oculatis.

Gen. 9. *Vertigo*. Apertura subquadrata, tentaculis binis sublinearibus, apice oculatis.

Gen. 10. *Turbo*. Apertura orbiculari, tentaculis binis setaceis, conspicuis, angulo extrinseco oculatis.

Gen. 11. *Helix*. Apertura lunari, tentaculis quatuor linearibus, apice oculatis.

Gen. 12. *Planorbis*. Apertura semilunari, tentaculis binis setaceis, angulo intrinseco oculatis.

Gen. 13. *Ancylus*. Apertura totali tentaculis binis truncatis, occultis, angulo extrinseco oculatis.

Gen. 14. *Patella*. Apertura totali, tentaculis binis setaceis, occulto angulo, extrinseco oculatis.

Gen. 15. *Haliotis*. Apertura repanda, poris pertusa.

SECT. III. Testacea univalvia, testa operculata.

Gen. 16. *Tritonium*. Libera, apertura canaliculata, tentaculis duobus linearibus, angulo extrinseco oculatis.

Gen. 17. *Trochus*. Libera, apertura sub-tetragona, tentaculis duobus setaceis, colliculo extrinseco oculatis.

Gen. 18. *Nerita*. Libera, apertura lunari, tentaculis duobus setaceis, angulo extrinseco oculatis.

Gen. 19. *Valvata*. Libera, apertura circinnata, tentaculis duobus setaceis, angulo postico oculatis.

Gen. 20. *Serpula*. Adnata, apertura orbiculari, tentaculis pinnatis.

FAMILIA II. *Testacea Bivalvia.*

SECT. I. Testacea bivalvia cardine dentata.

Gen. 1. *Mya*. Testa altera extremitate hiante; cardine dente crasso solitario.

Gen. 2. *Solen*. Testa utraque extremitate hiante; cardine dente reflexo, sæpe gemino.

Gen. 3. *Tellina*. Siphone duplici, murico; cardine dentibus utrinque tribus alternis.

Gen. 4. *Cardium*. Siphone duplici, cirrato, pedeque falciformi; cardine dentibus mediis alternis, remotis penetralibus.

Gen. 5. *Venus*. Siphone duplici, cirrata, pedeque laminæformi; cardine dentibus tribus approximatis, lateralibus divergentibus.

Gen. 6. *Mactra*. Cardine dente medio complicato, adjacente foveola.

Gen. 7. *Donax*. Cardine dentibus duobus, lateralique solitario.

Gen. 8. *Arca*. Cardine dentibus numerosis, alternis, penetrantibus.

Gen. 9. *Terebratula*. Branchiis circinnatis; cardine dentibus alterius uncinatis, valvula superiore deorsum perforata.

SECT. II. Testacea bivalvia, cardine edentulo.

Gen. 10. *Anomia*. Branchiis simplicibus; valvula inferiore perforata.

Gen. 11. *Ostrea*. Branchiis simplicibus, pede nullo; cardines fossula cava.

Gen. 12. *Pecten*. Branchiis cirratis, pede juxta auriculam cardine fossula ovata, byssum emittens.

Gen. 13. *Mytilus*. Siphone duplici brevi; fossula lineari, byssum emittens.

FAMILIA III. *Testacea Multivalvia.*

Gen. 1. *Chiton*. Valvulæ dorsales, tentacula nulla.

Gen. 2. *Lepas*. Valvulæ erectæ, tentacula bipartita.

Gen. 3. *Pholas*. Valvulæ ad cardinem minores.

14 Da Costa.

X. To this account of the different methods of arranging shells, we shall only add the system proposed by Da Costa in his Elements of Conchology. In this system the author adopts the usual general division into Univalves, Bivalves, and Multivalves.

I. UNIVALVES are distributed into 16 families, which are divided into four orders.

Order I. Simple; consists of four families. 1. Patella. 2. Haliotis. 3. Vermiculi. 4. Dentalia. Order II. includes only one family. 5. Polythalamia. Order III. Revolved. Fam. 6. Turbinata involuta. Order IV. Turbinated

Animals which inhabit Shells.

nated. Fam. 7. Cymbium. Fam. 8. Auriscochlea. Fam. 9. Cylindri. Fam. 10. Voluta. Fam. 11. Globosa. Fam. 12. Cassides. Fam. 13. Trochi. Fam. 14. Cochleæ. Fam. 15. Buccina. Fam. 16. Murex.

II. Bivalves composed of 3 orders.

Order I. With unequal valves, and shut close. Fam. 1. Pecten. Fam. 2. Spondylus. Fam. 3. Ostreum. Fam. 4. Anomia. Ord. II. With equal valves, and shut close, is divided into three sections. Sect. 1. Multarticulate. Fam. 5. Pectinoides. Fam. 6. Pectunculi. Fam. 7. Arca. Sect. 2. Articulate. Fam. 8. Pectunculus. Fam. 9. Tellina. Fam. 10. Placenta. Sect. 3. Inarticulate. Fam. 11. Margaritifera. Fam. 12. Musculus. Ord. III. With valves that never shut close. Fam. 13. Chama, *Gapers*.

III. Multivalves contain one order. Fam. 14. Pholas. Fam. 15. Anatiferæ. Fam. 16. Balani.

CHAP. II. OF THE ANIMALS WHICH INHABIT SHELLS.

15 Generic characters of testaceous animals.

BEFORE we proceed to the classification of shells, we shall here give a short description of the animals which inhabit them. Of these, however, a minute and accurate anatomical description is not to be expected; for little more is known of the structure of these animals than what has been given by naturalists concerning their external characters.

Some of the animals, which inhabit shells, are also found in the *mollusca* state; that is without any testaceous covering. Such, for instance, is the *limax*, or snail.

The animals which have been found inhabiting shells are the following; viz. Doris, Triton, Ascidia, Tethys, Limax, Spio, Amphitrite, Terebella, Nereis.

Doris.—The body is creeping, oblong, and flat beneath; the mouth is placed below on the forepart; vent behind on the back, and surrounded by a fringe. Feelers two or four, situated on the upper part of the body in front, and retractile within the proper receptacles.

The animal which inhabits the chiton belongs to this genus.

Triton.—The body is oblong, and the mouth is furnished with an involute spiral proboscis: tentacula or arms 12, six on each side, divided nearly to the base. The hind ones cheliforous.

The triton inhabits different species of lepas.

Ascidia.—The body is fixed, roundish, and apparently issuing from a sheath; apertures two, generally placed near the upper end, one beneath the other. The animals are found in the sea, and adhere by their base to rocks, shells, and other submarine substances: they are more or less gelatinous. The only powers of motion which they possess seem to be that of contracting and dilating themselves alternately; by which means they are enabled to throw out the water which they take in with considerable force.

This animal inhabits the pholas, solen, some species of the mya, mactra, and other bivalves.

Tethys.—The body is detached, rather oblong, fleshy, without peduncles: the mouth is furnished with a terminal cylindrical proboscis, under an expanded membrane or lip: apertures two, on the left side of the neck.

The tethys inhabits a great proportion of bivalve shells, as many species of tellina, cardium, mactra, venus, ostrea, and others.

Limax.—The body is oblong, creeping, with a fleshy kind of shield above, and a longitudinal flat disc beneath: aperture placed on the right side within the shield: feelers 4, situated above the mouth, with an eye at the tip of each of the larger ones.

The animals belonging to this genus inhabit the turbinated univalve shells; but it appears that all the animals which inhabit these shells do not exactly correspond with the above generic characters.

Spio.—The body projecting from a tube, jointed and furnished with dorsal fibres; peduncles or feet rough with bristles, and placed towards the back; feelers 2; long, simple; eyes 2; long.

This animal inhabits some species of sabella.

Amphitrite.—Body projecting from a tube, and annulate; peduncles or feet small, numerous, with lateral fasciculi, and branchiæ; feelers 2, approximate, feathered; no eyes.

The amphitrite inhabits some species of sabella and serpula.

Terebella.—Body oblong, creeping, naked, furnished with lateral fasciculi or tufts, and branchiæ; mouth placed before, furnished with lips, without teeth, and protruding a clavated proboscis; feelers numerous, ciliated, capillary, and placed round the mouth.

This animal is an inhabitant of many species of dentalium, serpula and sabella.

Nereis.—Body long, creeping, with numerous lateral peduncles or feet on each side; feelers simple, rarely none; eyes 2 or 4, rarely none. According to some naturalists, the nereis inhabits some species of sabella.

Sepia.—Body fleshy, receiving the breast in a sheath, with a tubular aperture at its base; arms 8, beset with numerous warts or suckers, and in most species 2 pedunculated tentacula; head short; eyes large; mouth resembling a parrot's beak.

The animal which inhabits the argonauta is considered by naturalists as belonging to this genus.

Clio.—Body oblong, natant, generally sheathed, and furnished with two dilated membranaceous arms or wing-like processes; tentacula 3, besides 2 in the mouth.

According to some naturalists, it is an animal belonging to this genus which inhabits the argonauta.

CHAP

Terms employed in describing Shells.

CHAP. III. OF THE TERMS WHICH ARE EMPLOYED IN DESCRIBING SHELLS.

16 Terms explained.

AS it will tend to facilitate our progrefs in the ftudy of *Conchology*, clearly to underftand the terms which are employed in defcribing fhells, and the names by which the different parts have been diftinguifhed by naturalifts; we fhall here give a few definitions of the principal terms. And that thefe definitions may be eafily confulted, we fhall obferve the fame order as in the claffification which is to be adopted. They may be conveniently arranged, therefore, into the three divifions of multivalves, bivalves, and univalves.

1. *Explanation of the Terms of Multivalve Shells.*

17 Multivalves.

Multivalve fhells are compofed of more than two pieces.

Articulated (teftæ articulatæ), when the different pieces of which the fhell is compofed are fo ftrongly united that they feem to form one fhell.

Æquivalve fhells (teftæ æquivalves), when the valves of the two fides have the fame form, fize, and pofition.

A fhell is faid to *adhere* (tefta adherens), when it is attached to folid bodies by fome of the pieces of which it is compofed: It is faid to be *loofe* (tefta libera), when it is not attached by any point.

Pedunculated (tefta pedunculata), when all the pieces of which it is compofed, are fupported by a tendinous peduncle which is fixed to folid bodies.

Tubular (tefta tubulofa), when the greateft part of the fhell is formed of a cylindrical tube.

Bafe of the fhell (bafis teftæ), that part on which it is fupported.

Ligament (ligamentum), is a membranous or tendinous fubftance which connects the valves together, and fometimes lines the cavity of the fhells. Of this there are feveral varieties.

——— fcaly (ligamentum fquamatum), when the furface is covered with fmall granular fcales.

——— prickly (ligamentum aculeatum), when the furface is furnifhed with fmall rough points.

——— fmooth (ligamentum læve), when the furface has neither points, fcales, nor tubercles.

——— punctated (ligamentum punctatum), when the furface is marked with fmall cavities.

Lid (operculum), is the name given to four fmall triangular valves articulated in the form of a crofs, which fhut up the fuperior orifice of fome fpecies of multivalve fhells.

Peduncle (pedunculus) is the tendinous fubftance which fupports fome of the multivalve fhells. It is flexible while the animal is alive, and is fmooth or fcaly.

Rays (radii); thefe are impreffions on the external furface of fome fhells; they are of a conical form, having the vertex turned towards the bafe of the fhell. They are only diftinctly feen in adult fhells.

——— filiform (radii filiformes) are long and narrow.

——— fmooth (radii leves.)———

——— ftriated (radii tranfverfim ftriati.)———

Valves (valvulæ) are the different pieces of which multivalve fhells are compofed.

2. *Explanation of the Terms applied to Bivalve Shells.*

18 Bivalves.

A bivalve fhell is faid to *adhere* (tefta adherens), when it is fixed by any part of one of its valves to a folid body.

It is faid to have *ears* (tefta aurita), when it forms at its bafe, one or two compreffed angles.

Gaping (tefta hians), when the valves do not fhut clofe.

Bearded (tefta barbata), covered externally with an epidermis compofed of ftrong hair or briftles.

Compreffed (tefta compreffa), when the valves are flat, forming a fmall cavity.

Heart-fhaped (tefta cordata), having the form of a heart; (fubcordata) approaching to that form.

Toothlefs (edentula), without teeth at the hinge.

Equilateral (tefta æquilatera), when the anterior and pofterior part of the fhell is equal in form and figure.

Equivalve (equivalvis), when the two valves are fimilar in form and convexity.

Irregular (tefta irregularis), when the form varies in the individuals of the fpecies.

Lenticular (lenticularis), when the valves are round, and little elevated in the middle, and diminifh gradually in thicknefs towards the edges.

Linear (tefta linearis), when the length confiderably exceeds the breadth, but without a cylindrical form.

Tongue-fhaped (linguæformis), flat and oblong, having the two extremities round and obtufe.

Boat-fhaped (navicularis), refembling the figure of a boat.

Pectinated (pectinata), when the valves being furnifhed with longitudinal ribs, have on their anterior furface ribs nearly tranfverfe, which form by their union with the firft acute angles.

Radiated (radiata), when it is marked on the external furface with rays, ribs, or elevated ftriæ, which proceed from the extremity of the fummits, and terminate in the circumference of the valves.

Beaked (roftrata), when one of its furfaces, either anterior or pofterior, being contracted and elongated, terminates in form of a beak.

Bafe (bafis). The fituation in which Linnæus has defcribed and confidered bivalve fhells, confifts in placing the beaks of the fhell turned downwards, in fuch a way that the ligaments of the valves may be feen, fo that the bafe of the fhell is the region of its beaks.

Margin of the fhell (margo teftæ) fignifies the whole circumference of the fhell, parallel to the edge of the valves. It is divided into anterior, pofterior, and fuperior.

——— anterior (margo anterior), when the fhell is placed on the beak of the valves, commences at the fide of the ligament, on the fore-part of the beaks,

Terms employed in describing Shells.

beaks, and extends to one-third of the whole circumference of the valves.

Margin posterior (margo posterior), extends to one-third of the circumference from the beaks of the valves behind.

——— superior (margo superior), includes the upper part of the circumference of the valves comprehended between the superior extremity of the anterior margin, and the superior extremity of the posterior margin. Hence the whole circumference of the shell is divided into three equal parts.

Margins of the valves (margines valvularum), signify the whole interior circumference of the valves, including about the breadth of a line of the outer edge. They are divided into

——— furrowed (margines canaliculati), having on some part of the anterior circumference, a small gutter parallel to it.

——— notched (margines crenulati), furnished interiorly with rounded notches.

——— toothed (margines dentati), provided with pointed teeth.

——— folded (margines plicati), furnished with folds which reciprocally correspond with those of the opposite valve.

——— simple (margines simplices) having neither folds, teeth, nor notches.

——— striated (margines striati), having longitudinal striæ.

Hinge. The hinge of a shell is the most solid and thickest part of the circumference of the valves, constituting their base. It is almost always furnished with teeth of different proportions, which serve to fix the valves together. The hinge is

——— compressed (cardo depressus), formed of one compressed tooth.

——— lateral (cardo lateralis), when it is placed at one of the sides of the shell.

——— oblong (cardo oblongus), when it occupies the whole base of the shell.

——— reflected (cardo reflexus), when its edges are folded back externally towards the convexity of the valves.

——— terminal (cardo terminalis), situated at the inferior extremity of the shell.

——— truncated (cardo truncatus), when the base of the shell terminates transversely and suddenly, and the teeth of the hinge are fixed in this part.

Teeth (dentes), are solid protuberances, commonly pointed, with which the hinge of shells is usually furnished, and which are destined to fix the two valves together. They are divided into

——— alternate (dentes alternati), when they are placed in a line parallel to the edges of the hinge; and when the teeth of one valve are received into the interstices of the teeth of the other valve.

——— articulated (dens insertus), when it is received in a corresponding cavity at the opposite valve.

——— forked (dens duplicatus seu bifidus), having the point divided into two.

——— cardinal (dens primarius seu cardinalis), is the tooth which is placed immediately opposite.

——— compressed (dens depressus), which is very much flattened.

Teeth erect (dens erectus), when the valve is laid on the convex side, the tooth rises perpendicularly.

——— longitudinal (dens longitudinalis), when it extends like a rib on the base of the valves.

The *disk* (discus), signifies the convex centre of the valves, which is usually situated between the belly of the shell and its limb.

Limb (limbus), is the circumference of the valves from the disk to their edges.

Belly of the shell (testæ umbo), is the most inflated part of the valves.

It is vaulted (umbo fornicatus) when in the interior of the valves it exhibits a cavity separated from the hinge by a vertical membrane.

Nates are two protuberances of a conical figure, somewhat spiral, which accompany the external base of most bivalve shells. They are

——— flattened (nates depressæ), when the surface is sensibly compressed.

——— approximate (nates approximatæ), meeting together when the shell is shut.

——— horned (nates corniformes), when the angles being considerable, and their direction waved or spiral, they resemble a horn.

——— bent (nates incurvatæ), when the curvature of the one is directed towards that of the other.

——— separated (nates distantes), when they are separated from each other, at least the distance of a line.

——— distant (nates remotissimæ), when the interval is very great.

——— reflected (nates recurvæ), when the curvature is directed towards the posterior surface of the shell.

——— wrinkled (nates rugosæ), when the surface is marked with unequal lines.

——— spiral (nates spirales), when the curvature exhibits more than one circumvolution.

Vulva, is situated at the lower part of the anterior margin of the valves. It is divided into

——— hollowed (excisa, seu canaliculata), when it is marked with a groove during its whole length.

——— distinct (distincta), marked by a perceptible difference of colour.

——— lettered (scripta seu literata), when the surface is marked with lines resembling written characters.

——— inflected (inflexa), when the edge of the lips is bent towards the inner surface of the valves.

Anus, is an impression usually hollow, placed at the lower part of the posterior surface. It is divided into

——— bordered (marginatus), when it is circumscribed by a distinct elevation.

——— heart-shaped (cordatus), exhibiting the form of a heart.

——— toothed (dentatus), furnished with teeth or notches.

——— lanceolated (lanceolatus), when the length is greater than the breadth, and the extremities are pointed.

——— open (patulus seu hians), forming by the separation of its edges, a considerable opening, which penetrates into the interior of the shell.

——— oval (ovatus), of an elliptical figure.

Valves,

rms em-ployed in scribing Shells.

Valves, of bivalve ſhells, are divided into right and left, equal and unequal, equilateral and inequilateral, ſuperior and inferior.

——— right valve (dextra), is diſtinguiſhed from the left, by placing the ſhell on its baſe, having the cardinal ligament before, and the anus behind. In this poſition the right valve of the ſhell correſponds to the left of the obſerver, and the left valve (ſiniſtra) to the right of the obſerver.

——— equal (equales), when the right valve correſponds with the left in form, ſize, and other external characters.

——— ſuperior (valvula ſuperior). In an irregular ſhell, ſuch as the oyſter, one of the valves is attached to ſolid bodies; the other in this caſe is ſuperior. This valve is ſometimes called by Linnæus, the lid (operculum): in ſome ſpecies it is flat and ſmall, and in others more convex than the inferior valve.

——— keel ſhaped (valvulæ carinatæ), when one part of their convexity preſents a ſharp edge.

——— chambered (concameratæ), when they exhibit in their cavity teſtaceous plates, detached and raiſed.

——— ſpinous (ſpinoſæ), when the whole ſurface is furniſhed with ſpines.

——— banded (faſciatæ), exhibiting large coloured tranſverſe ſtripes or bands.

——— lamellated (lamelloſæ), when the ſurface is furniſhed with plates more or leſs ſeparated.

——— radiated (radiatæ), exhibiting divergent or coloured rays.

——— ſinuated (lacunoſæ), when one of the valves has a ſenſible depreſſion at the middle of its margin, and a correſponding elevation of the oppoſite valve.

——— ſtriated (ſtriatæ) when the ſurface is marked with ſtriæ.

——— tranſverſe, when the ſtriæ are parallel to the margin of the valves.

——— longitudinal, when they run from the baſe to the circumference.

Muſcular impreſſions (impreſſiones), are marks on the interior ſurface of the valves, where the muſcles of the animal are attached.

——— ſolitary (ſolitariæ), when the inner ſurface of each valve has only one.

——— double (duplicatæ), two on the inner ſurface of each valve.

——— triple or ternate (ternatæ), three in each valve.

Ligament (ligamentum), is a horny ſubſtance, of little flexibility, which unites the two valves near their baſe, and which in almoſt all bivalve ſhells is placed at the lower part of their anterior ſurface. It is divided into

——— gaping (hians), when its upper extremity is divided into two.

——— double (duplex), when under the external ligament there appears a ſecond, in a particular hollow of the hinge, which does not appear externally.

——— internal (internum), when it unites the valves without appearing externally.

——— profound (retractum ſeu intractum), when it is ſo deep in the ſuture as ſcarcely to be ſeen when the valves are ſhut.

——— truncated (truncatum), when ſhorter than its ſuture.

Terms employed in deſcribing Shells.

Furrows (ſulci), are thoſe impreſſions or interſtices between the ribs or rays on the ſurface of the valves.

——— ſquare (quadrati), when the bottom is flat.

——— lamellated (lamelloſi), when the bottom is marked with ſmall tranſverſe ſcales.

——— punctated (excavato punctati), when the whole ſurface is marked with ſmall cavities or dots.

3. *Explanation of Terms applied to Univalve Shells.*

19 Univalves.

The *baſe* (baſis), is the moſt elevated part of the ſhell, oppoſite to the ſpire. It is divided into

——— notched (emarginata), when it is accompanied with a deep notch.

——— tubular (tubuloſa ſeu cordata), when it is formed by a tube.

——— ſimple or entire (ſimplex aut integra), without notch or tube.

Summit (vertex) ſignifies the top of ſome patellæ, and from its poſition is central, marginal, or ſubmarginal.

The *ſhell* (teſta) is divided with regard to its poſition into ſuperior and inferior.

The *anterior part* (pars antica), is that which forms the ſpire of the ſhell; and it is alſo the ſuperior part.

The form of ſhells is

——— bordered (marginata), when the two ſides of the opening are broader and thicker than the reſt of the diameter.

——— chambered (polythalamia), when it is internally divided by different partitions parallel to the opening.

——— convoluted (convoluta), when the ſpires turn round a lengthened cone, nearly vertical to each other.

——— rooted (radicata), when it is attached to a ſolid body by a ligament proceeding from its baſe.

——— interrupted (interrupta), when the ſucceſſive additions to the ſhell are marked with diſtinct rings.

——— umbilicated (umbilicata), when the axis round which the ſphere turns, being empty, forms a cavity at the baſe of the ſhell, whoſe diameter is at leaſt a ſixth part of that of the ſhell.

——— imperforated (imperforata ſeu exumbilicata), when its inferior axis has neither hole nor umbilicus.

——— oval or elliptic (ovales), the longitudinal diameter exceeding the tranſverſe, and the two extremities equal and a little contracted.

——— egg-ſhaped (ovata), the longitudinal diameter exceeding the tranſverſe, and the extremities terminated by the ſegment of a circle.

——— beaked (roſtrata), when the two extremities, ſometimes tubular, form a projection in form of a beak.

——— imbricated (imbricata), when the ſurface is covered with parallel ſcales, ſo arranged as to cover each other.

——— turbinated (turbinata), when the belly of the ſhell is large in proportion to the ſpires, which ſeem to proceed from its centre.

Opening

Terms employed in describing Shells.

Opening or *mouth* (apertura), is that part of the cavity of the shell which is visible. It is

——— angular (angulata), when its circumference has several angles.

——— gaping (dehiscens), when one of the extremities is wider than the other.

——— bimarginated (bimarginata), when the right lip forms a double margin.

——— compressed (coarctata), when it is distinctly flattened.

——— semicircular (semiorbiculata), when it forms half a circle.

——— linear (linearis), when it is narrow, and the length considerably exceeds the breadth.

——— longitudinal (longitudinalis), when the length is greater than the breadth, and the greatest dimension is parallel to the axis of the shell.

——— orbicular (orbicularis), forming an entire circle.

——— striated (striata), when the cavity is marked with striæ, parallel to the direction of the convolutions.

——— transverse (transversa), when the breadth is greater than the length.

Pillar (columella), is that part of the shell situated within the opening, near its axis, round which the spires turn. It is brought into view by dividing the shell its whole length. It is

——— flattened (plana), when the surface is flat and smooth.

——— caudated (caudata), when it is lengthened beyond the base of the shell.

——— folded (plicata), marked with transverse and distinct folds.

——— spiral (spiralis), proceeding from the base, and forming a small twisted elongation.

——— truncated (truncata), cut transversely at the base.

Convolutions (anfractus), are the turnings of the spire round the pillar, from the opening to the base of the shell. They are

——— bifid (bifidi), when each is divided into two equal parts by a furrow or spiral line.

——— grooved (canaliculati), when the superior edge is marked with a groove.

——— keel-shaped (carinati), when the outer turn of the shell is marked with an angle more or less acute.

——— crowned (coronati), when the upper surface is bordered at a little distance from the sutures, with a single row of tubercles or spinous scales.

——— dextral (dextri), turning from the left to the right.

——— sinistral (sinistri), turning from the right to the left.

——— lettered (scripti), marked with characters.

——— spinous (spinosi), having short spines on the surface.

——— entire (simplices), without furrows or tubercles.

——— banded (fasciati), when the surface is marked with broad coloured stripes.

——— lamellated (lamellati), the surface marked with longitudinal or transverse excrescences, and laminated like membranes.

——— lineated (lineati), marked with coloured lines.

——— radiated (spinoso-radiati), having the circumference bordered with straight spines, separating and divergent.

——— separated (disjuncti), having an interval between each convolution.

——— furrowed (sulcati), having the surface marked with furrows, which are always broader than striæ.

——— decussated (decussati), when the striæ cross each other at right angles.

Spire (spira), signifies all the convolutions taken together. It is

——— pointed (acuta), when the convolutions joined together form an acute angle.

——— flattened (depressa), forming a flat surface.

——— convex (convexa), when it is rounded, and the point of the base has little elevation.

——— convex (convexo-acuta), rounded at the outer edge, but elevated into an acute angle.

——— convex and elevated (convexo-exserta), rounded at the outer edge, and elevated without forming an acute angle.

——— convex and pointed (convexo-mucronata), obtuse and almost rounded at the outer edge, and terminated at the centre with a pointed elevation.

——— crowned (coronata), when the outer edges of each convolution are accompanied with a row of spines or tubercles.

——— capitate (capitata), the convolutions united, forming a swelling resembling a head.

——— obtuse (obtusa), the convolutions united, forming an obtuse angle.

——— plano-concave (plano-concava), the convolutions forming no elevation, but are slightly grooved.

——— pyramidal (pyramidata), of a conical form.

Sutures (suturæ), signify the place of junction of the different convolutions, forming a spiral line. They are

——— grooved (canaliculatæ), when they are so deep as to form a small canal.

——— notched (crenulatæ), when the points of contact are marked with notches.

——— double (duplicatæ), accompanied with two striæ, which run parallel.

——— effaced (obsoletæ), when the place of junction is not perceptible.

Siphon (sipho), is a small canal situated in the internal part of the shell of the nautili, which penetrates into the divisions of which it is composed. It is

——— central (centralis), when it is situated in the middle of the divisions.

——— lateral (lateralis), situated at one side.

——— oblique (obliquus), cutting the axis of the divisions obliquely.

Veins (varices), are elevations or ribs, running in the direction of the length of the shell, formed by the junction of the different additions which the shell has received. They cut the convolutions of the spire transversely. They are

——— continued (continuatæ), proceeding from the base of the spire to the convolution at the opening, without interruption.

——— spinous (spinosæ), furnished with strong spines.

——— interrupted (decussatæ), not corresponding with the different convolutions.

CHAP.

Claffification of Shells.

CHAP. IV. CLASSIFICATION OF SHELLS.

20 Claffification.

SHELLS are divided by Linnæus into multivalve, bivalve, and univalve. In the following claffification the fame arrangement will be adopted; and we fhall firft exhibit in one view the characters of each genus, in the original language of Linnæus, with a tranflation oppofite for the fake of the Englifh reader; fo that the genus of any fhell may be eafily determined. In defcribing the fpecies, we fhall obferve the utmoft brevity, giving fuch characters only as are neceffary to afford precife marks of diftinction. In arranging the fpecies under each genus, the Britifh fpecies will be diftinguifhed with an afterifk; fo that, with the advantage of a general claffification, this will anfwer the purpofe of a Britifh conchology.

GENERIC CHARACTERS.

I. MULTIVALVE SHELLS.

21 Generic character of multivalves.

1. CHITON. Animal doris. Teftæ plures, fecundum longitudinem fibi appofitæ dorfo incumbentes.

2. LEPAS. Animal triton. Tefta bafi affixa multivalvis: valvis inæqualibus erectis.

3. PHOLAS. Animal afcidia. Tefta bivalvis divaricata, cum minoribus accefforiis difformibus: cardo recurvatus cartilagine connexus.

1. C. Animal inhabiting the fhell a doris. Shell confifting of feveral fegments or valves difpofed down the back.

2. L. Animal a triton. Shell affixed at the bafe, and confifting of many unequal erect valves.

3. P. Animal an afcidia. Shell bivalve, divaricate, differently fhaped; acceffory valves: hinges bent back, united by a cartilage: beneath the hinge, internally, is an incurved tooth.

II. BIVALVE SHELLS.

22 Bivalves.

4. MYA. Animal afcidia. Tefta bivalvis hians, ut plurimum, altera extremitate: cardo dente (plerifque uno) folido, craffo, patulo, vacuo; nec inferto teftæ appofitæ.

5. SOLEN. Animal afcidia. Tefta bivalvis oblonga, utroque latere hians. Cardo dens fubulatus reflexus, fæpe duplex, non infertus teftæ appofitæ; margo lateralis magis obfoletus.

6. TELLINA. Animal tethys. Tefta bivalvis, anterius hinc ad alterum latus flexa. Cardinis dentes ut plurimum tres: laterales plani alterius teftæ.

7. CARDIUM. Animal tethys. Tefta bivalvis fubæquilatera, æquivalvis plerumque convexa, longitudinaliter coftata, ftriata aut fulcata, margine dentata. Cardo dentibus mediis binis alternatis: altero ut plurimum incurvo; lateralibus remotis infertis.

8. MACTRA. Animal tethys. Tefta bivalvis, inæquilatera, æquivalvis. Cardo dente medio complicato cum adjecta foveola, lateralibus remotis infertis.

9. DONAX. Animal tethys. Tefta bivalvis, margine fæpe crenulato antico obtufiffimo. Cardo dentibus duobus; marginalique folitario (rarius duplice, triplice, aut nullo) fubremoto fub ano.

10. VENUS. Animal tethys. Tefta bivalvis; labiis margine antico incumbentibus. Cardo dentibus tribus, omnibus approximatis lateralibus apice divergentibus.

4. M. Animal an afcidia. Shell bivalve, generally gaping at one end. Hinge with broad, thick, ftrong teeth (feldom more than one), and not inferted into the oppofite valve.

5. S. Animal an afcidia. Shell bivalve, oblong, open at both ends. Hinge with a fubulate, reflected tooth, often double, and not inferted in the oppofite valve; the lateral margin more effaced.

6. T. Animal a tethys. Shell bivalve, generally floping on one fide, in the fore part of one valve a convex, of the other a concave fold, Hinge ufually with three teeth: the lateral ones in one fhell being fmooth.

7. C. Animal a tethys. Shell bivalve, nearly equilateral, æquivalve, generally convex, longitudinally ribbed, ftriated or grooved, with a toothed margin. Hinge with two teeth near the beak, and a larger remote lateral one on each fide, each locking into the oppofite.

8. M. Animal a tethys. Shell bivalve, of unequal fides, and æquivalve. Middle tooth of the hinge complicated, with a fmall hollow on each fide, lateral ones remote and inferted into each other.

9. D. Animal a tethys. Shell bivalve, generally with a notched margin: the frontal margin very obtufe. Hinge with two teeth, and a fingle marginal one placed behind (rarely double, triple or none).

10. V. Animal a tethys. Shell bivalve; the frontal margin flattened with incumbent lips. Hinge with three teeth, all approximate; the lateral ones divergent at the tip.

Classification of Shells

11. SPONDYLUS. Animal tethys. Testa inæquivalvis rigida. Cardo dentibus duobus recurvis, cum foveola intermedia.

11. S. Animal a tethys. Shell hard, solid, with unequal valves. Hinge with two recurved teeth, separated by a small cavity.

12. CHAMA. Animal tethys. Testa bivalvis crassior, cardo callo gibbo, oblique inserto fossulæ obliquæ.

12. C. Animal a tethys. Shell bivalve, rather coarse. Hinge with a callous protuberance, obliquely inserted in an oblique hollow.

13. ARCA. Animal tethys? Testa bivalvis æquivalvis. Cardo dentibus numerosis, acutis alternis insertis.

13. A. Animal a tethys? Shell bivalve equivalve. Hinge with numerous sharp teeth, alternately inserted between each other.

14. OSTREA. Animal tethys. Testa bivalvis, plurimis inæquivalvis subaurita. Cardo edentulus, fossula cava, ovata, sulcisque (in plurimis) lateralibus transversis.

14. O. Animal a tethys. Shell bivalve, generally with unequal valves, and slightly eared. Hinge without teeth, but furnished with an ovate cavity, and in most with lateral, transverse furrows.

15. ANOMIA. Animal corpus ligula emarginata ciliata: ciliis valvæ superiori affixis; brachiis duobus linearibus corpore longioribus conniventibus porrectis, valvæ alternis utrinque ciliatis: ciliis affixis valvæ utrique: testa inæquivalvis, valva altera planiuscula, altera basi magis gibba: parum altera basi sæpe perforata. Cardo cicatricula lineari prominente introrsum dente laterali; valvæ vero planioris in ipso margine. Radii duo ossei pro basi animalis.

15. A. Animal an emarginate, ciliated, strap-shaped body, with bristles attached to the upper valve; arms two, linear, longer than the body, projecting and approaching together, alternate on the valve, and ciliated on each side, with bristles affixed to each valve. Shell inequivalve, one of the valves flattish, the other protuberant at the base: one of the valves often perforated near the base. Hinge with a linear prominent cicatrix, and a lateral tooth placed within; but on the very margin of the flat valve there are two bony rays for the base of the animal.

16. MYTILUS. Animal ascidia? Testa bivalvis, rudis, sepius affixa bysso, ut plurimum, crassiori. Cardo in plurimis edentulus, distinctus, paucis exceptis, linea subulata, excavata longitudinali.

16. M. Animal an ascidia? Shell bivalve, rough, generally affixed by a byssus or beard of silky filaments. Hinge mostly without teeth, and in most cases with a subulate, hollow, longitudinal line.

17. PINNA. Animal limax. Testa sub-bivalvis fragilis, erecta hians, emittens barbam byssinam. Cardo edentulus, coalitis in unam valvis.

17. P. Animal a limax. Shell bivalve, brittle, gaping at one end, and having a byssus or beard. Hinge without teeth, the valves being united into one.

III. UNIVALVE SHELLS.

23 Univalves.

18. ARGONAUTA. Animal sepia aut clio. Testa univalvis, spiralis, involuta, membranacea, unilocularis.

18. A. Animal a sepia or clio. Shell univalve, spiral, involute, membranaceous, one cell.

19. NAUTILUS. Animal? Testa univalvis, isthmis perforatis concamerata, polythalamia.

19. N. Animal? Shell univalve, divided into several chambers communicating with each other.

20. CONUS. Animal limax. Testa univalvis convoluta, turbinata; apertura effusa, longitudinalis, linearis, edentula, basi integra; columella levis.

20. C. Animal a limax. Shell univalve, convolute, turbinate; aperture effuse, longitudinal, linear, without teeth; entire at the base. Pillar smooth.

21. CYPRÆA. Animal limax. Testa univalvis, involuta, sub-ovata, obtusa, lævis. Apertura utrinque effusa, linearis utrinque dentata longitudinalis.

21. C. Animal a slug. Shell univalve, involute, subovate, smooth, obtuse. Aperture effuse at each end, linear, extending the whole length of the shell, and toothed on each side.

22. BULLA. Animal limax. Testa univalvis convoluta, inermis. Apertura sub-coarctata, oblonga, longitudinalis, basi integerrima. Columella obliqua, lævis.

22. B. Animal a limax. Shell univalve, convolute, without teeth. Aperture a little narrowed, oblong, longitudinal, quite entire at the base. Pillar oblique and smooth.

23. VOLUTA. Animal limax. Testa unilocularis spiralis. Apertura ecaudata, sub-effusa. Columella plicata: labio umbilicove (ut plurimum) nullo.

23. V. Animal a limax. Shell one cell, spiral. Aperture without a beak, and somewhat effuse. Pillar twisted or plaited: generally without lips or perforation.

24. BUCCINUM. Animal limax. Testa univalvis, spiralis, gibbosa. Apertura ovata desinens in canaliculum (retusam lacunam) dextrum, cauda retusa. Labium interius explanatum.

24. B. Animal a limax. Shell univalve, spiral, gibbous. Aperture ovate, ending in a short canal, leaning to the right, with a retuse beak. Internal or pillar lip expanded.

25. STROMBUS. Animal limax. Testa univalvis, spiralis, latere ampliata. Apertura labro sæpius dilatato, desinens in canalem sinistrum.

25. S. Animal a limax. Shell univalve, spiral, enlarged at the side. Aperture dilated with the lip expanding, and ending in a groove towards the left.

26. MUREX. Animal limax. Testa univalvis, spiralis, exasperata suturis membranaceis. Apertura desi-

26. M. Animal a limax. Shell univalve, spiral, rough, with membranaceous sutures. Aperture oval, terminating

nens in canalem integrum rectum ſive ſubaſcendentem.

27. TROCHUS. Animal limax. Teſta univalvis ſpiralis, ſubconica. Apertura ſubtetragono-angulata ſeu rotundata, ſuperius tranſverſè coarctata; columella obliquata.

28. TURBO. Animal limax. Teſta univalvis, ſpiralis, ſolida. Apertura coarctata, orbiculata, integra.

29. HELIX. Animal limax. Teſta univalvis, ſpiralis, ſubdiaphana, fragilis. Apertura coarctata, intus lunata ſeu ſubrotunda; ſegmento circuli dempto.

30. NERITA. Animal limax. Teſta univalvis, ſpiralis, gibba, ſubtus planiuſcula. Apertura ſemiorbicularis, vel ſemilunaris; labio columellæ tranſverſo, truncato, planiuſculo.

31. HALIOTIS. Animal limax. Teſta auriformis, patens: ſpira occultata laterali diſco, longitudinaliter poris pertuſa.

32. PATELLA. Animal limax. Teſta univalvis ſubconica, abſque ſpira.

33. DENTALIUM. Animal terebella. Teſta tubuloſa, recta, monothalamia, utraque extremitate pervia.

34. SERPULA. Animal terebella. Teſta univalvis, tubuloſa, adherens (ſæpe iſthmis integris paſſim intercepta).

35. TEREDO. Animal terebella. Valvis duabus calcariis hemiſphericis, anterius exciſis, et duabus lanceolatis. Teſta teres, flexioſa, lignum penetrans.

36. SABELLA. Animal nereis. Ore ringente, tentaculis duobus craſſioribus pone caput. Teſta tubuloſa, contexta ex arenulis confertim membranæ vaginali inſertis.

terminating in an entire ſtraight, or ſlightly aſcending canal.

27. T. Animal a limax. Shell univalve, ſpiral, ſomewhat conic. Aperture ſomewhat angular, or rounded: the upper ſide tranſverſe and contracted; pillar placed obliquely.

28. T. Animal a limax. Shell univalve, ſpiral, ſolid. Aperture contracted, orbicular, entire.

29. H. Animal a limax. Shell univalve, ſpiral, ſubdiaphanous, brittle. Aperture contracted, ſemilunar or roundiſh.

30. N. Animal a limax. Shell univalve, ſpiral, gibbous, flattiſh at bottom. Aperture ſemiorbicular or ſemilunar, pillar lip tranſverſely truncated and flattened.

31. H. Animal a limax. Shell ear-ſhaped dilated, with a longitudinal row of orifices along the ſurface; the ſpire lateral and nearly concealed.

32. P. Animal a limax. Shell ſubconic, without ſpire.

33. D. Animal a terebella. Shell tubular, ſtraight, or ſlightly curved, with one cavity open at both ends.

34. S. Animal a terebella. Shell tubular, generally adhering to other ſubſtances (often ſeparated internally by entire diviſions.)

35. T. Animal a terebella. With two calcareous, hemiſpherical valves, anteriorly cut off, and two lanceolate ones. Shell round, flexuous, penetrating wood.

36. S. Animal a nereis. With a ringent mouth, and two thicker tentacula behind the head. Shell tubular, conſiſting of particles of ſand united to a membrane by a glutinous cement.

I. MULTIVALVES.

24 Chiton.

Gen. 1. CHITON.

Gen. Char.—The animal inhabiting this ſhell is a doris. The ſhell conſiſts of ſeveral ſegments or valves, arranged along the back.

SPECIES.

1. C. ſhell with ſix plates or valves ſtriated. America. *ſpidus.*

2. C. ſhell ſix-valved, glabrous, oval, a little convex, ſea-green. America. *ılaſſinus.*

3. C. ſhell ſeven-valved, body tuberculated. America. *ıercula-*

* 4. C. ſhell ſeven-valved, thick ſet with ſhort hairs, $\frac{5}{8}$ inch long. Sandwich, Aberdeen. *nitus.*

5. C. ſhell eight-valved, ſtriated; body prickly. Aſia. *ıleatus.*

* 6. C. ſhell eight-valved, apparently ſmooth, but when examined with a glaſs, is found to be rough like ſhagreen. Coaſt of Barbary, Salcomb bay, Devonſhire, Sandwich. *ıcicula-*

7. C. eight valves, ſemiſtriated; margin covered with minute ſcales. America. *ıamoſus.*

8. C. with eight valves, ſmooth body with excavated dots. Europe, America. *ıctatus.*

9. C. eight valves, ſubſtriated; ſtriæ covered, body red. North ſeas. *ruber.*

* 10. C. eight valves, ſmooth, with tranſverſe lines at the margin of the valves; body white, oval; firſt valve notched on the hinder edge. Northern ſeas; on oyſter ſhells from Poole. *albus.*

11. C. eight valves, ſmooth, carinated, oval, compreſſed. Northern ſeas, Salcomb bay. *cinereus.*

12. C. ſeven carinated valves ſtrongly beaked; beaks frequently rufous, $\frac{1}{2}$ inch long. Salcomb bay, but rare. *Montagu, Teſt. Brit.* p. 3. *ſeptemvalvis.*

13. C. eight-valved, thick ridged; the outſide ſea-green, inſide ſnowy, edged with black. *bicolor.*

14. C. eight-valved, cherry colour, ſmooth, with ſnowy marginal teeth. *ceraſinus.*

15. C. eight-valved, thick, black brown. Straits of Magellan. *magellanicus.*

16. C. eight-valved, brown, ſmooth; inſide teeth of the margin ſnowy. India. *fuſcus.*

17. C. eight-valved, ſmooth, within ſea-green, margin covered with gray white ſcales. *maculatus.*

18. C. eight-valved, ſmooth, varied with white and black. Var. ſeven-valved. America. *marmoratus.*

19. C. flat above, with numerous raiſed dots in rows; border broad, ſpinous. America. *granulatus.*

20. C. eight-valved, ſmooth above, piceous and varied with white and black. America; Red ſea. *piceus.*

indus. 21. C. eight-valved, whitifh afh colour, with a fcaly border; middle valves finely punctured. America.

minimus. 22. C. eight-valved, fmooth, black, very fmall. Norway feas.

cimex. 23. C. eight-valved, carinated, diaphanous, banded; extreme valves finely punctured; fmall. Norway.

afellus. 24. C. eight-valved, deep black, convex above, with a yellowifh fpot on each valve. North feas.

gigas. 25. C. eight-valved, thick, convex, white; firft valve notched, laft toothed, middle ones emarginate, four inches long. Cape of Good Hope.

iflandicus. 26. C. eight-valved, fubcylindrical, finely punctured; very minute and narrow at each end.

marginatus. * 27. C. eight-valved, carinated along the back; the valves projecting over each other in a point. Salcomb bay, Sandwich.

lævis. * 28. C. eight-valved, fmooth, with an elevated band down the back; the length $\frac{1}{2}$ inch. Loch Broom, Rofs-fhire, Salcomb bay.

amiculatus 29. C. eight-valved, kidney-fhaped, fragile; valves imbricated. Kurile iflands.

25 Lepas.

Gen. 2. Lepas, *Acorn-fhell.*

Gen. Char.—Animal a triton; fhell affixed at the bafe, and compofed of many unequal erect valves.

Species.

balanus. * 1. L. conic, grooved, lid fharp-pointed. European feas, Britain.

balanoides. * 2. L. conic, truncated, fmooth; lip obtufe. American and Indian feas; abundant on the coafts of Britain.

intertexta. * 3. L. fomewhat depreffed; valves imbricated and obliquely ftriated. Weymouth.

cornubienfis. * 4. L. bafe dilated, aperture rather narrow; valves grooved near the lower edges. Cornwall.

tintinabulum. 5. L. conic, obtufe, bell-fhaped, rugged and fixed. Indian and American feas.

diadema. * 6. L. roundifh, fix-lobed; valves grooved longitudinally. European and Indian feas, Scotland.

balænaris. 7. L. fubconic, with fix elevated, wrinkled, 4-parted lobes; lid membranaceous, and two-toothed; found adhering to the pectoral wrinkles of the balæna boops.

coftata. * 8. L. fomewhat conic, with equidiftant ribs, divergent from the aperture; lid pointed. On rocks on the Pembrokefhire coaft.

conoides. * 9. L. conic, fmooth, valves pointed, aperture very fmall; fhell fmall, reddifh; valves finely teffelated. Weymouth.

teftudinaria. 10. L. plano-convex, with fix excavated ftriated rays; lid compofed of four triangular pieces inferted on a membrane.

galeata. 11. L. helmet-form, with a lateral aperture; fhell boat-fhaped, fmooth. Adheres to the gorgonia verrucofa, and ventilabrum.

palmipes. 12. L. erect, conic; valves palmated at the bafe; fhell white.

tulipa. 13. L. fubcubic, fmooth; lid acute, tranfverfely ftriated. Northern ocean.

mitella. 14. L. compreffed, erect, irregularly ftriated. Indian ocean.

fcalpellum. * 15. L. compreffed, 13-valved, fmooth, feated on a fcaly peduncle, which is large, and compofed of rings, covered with fhort hairs. North feas, Plymouth.

anferifera. * 16. L. compreffed, five-valved, ftriated, pedunculated. American and Atlantic feas, coaft of Devonfhire; is fometimes found in a foffil ftate.

anatifera. * 17. L. compreffed, 5-valved, pedunculated; adheres to the bottom of fhips, when it is well known by the name of *bernacle.*—It was from this fpecies of fhell that the bernacle goofe was fuppofed to have had its origin. Gerard's account of this transformation, as it affords a remarkable inftance of the credulity of the times, is too curious to be omitted. "There are found in the north parts of Scotland, and the iflands adjacent called Orchades, certain trees whereon do grow certain fhells tending to ruffet, wherein are contained little living creatures: which fhells in time of maturitie do open, and out of them grow thofe little living things, which falling into the water do become fowles, which we call barnakles; in the north of England brant geefe; and in Lancafhire, tree geefe; but the other that do fall upon the land perifh, and come to nothing. Thus much from the writings of others, and alfo from the mouths of people of thofe parts, which may very well accord with truth."

"But what our eyes have feene, and hands have touched, we fhall declare. There is a fmall ifland in Lancafhire, called the Pile of Foulders, wherein are found the broken pieces of old and bruifed fhips, fome whereof have been caft thither by fhipwracke, and alfo the trunks and bodies with the branches of old and rotten trees, caft up there likewife: whereon is found a certain fpume or froth that in time breedeth into certain fhells, in fhape like thofe of the mufkle, but fharper pointed, and of a whitifh colour: wherein is contained a thing in forme like a lace of filke, finely woven, as it were, together, of a whitifh colour, one end whereof is faftened unto the infide of the fhell, even as the fifh of oifters, and mufkles are; the other end is made faft unto the belly of a rude mafs or lumpe, which in time commeth to the fhape and forme of a bird: when it is perfectly formed the fhell gapeth open, and the firft thing that appeareth is the forefaid lace or ftring; next come the legs of the bird hanging out, and as it groweth greater it openeth the fhell by degrees, till at length it is all come forth and hangeth only by the bill: in fhort fpace after it cometh to full maturitie, and falleth into the fea, where it gathereth feathers, and groweth to a fowl bigger than a mallard, and leffer than a goofe, having blacke legs, bill or beake, and feathers blacke and white, fpotted in fuch manner as is our magpie, called in fome places a pie-annet, which the people of Lancafhire call by no other name than a tree-goofe: which place aforefaid, and thofe parts adjoyning do fo much abound therewith, that one of the beft is bought for threepence. For the truth hereof, if any doubt, let them repaire unto me, and I fhall fatisfie them by the teftimonie of good witneffes." *Herball*, p. 1588.

aurita. 18. L. membranaceous, ventricofe, feated on a tube and eared, 8-valved. North feas.

pfittacus. 19. L. hooked behind, 6-valved, wrinkled, not an inch long. Chili.

20. L.

inor. 20. L. reddiſh, 6-valved, unequal; lid pointed. India.

errruca. 21. L. hemiſpherical, ſerrated, 6-valved; 4 outer valves and lid plaited. North ſeas.

guſtata. 22. L. elongated, ſmooth, 6-valved; aperture narrow, lid minute.

rofa. 23. L. granulated and ſtriated, conic, tubular; lid obtuſe. India.

ongata. * 24. L. cylindrical, ſnowy, pellucid, 6-valved; lid obtuſe, grooved and tranſverſely ſtriated. Three inches long. Iceland, Weymouth. *Balanus Clavatus*, *Montagu*, p. 10.

tellaris. 25. L. 6-valved; outwardly violet mixed with white, and marked with fine longitudinal ſtriæ; valves denticulate at the margin. Coromandel, very rare.

inoſa. 26. L. conic with 12 triangular valves, 6 more depreſſed, whitiſh and tranſverſely ſtriated, and 6 purple and longitudinally ſtriated; all armed with tubular recurved ſpines. India.

olacea. 27. L. 6-valved, thick, glabrous, white, with violet rays. India.

llicipes. 28. L. many-valved, compreſſed, erect, ſmooth; ſeated on a ſhort, hard, ſcaly peduncle. Mediterranean.

lindrica. 29. L. ſlightly curved, with a large oblique orifice; lip horned. Africa.

iſpata. 30. L. oval-truncated, conic, with 6 bluiſh valves ſhaded with white, and 6 reddiſh, elevated, ſpinous, and perpendicularly ſtriated; an inch high; is frequently perforated by the teredo.

riofa. 31. L. ſolid, white, depreſſed with carinous grooves, unequally ſmooth internally. Kurile iſlands.

æmia. 32. L. conico-convex, 4 valves ſerrate-ſtriated; lid 2-valved. North ſeas.

ſcicu-ris. * 33. L. 5-valved, ſmooth, dorſal valve dilated at the baſe. St George's Channel.

Gen. 3. Pholas.

26 *holas.*

Gen. Char.—The animal is an aſcidia. Shell bivalve, divaricate, with ſeveral leſſer differently acceſſory ones at the hinge. Hinges recurved, united by a cartilage. Beneath the hinge internally is an incurved tooth.

Species.

ctylus. * 1. P. oblong, with reticulated, ſubſpinous ſtriæ, on the upper part. Europe. Salcomb bay, Devonſhire. Five inches long; is found in hard clay, marl, and wood; has a phoſphoreſcent property.

ſtata. 2. P. ovate; ſtriated with elevated ribs; 6 inches long. American ſeas.

riata. 3. P. ovate, multifariouſly ſtriated. Europe, India.—This ſpecies ſeems to be nearly equally deſtructive with the teredo navalis. The pholas perforates the wood acroſs the grain or fibre; the teredo inſinuates itſelf along the fibres, or in the ſame direction.

ndida. * 4. P. oblong, muricated on all ſides, with decuſſated ſtriæ. Europe, America, Salcomb bay.

ſilla. 5. P. oblong, rounded; ſtriæ arched. America, India. This animal penetrates the bottom of ſhips.

iſpata. * 6. P. oval; part next the hinge more obtuſe, waved, ſtriated; tooth of the hinge curved, large and ſtrong. Two inches long. Europe. Weſt of England.

ientalis. 7. P. oblong, with a ſtraight margin: one half quite ſmooth, the other reticulated with ſtriæ. Siam and Tranquebar.

campechiana. 8. P. narrow, white, finely ſtriated. Bay of Campeachy.

cordata. 9. P. ſhort, turgid, furrowed, with fine elevated tranſverſe ſtriæ; aperture heart-ſhaped.

chilenſis. 10. P. oblong, depreſſed, with diſtant longitudinal ſtriæ; five inches long. Chili.

teredula. 11. P. oblong, white, with a longitudinal brown granular ſuture; penetrates timber. Belgic ſhores

hians. 12. P. bivalve, white, with tranſverſe arched ſtriæ; convex in the middle; aperture large, oval; perforates calcareous rocks. American iſlands.

II. BIVALVE SHELLS.

Gen. 4. Mya.

27 Mya.

Gen. Char.—The animal is an aſcidia. The ſhell is bivalve, generally gaping at one end. The hinge has broad, thick, ſtrong teeth, ſeldom more than one, and not inſerted into the oppoſite valve.

Species.

truncata. * 1. M. ovate, truncated, gaping greatly behind; tooth projecting, obtuſe; 2½ inches long. Europe.

declivis. * 2. M. brittle, ſemitranſparent, ſloping downwards near the open end. Hebrides.—A fiſh much eſteemed as food by the inhabitants.

arenaria. * 3. M. ovate, rounded behind; 2½ inches long. European ſeas, Portſmouth.

pictorum. * 4. M. ovate; a ſingle, longitudinal, notched tooth, in one hinge, and two in the other; near 2 inches long, and 3½ broad. Europe, Barbary, River Kennet, Berkſhire.—This ſhell is employed by painters for holding water colours.

margaritifera. * 5. M. ovate, a little contracted in the middle of the thinner margin; primary tooth of the hinge conic; length 2½ inches, breadth 5 inches; inhabits moſt parts of the arctic circle, and is moſt frequently found in mountainous rivers, and about cataracts.—This ſhell yields mother-of-pearl and pearl. The river Conway in Wales, was formerly famous for producing pearls of great ſize and value. They have alſo been found in the river Irt, in Cumberland. Sir John Hawkins obtained a patent for fiſhing them in that river.

perna. 6. M. oblong, dilated; the narrower baſe compreſſed. Straits of Magellan, Barbary.

vulſella. 7. M. tongue-ſhaped; hinge terminal, ſemiorbicular; 4 inches long, and 1½ broad. Indies.

arctica. 8. M. ſtriated, valves with two ſubſpinous ridges; hinge without teeth. North ſeas.

edentula. 9. M. oval, equivalve, widely gaping, and ſtriated; 1 inch long. Shores of the Caſpian ſea.

radiata. 10. M. equivalve, pellucid, finely ſtriated. Rivers of Malabar.

oblonga. 11. M. ovate, oblong; 3 inches broad, 1½ long.

anatina. 12. M. globular, ſnowy, pellucid. Guinea.

nicobarica. 13. M. equivalve, ſnowy, ovate, oblong; ſtriæ decuſſated. Nicobar iſlands.

auſtralis. 14. M. ovate, compreſſed, cloſed. New Zealand.

gaditana. 15. M. rounded, flattiſh, tranſverſely ſtriated. Cadiz.

corrugata. 16. M. rhombic, green, protuberant parts wrinkled. Rivers of Coromandel.

rugosa. 17. M. oval, wrinkled, outwardly greenish, within pearly. Rivers of Coromandel.

nodosa. 18. M. oval, greenish; protuberant parts knotty.

norwegica 19. M. oval, longitudinally and thickly striated; one end rounded, the other truncated.

spuria. 20. M. rhombic; protuberant part glabrous. Rivers of Tranquebar.

glycemeris. 21. M. gaping at both ends, thick, lamellous, oblong, oval; 5 inches long, 10 broad. Mediterranean sea.

syrmatophora. 22. M. ovate, depressed; margin of the hinge with a subulate projection near the primary tooth; that of the other valve dilated. Rivers of Guinea.

nitida. 23. M. oval, smooth; an obtuse tooth in each hinge. Norway.

membranacea. 24. M. ovate, membranaceous, with a protracted reflected margin at the proboscis.

byssifera. 25. M. coarse, thick, oblong, striated, convex; hinge without a tooth. Greenland coast.

dubia. * 26. M. with an oval and large hiatus opposite to the hinge; length of a horse bean. Weymouth.

inæquivalvis. * 27. M. subtriangular, opaque, white; under valve deep; upper valve not half the size of the other. Cornwall, Devonshire. *Montagu, Test. Brit.* p. 38.

suborbicularis. * 28. M. subpellucid, faintly striated transversely; sides nearly equal, rounded; hinge central, 1/8 of an inch; found in hard limestone at Plymouth. *Montagu, Test. Brit.* p. 39.

prætenuis. * 29. M. oval, thin, brittle, flat; striæ fine, concentric. Falmouth harbour.

distorta. * 30. M. subpellucid, thin, fragile, distorted into various shapes. Falmouth. *Montagu, Test. Brit.* p. 42.

bidentata. * 31. M. suboval, compressed; hinge with two broad, erect, laminated teeth in one valve; none in the other. Salcomb bay.

28 Solen.

Gen. 5. Solen, *Razor-sheath.*

Gen. Char.—The animal inhabiting this shell is an ascidia: shell bivalve, oblong, open at both ends; hinge with a subulate reflected tooth, often double, and not inserted in the opposite valve.

SPECIES.

vagina. * 1. S. linear, straight, roundish; one end margined; hinge with a single opposite tooth in each valve. European and Indian seas, Caermarthenshire, Weymouth.

siliqua. * 2. S. linear, straight, one hinge 2-toothed. European and Indian seas. Length 1 inch, breadth 8 inches. Common on the shores of Britain, where it is employed as food.—This species lurks in the sand, near low-water mark, in a perpendicular direction, and when in want of food, they raise one end above the surface, and protrude the body a considerable way out of the shell. At the approach of danger they dart deep into the sand, as far even as to the depth of two feet; and the place is known by a small hollow on the surface. They are sometimes taken by digging them out of the sand, or by striking a barbed dart into their bodies.

ensis. * 3. S. linear, in form of a scymeter; one hinge 2-toothed; 1/4 of an inch long, 5 inches broad. European seas; not uncommon on the British shores.

pellucidus. * 4. S. subarched, suboval, pellucid; one hinge 2-toothed; length 1/4 inch, breadth above one inch. Anglesea, Cornwall.

* 5. S. linear, oval, straight; hinge in the middle 2-toothed, one of them bifid; 2½ inches broad. European and Atlantic seas, Anglesea, Hampshire. *legumen.*

* 6. S. kidney-shaped, a single tooth in one valve, two in the other. Europe and India, Cornwall. *cultellus.*

7. S. oval, straight, smooth, with a transverse, depressed rib on one side. India. *radiatus.*

8. S. oval, obliquely striated. Atlantic and Indian seas. *strigilatus.*

9. S. ovate, membranaceous, hairy, with a falcated rib at the hinge. Indian ocean. *anatinus.*

10. S. oval, oblong, truncated before. Pacific ocean.—This species produces pearl. *macha.*

11. S. roundish, inflated, substriated. Indian and American seas. *bullatus.*

* 12. S. oval; angles of the valves serrated; size of a cucumber seed. Coral rocks in Norway and Greenland; in hard limestone at Plymouth. *minutus.*

13. S. ovate, oblong, with tumid bosses. Java. *virens.*

14. S. oval, straight, smooth, with prominent membranes; 2½ inches long, 5 broad. Indian ocean. *diphos.*

15. S. linear, oval, straight. Tranquebar. *minimus.*

16. S. linear, oval, straight, with arched striæ. Nicobar. A very rare species. *maximus.*

17. S. transversely wrinkled, contracted in the middle, rounded at both ends; 3/4 of an inch long, 2½ broad. Nicobar islands. *coarctatus.*

18. S. equivalve, rosy, tooth of the hinge subbifid. Red Sea. *roseus.*

19. S. oval, quite smooth; hinge callous, two-toothed. Jamaica. *sanguinolentus.*

20. S. equivalve, transversely striated; hinge with a single tooth. Nicobar islands. *striatus.*

21. S. transversely striated, hinges 2-toothed, with a hollow in the middle; 4 inches broad, and 2 long. *occidens.*

* 22. S. partly smooth, partly rough, with undulated, crimped lines. River Tees in England. *crispus.*

23. S. protuberances or beaks of the shell 2-parted, an inch long, 2½ broad; rounded at the ends. *spengleri.*

* 24. S. pellucid, fragile, depressed; suboval, concentrically wrinkled; a blunt tooth in each valve; 3/8 of an inch long, and 3/4 broad. Torcross. *Montagu, Test. Brit.* p. 566. *pinna.*

29 Tellinas.

Gen. 6. Tellina.

Gen. Char.—The animal is a tethys: the shell is bivalve, generally sloping on one side; in the fore part of one valve there is a convex, and in that of the other, a concave fold; the hinge has usually three teeth, the lateral ones flat or nearly obsolete, in one valve.

SPECIES.

A. Ovate and thickish.

1. T. roundish, compressed, wrinkled on the fore-part. Indian ocean, very rare. *gargadia.*

2. T. subovate, rough, with lunated scales, disposed in a quincunx. Indian ocean. *lingua felis.*

3. T. angular, with transverse, recurved striæ; 2 inches long, and 2½ broad. Indian and Atlantic oceans. *virgata.*

4. T. subovate, angular before, with transverse, recurved striæ; no lateral teeth; 1½ inch long, and 2 broad. Indian ocean. *angulata.*

5. T.

i. 5. T. ſtriæ recurved, tranſverſe; lateral teeth obſolete. Indian ocean.

gilis. * 6. T. ovate, white, gibbous, with tranſverſe, recurved ſtriæ; beaks yellowiſh. European ſeas, Britain.

reſſa. * 7. T. very thick, depreſſed, oblong, with tranſverſe, concentric ſtriæ. Europe, Britain.

ſſa. * 8. T. very thick, broad, depreſſed; concentric ſtriæ numerous, $1\frac{1}{4}$ inch broad, and $1\frac{1}{4}$ long. Europe, Britain.

oſa. 9. T. wrinkles tranſverſely undulated, hinged with two lateral teeth. Indian and American ſeas.

ata. 10. T. rounded, thick, gibbous; ſtriæ longitudinal, fine.

langu-a. 11. T. ovate, ventricoſe, inequivalve, with decuſſated ſtriæ. Tranquebar.

yracea. 12. T. thin, ovate, ventricoſe, and tranſverſely ſtriated; wrinkles on the fore part, plaited; 3 lines long, and an inch and a half broad. Guinea.

boſa. 13. T. angular, ventricoſe; and finely ſtriated tranſverſely.

quila-a. 14. T. equivalve, roundiſh, white, with a few tranſverſe ſtriæ round the edges.

rii. 15. T. rich red colour, with a violet margin; $2\frac{1}{2}$ inches broad, and $1\frac{1}{2}$ long.

nii. 16. T. tranſverſely ſtriated; one ſide bent and reddiſh, with red rays; $\frac{3}{4}$ inch long, and 2 inches broad.

illa. 17. T. ovate, ventricoſe, thin, tranſverſely ſtriated, very minute. Rivers of Europe.

culata. * 18. T. ſubovate, thickiſh, with decuſſated ſtriæ, and irregular ſpots; figure of the ſpots different in different ſhells, but exactly ſimilar in both valves of the ſame ſhell. Denbigh in England.

alis. * 19. T. obliquely ſubovate, tranſverſely grooved; ſize of a pea. River Avon near Saliſbury.

B. *Ovate, compreſſed.*

ida. 20. T. oval, ſmooth, with prominent membranes; ſize of an egg. European ocean.

acea. 21. T. oval, with rough pubes, flattened ſides, ſerrated; $1\frac{1}{2}$ inch long, and 3 broad. Indian ocean.

nata. * 22 T. ovate, compreſſed, tranſverſely ſubſtriated, ſmooth, with acute margins. European and Mediterranean ſeas; common on the ſhores of Britain.

iabilis. * 23. T. ovate, oblong, with pale purple eyes. European and Atlantic ſeas, Britain.

ugata. 24. T. ovate, ſmooth, lateral teeth, margined. European and Indian ſeas.

iata. * 25. T. oblong; ſtriæ faint, longitudinal. European and American ſeas, Britain.

rata. 26. T. oblong, the fore-part produced into an angular beak. Indian ocean.

quival- 27. T. oblong, produced into a beak, upper valve flat, lower convex; length $\frac{1}{2}$ inch, breadth 1 inch. European and North ſeas.

aſciata. * 28. T. ovate, ſmoothiſh, triradiate, with red and ſlightly ſtriated tranſverſely. European ſeas, Britain.

rnata. * 29. T. ovate, a little produced on the fore-part, flattiſh; 2 inches broad. European and Mediterranean ſeas, Britain.

acina. * 30. T. ovate, flattiſh, very obtuſe on the fore-part. Mediterranean, Sandwich, Weymouth.

ncata. 31. T. oval, compreſſed, ſubſtriated; fore-part truncated. Java.

32. T. flat, fore-part truncated, yellow; $1\frac{1}{2}$ inch long, and 2 broad. *trilatera.*

33. T. oblong, brittle, yellowiſh; rounded on one ſide. Europe. *oblonga.*

34. T. white, tranſverſely ſtriated, and bifariouſly hooked on each ſide. Nicobar iſlands. *ſpengleri.*

* 35. T. with rugged, concentric ſtriæ; the ſize of a filbert. Weymouth. *rugoſa.*

* 36. T. oval, oblong, deeply ſtriated, parallel to the margin. Cornwall. *cornubienſis.*

* 37. T. oblong, ovate, compreſſed, with fine, tranſverſe ſtriæ; 1 inch long, and 2 broad. North ſeas, Weymouth, Yorkſhire. *ferrvenſis.*

38. T. purple, with white bands, and decuſſated ſtriæ; one valve convex, the other flat; $2\frac{1}{4}$ inches broad and $1\frac{3}{4}$ long. *operculata.*

39. T. oval, inequivalve, flat, pellucid, with fine decuſſated ſtriæ; $1\frac{1}{2}$ inch long, 3 broad. Guinea. *hyalina.*

40. T. yellowiſh, very thin, perpendicularly ſtriated. North and Baltic ſeas. *vitrea.*

41. T. oval, very thin, tranſverſely ſtriated; 10 lines long, $1\frac{1}{2}$ inch broad. India. *lanceolata.*

42. T. oval, pellucid, with a rib in each valve, reaching from the hinge to the outer margin; very thin. Nicobar. *apelina.*

43. T. oval, pellucid, ſcarlet, tranſverſely ſtriated, very thin. Sea round Iceland. *coccinea.*

44. T. ſtriæ fine, tranſverſe, lengthened forwards into a beak, very ſmall and rounded. Rivers of Virginia. *virginica.*

45. T. nearly triangular, margin dilated; 2 inches broad, and $1\frac{1}{4}$ long. *alata.*

46. T. rounded, flat, thin, with longitudinal ſtriæ. *pectinata.*

47. T. flattiſh, red, with white rays; one end pointed, the other rounded. *anguſtata.*

48. T. oval, rounded at one end; variegated, with a whitiſh ray at the crown. *variegata.*

49. T. oval, a little pointed at one end; $2\frac{1}{2}$ inches long, and $3\frac{1}{2}$ broad. Madagaſcar. *madagaſcarienſis.*

50. T. purpliſh at each end; $1\frac{1}{2}$ inch long, and ſomething broader. *purpureſcens.*

51. T. pointed at one end, yellowiſh within, radiated and rough with tranſverſe ſtriæ without; $1\frac{3}{4}$ inch long, and 3 inches broad. *aſpera.*

52. T. ſlightly wedged, whitiſh, and tranſverſely ſtriated; $1\frac{1}{2}$ inch broad, and 1 long. *triangularis.*

53. T. white, with unequal ſides, pointed at one end; $1\frac{1}{3}$ inch long, and 2 broad. Norway ſeas. *lata.*

54. T. thick, beak purpliſh without. Jamaica. *jamaicenſis.*

* 55. T. outwardly white and rough, with tranſverſe ſtriæ; within bluiſh; 2 inches broad, 1 long. River Tees, England. *rhomboides.*

* 56. T. purpliſh, tawny, with white rays; 1 inch long, and $1\frac{1}{2}$ broad. Britiſh and Baltic ſeas. *vinacea.*

57. T. roſy, with a white band. Shores of Tuſcany. *zonata.*

58. T. whitiſh, with a paler band; within yellow. *albicans.*

59. T. reddiſh, with pale yellow ſpots, and decuſſated ſtriæ; $\frac{3}{4}$ inch long, $1\frac{1}{4}$ broad. *rufeſcens.*

60. T. unequal ſided, depreſſed, minutely ſtriated, *plana.*

61. T. unequal ſided, round at both ends, roſy white, pellucid; 2 inches broad, $1\frac{1}{4}$ long. *ſtriata.*

62. T. roſy, with thin ribs running from the hinge to the margin; 1 inch long, $1\frac{1}{2}$ broad. *roſea.*

63. T.

punicea. 63. T. oval, flat, equal ſided, tranſverſely ſtriated; 1 inch long, 2 broad.

compla-nata. 64. T. obovate, flattened; obſoletely ſtriated, reddiſh, with a dilated margin; 2 inches long, 3 broad.

fabula. * 65. T. ovate, compreſſed, inflated, lengthened before; one valve ſmooth, the other with oblique, reflected ſtriæ. Mediterranean, American and North ſeas, Wales.

adanſoni. 66. T. whitiſh, with a violet hinge. Africa.

cancellata. 67. T. thin, with numerous longitudinal grooves croſſing the tranverſe wrinkles. Atlantic.

ſtrigoſa. 68. T. with whitiſh bands, glabrous and wrinkled at the margin. African ſhores.

C. *Suborbicular.*

balauſtina. 69. T. dilated, orbicular, lateral teeth in one valve. Mediterranean.

remies. 70. T. compreſſed and tranſverſely wrinkled; 3 inches long, 3½ broad. Indian and American oceans.

reticulata. 71. T. lentiform, compreſſed, reticulate. India.

ſcobitina. 72. T. lentiform, rough, with lunated ſcales diſpoſed in a quincunx; 2½ inches long, 2¼ broad. Indian ocean.

lactea. 73. T. lentiform, gibbous, white, pellucid, ſmooth. Mediterranean.

carnaria. * 74. T. white, with a roſy tinge within and without; fine ſtriæ, diſpoſed obliquely. Europe and American iſlands, Britain.

bimaculata * 75. T. triangularly rounded, ſmooth, whitiſh, with two oblong red ſpots on the inſide; ſcarcely an inch broad. Europe and American ſeas, Britain.

balthica. 76. T. roundiſh, ſmooth, outſide bloom colour; ſize of a horſe bean. Baltic.

piſiformis. 77. T. ſubglobular, ſmooth, obliquely ſubſtriated; ſize of a pea; mouths of rivers in Europe.

divaricata. 78. T. ſubglobular, white, with oblique bifarious ſtriæ. American ſeas.

digitaria. 79. T. ſubglobular, pale, ſurrounded with oblique uniform ſtriæ; ſize of a pea, nearly an inch long. American and Indian ſeas.

cornea. * 80. T. globular, glabrous, horn-colour, with a tranſverſe groove; ſize of a pea. Ponds and freſh waters of Europe, Britain.

lacuſtris. 81. T. rhombic, flattiſh, glabrous, with an acute protuberance. Pools and marſhes of Europe.

amnea. 82. T. heart-ſhaped, tranſverſely grooved. Pools and ditches of Europe.

fluminalis. 83. T. triangular, gibbous, tranſverſely ſtriated. River Euphrates.

fluminea. 84. T. triangular, gibbous, tranſverſely ribbed. China.

fluviatilis. 85. T. triangular, tranſverſely wrinkled. Canton.

iberica. 86. T. globular, ſmooth, poliſhed. Shores of Iberia.

adriatica. 87. T. ſubglobular, margined, denticulated, white without, pearly within. Shores of the Adriatic.

ſinuoſa. 88. T. ſubglobular, equivalve and equal-ſided, with a few tranſverſe ſtriæ.

purpurata. 89. T. equal ſided, ſmooth, lucid purple colour; one inch long, 1½ broad.

candida. 90. T. white, with fine tranſverſe ſtriæ.

gallica. 91. T. triangular, pectinated. France.

ſenegalen-ſis. 92. T. triangular, globoſe, with tranſverſe grooves. Africa.

anguloſa. 93. T. oval, flattiſh, tranſverſely ſtriated, fore-part angularly inflected. America.

polygon[a]. 94. T. tranſverſely ſtriated, orbicular, angular on the fore-part. India.

Gen. 7. CARDIUM, *Cockle.*

30 Cardium.

Gen. Char.—The animal is a tethys: the ſhell is bivalve, nearly equilateral, equivalve, generally convex, longitudinally ribbed, ſtriated or grooved, with a toothed margin. Hinge of the two teeth near the beak, and a larger remote lateral one on each ſide; each locking into the oppoſite.

SPECIES.

coſtatum. 1. C. gibbous, equivalve, with elevated, carinated, concave, membranaceous ribs; three inches long, three and a half broad, three high. African ocean.

cardiſſa. 2. C. heart-ſhaped, valves compreſſed and carinated with teeth; two inches and a half long, above two broad. Indian ocean.

roſeum. 3. C. heart-ſhaped; fore part ſurrounded with lines, hind part with broader ſtriæ, forming by their union the figure of a heart. Nicobar iſlands.

retuſum. 4. C. heart-ſhaped; valves ſtriated, notched; behind the beaks a lunated heart-ſhaped gape; two inches long, and nearly the ſame breadth. India, Arabia, and Egypt.

hemicardium. 5. C. heart-ſhaped, ſubquadrilateral; valves carinated, beaks diſtant. Indian ocean.

lithocardium. 6. C. heart-ſhaped, ſubtrilateral; valves tranſverſely grooved, and the fore-part longitudinally ſtriated; has only been found in the foſſil ſtate.

lineatum. 7. C. heart-ſhaped, carinated; fore-part obliquely truncated, thin, quite ſmooth, ſnowy, with gilt ſtriæ above an inch long.

medium. * 8. C. ſomething heart-ſhaped, ſubangular; valves angular, grooved, ſmooth. European and American ſeas, coaſt of Durham.

aculeatum. * 9. C. ſomewhat heart-ſhaped, ribs high, and grooved down the middle, and beſet with large hollowed ſpines near the circumference. European and Mediterranean ſeas, Devonſhire.

echinatum. * 10. C. ſlightly heart-ſhaped; ribs ſpinous, carinated. European ſeas, Britain.

ciliare. * 11. C. ſlightly heart-ſhaped, triangular ribs, beſet along the ridges with thin ſpines; ſize of a hazel-nut. European ſeas, Cornwall.

ciliatum. 12. C. ſlightly heart-ſhaped, with elevated, ſubtriangular, ciliated grooves. North ſeas.

tuberculatum. 13. C. ſomewhat heart-ſhaped, with obtuſe, knotty, tranſverſely ſtriated grooves. Mediterranean.

iſocardia. 14. C. heart-ſhaped, with arched imbricated ſcales along the grooves. Mediterranean.

fragum. 15. C. ſomewhat heart-ſhaped, ſubangular. India.

unedo. 16. C. ſubcordate, with lunated, coloured grooves. India.

muricat[um]. 17. C. ſubcordate, grooved, and muricated at the ſides. America.

magnum. 18. C. oblong, with angular grooves, ſerrated at the ſide. America and India.

flavum. 19. C. ſubovate, grooved; anterior margin rough, poſterior one toothed. India.

lævigatum. * 20. C. obovate, with obſolete, longitudinal ſtriæ, and a few tranſverſe ones concealed by a gloſſy, yellowiſh brown epidermis. European and American ſeas, Britain.

21. C.

21. C. obovate, smooth, with obsolete striæ; interior margin serrated. Mediterranean and Indian seas. *ratum.*

* 22. C. antiquated, with 28 depressed ribs, with obsolete, recurved scales. Abounds frequently on all sandy coasts, and is lodged a little beneath the sand. This is employed as a wholesome and nourishing food. It is the common cockle of this country. *le.*

23. C. grooved with about 36 triangular, smooth ribs. Iceland and Greenland seas. *andi- n.*

24. C. antiquated, glabrous, thin, with angular ferruginous lines; two and three-fourths inches long, three and a half broad. Greenland and Iceland. *enlan- um.*

25. C. antiquated, with 20 remote grooves, the intermediate spaces rugged. Mediterranean seas. *icum.*

26. C. Subantiquated, hind-part with 20 grooves imbricated upwards. Barbary. *ucum.*

27. C. slightly heart-shaped and pectinated. Mediterranean. *tinatum*

28. C. triangular, rounded, equilateral, with transverse, membranaceo-recurved wrinkles; hinges blue. Mediterranean. *ginicum*

29. C. triangular, gibbous, striated. Caspian sea. *aterum.*

30. C. heart-shaped, subrhombic, 24 ribs on each side; the grooves finely notched; two and one-fourth inches long, one and three-fourths broad. Arabia and Egypt. *icula.*

31. C. oval, smooth; margin striated on each side the beak. *e.*

32. C. gibbous; one side impressed and ochraceous, the other convex, heart-shaped, and whitish, spotted with yellow. Nicobar islands. A very rare species. *stro-*

33. C. gibbous, with prickly ribs; anterior ones with recurved, membranaceous tubercles, crenated at the sides. Nicobar islands.

34. C. rounded, ventricose, white, with deep teeth on the margin; anterior ones rosy. Africa and America. *ens.*

35. C. pellucid, cinereous, with thin longitudiaal striæ. India. *yra- n.*

36. C. thick, with longitudinal anterior striæ, and transverse posterior ones. Guinea, Antilles islands. *cum.*

37. C. Yellowish, oblong, turgid ribbed, anterior parts glabrous; margin notched; three inches long, two and a half broad, ribs about 30. Mediterranean. *ngum.*

38. C. brownish, rather oblong, thick, antiquated, with deeper teeth on the margin; ribs about 23. Mediterranean and North seas. *tum.*

39. C. broad, unequal sided, within white; ribs flat and spinulous: two inches long, two and a half broad. Tranquebar and Nicobar islands. *n.*

* 40. C. somewhat heart-shaped, subangular; grooves imbricated, or beset with recurved scales. Falmouth, Sandwich. *icum.*

41. C. with crowded, undulated wrinkles; ribs broad, grooves narrow; three inches long, three and one-fourth broad. Bay of Campeachy. *ula-*

42. C. rounded, brown; ribs flexuous, grooves wrinkled; $1\frac{1}{4}$ inch long, and about the same breadth. *osum.*

* 43. C. flattish, thick, white, with flat ribs. Mouth of the Tees, England. Rare. *atile.*

44. C. rounded, yellowish-white, varied with red, green, and brown, and marked with decussated striæ. Cadiz. *a-*

45. C. rounded; ribs flat, broad, finely notched. Brazil. *lense.*

46. C. rather oblong, white, with blackish spots; ribs about 12, very convex; $1\frac{1}{4}$ inches long. *amboinense.*

47. C. heart-shaped, equilateral, tawny white and purplish within; ribs with imbricated scales. *squamosum.*

48. C. reddish, thin, rounded, with decussated striæ. *cancellatum.*

49. C. reddish, unequal sided; ribs convex, transversely striated. *rubiginosum.*

50. C. unequal sided, ribbed, whitish, within purple; minute. *albidum.*

51. C. inequilateral, oblong, with fine ribs doubled above. *virescens.*

52. C. rounded, whitish, with a brown band; ribs acute. *fasciatum.*

Gen. 8. Mactra.

31 Mactra.

Gen. Char.—The animal is a tethys; the shell is bivalve, unequal sided and equivalve; the middle tooth of the hinge is complicated, with a small hollow on each side; the lateral ones are remote, and inserted into each other.

Species.

1. M. smooth, with a flat, anterior margin, on which is a lunated cape, $3\frac{1}{2}$ inches broad. Cape of Good Hope. *spengleri*

2. M. with transverse, wrinkled plaits, diaphanous; anterior margin flattish, shell thin like paper; from 1 to 2 inches long, $2\frac{1}{2}$ broad. Indian ocean. *plicatoria.*

3. M. thin, pellucid, white, convex, fore-part a little gaping, finely striated and ribbed. Nicobar islands. Very rare. *papyracea.*

4. M. smooth, diaphanous; back substriated, with a smooth marginal impression before them, surrounded with a rim; $2\frac{1}{2}$ inches long, 3 broad. Mediterranean and Coromandel coasts. *striatula.*

5. M. triangular, thick, with strong, thick crowded, arched striæ. *striata.*

6. M. obtusely triangular, whitish, with milk-white bands on the beak; margins on each side the beaks violet; $1\frac{1}{4}$ inch long, and nearly 2 broad. Mediterranean. *rotundata.*

7. M. smooth, diaphanous, striated; beaks smooth, margins on each side of them striated; $1\frac{1}{2}$ inch long and 2 broad. African and Indian oceans. *glabrata.*

8. M. snowy, glossy, thick, diaphanous, smooth; depressions on each side the beaks striated. *nitida.*

9. M. smooth, subdiaphanous, white, with paler bands; 2 inches broad, $1\frac{1}{2}$ long. Mediterranean and Guinea. *corallina.*

10. M. thin, turgid, pellucid white; fore-part finely striated, with paler bands. Indian ocean. *lactea.*

* 11. M. semitransparent, smooth, glossy, obsoletely radiated, white without, purplish within; sides nearly equal; length $1\frac{1}{2}$ inch, breadth $1\frac{3}{4}$. European and American seas, England, and shores of Scotland. *stultorum.*

12. M. semitransparent, smooth, fawn colour with pale rays; beak and hinge placed beyond the middle; $2\frac{1}{4}$ inches long, $3\frac{1}{4}$ broad. *grandis.*

* 13. M. strong, subtriangular, of a yellowish-white colour, with a few concentric ridges; equal sided; $1\frac{1}{2}$ inch long, $1\frac{3}{4}$ broad. Common on European shores, and also in Britain. *solida.*

* 14. M. oval, oblong, smooth, with irregular concentric striæ; inside glossy white, gaping a little at both ends. *lutraria.*

ends. Europe, near the mouths of rivers. Found very large on the coast of Caermarthen, and some parts of Cornwall.—The animal which inhabits this shell, according to Montagu, is an ascidia; and he observes that it frequently protrudes not less than 7 or 8 inches from the smaller end in search of food. *Test. Brit.* p. 100.

cygnus. 15. M. three-sided, finely striated transversely; fore-part flattish and slightly wrinkled; 1 inch long and rather broader. Tranquebar.

macula. 16. M. obtusely triangular, smooth, thin, with pellucid chesnut spots; within white, and finely striated; a heart-shaped impression behind the beaks; 1½ inch long, and rather broader.

turgida. 17. M. inflated, faintly striated, ochraceous and white within; hinge with a supernumerary, triangular, double tooth; 2¼ inches long, 3½ bread. Tranquebar.

violacea. 18. M. thin, obsoletely radiated, finely striated transversely; margins on each side the beaks whitish; 2 inches long and 3 broad. Tranquebar.

cuneata. 19. M. wedge-shaped, blue, with fine transverse striæ; margin notched within; 1 inch long and scarcely so broad.

glauca. 20. M. ovate, dirty white with glaucous rays, and fine transverse striæ; 2¼ inches long, 3½ broad. Mediterranean.

pellucida. 21. M. ovate, thin, pellucid, white, with unequal transverse striæ; 1½ inch long, and 2 broad. Guinea.

fragilis. 22. M. ovate, thin, smooth, pellucid, flattish; anterior gape transversely striated, and wrinkled. Nicobar islands.

rugosa. 23. M. ovate, dirty white, with elevated longitudinal striæ; crossing the transverse ones, which are a little more raised; 2½ inches long, 2¾ broad; thick, and white within.

nicobarica. 24. M. ovate, thin, pellucid, smooth on the fore-part; the hind-part with cancellated striæ. Nicobar islands.

complanata. 25. M. ovate, thin, with arched plates; the plates transversely striated; no lateral teeth; 1 inch long, 2½ broad. India.

listeri. * 26. M. very thin, nearly round, whitish; hinge with a triangular tooth, and large cavity; 1½ inch long, and 2 broad. Common on the shores of Britain. *Mactra compressa*, Montagu, *Test. Brit.* p. 96.

piperita. 27. M. ovate, compressed, transversely striated; hinge teeth very minute, with a large oblique hollow. Mediterranean.

32 Donax.

Gen. 9. DONAX, or *Wedge-shell.*

Gen. Char.—The animal is a tethys. The shell is bivalve, with generally a crenulate margin; the anterior margin very obtuse; hinge with two teeth, and a single marginal one placed a little behind; rarely double, or triple.

SPECIES.

scortum. 1. D. triangular, heart-shaped, with a flat frontal margin. Indian ocean.

pubescens. 2. D. ciliated with spines on the anterior margin. Indian ocean.

rugosa. 3. D. wrinkled and gibbous before, with notched margins. Mediterranean and Atlantic seas.

trunculus. * 4. D. oblong, smooth, glossy, finely striated longitudinally; margin crenated; an inch broad. European coasts, Wales.

striata. 5. D. obtuse before, striated, the margin denticulated. Southern Europe.

denticulata. * 6. D. obtuse in front, lips transversely wrinkled; finely striated longitudinally; margin denticulated. European and American seas; shores of Britain, but rare.

cuneata. 7. D. wedge-shaped, margins very entire; 1 inch long, 1¼ broad. Tranquebar.

faba. 8. D. gibbous, finely striated transversely, spotted with yellow.

scripta. 9. D. ovate, compressed, smooth, marked with purple waved lines; margins crenulate. Malabar coasts.

muricata. 10. D. ovate, striæ muricated; margin denticulated. Indian ocean.

irus. * 11. D. oval, with transverse, waved, erect, striated, membranaceous wrinkles; size of a small kidney bean. Mediterranean, shores of Devonshire and Cornwall, where it is found in the hardest limestone.

lævigata. 12. D. obtuse before, obsoletely striated at the sides; margin very entire; hinge without marginal teeth; 1½ inch long, 2 inches broad. Tranquebar.

spinosa. 13. D. hind-part smooth and perpendicularly striated; fore-part truncated, and finely cancellated; angles spinous. Tranquebar. Very rare.

incarnata. 14. D. flesh-coloured, anterior part truncated, wrinkled, and marked with reticulated striæ; hind-part wedge-shaped, and furrowed with fine perpendicular striæ. Tranquebar.

argentea. 15. D. oval, smooth, olive-green, within silvery; margin with more elevated acute teeth, near the hinge.

bicolor. 16. D. ovate with elevated striæ crossing a few transverse ones; rufous with a white ray on one side.

radiata. 17. D. brown, with hyaline spots; outside with crowded, arched, transverse striæ, inside with perpendicular ones; 1 inch broad, 1½ long. Tranquebar.

straminea. 18. D. with thin perpendicular striæ, crossing the transverse ribs on the fore-part; straw colour, with darker transverse bands; margin tawney and entire behind; 1 inch long, ¾ broad.

candida. 19. D. entirely white, with a few thin, arched, transverse striæ, which are oblique towards the rim; hinge with three oblique middle teeth; margin entire; 1 inch long, and something broader.

complanata. * 20. D. oblong, smooth, glossy, light yellow, with small spots or streaks of white, and one broad ray of the same from the back to the opposite margin; ⅝ inch long, ¼ broad. Devonshire, but rare. Montagu, *Test. Brit.* p. 106.

plebeia. * 21. D. oblong, suboval, smooth, glossy, commonly marked with two brown stripes longitudinally from the beak; margin smooth; scarcely ½ inch long, ¾ broad. Weymouth, Dorsetshire. Montagu, *Test. Brit.* 107.

33 Venus.

Gen. 10. VENUS.

Gen. Char.—The animal a tethys; shell bivalve, frontal margin flattened, with incumbent lips; hinge with three teeth, all of them approximate; the lateral ones divergent at the tip.

SPECIES.

A. *Shell ſomewhat heart-ſhaped.*

dione. 1. V. tranſverſely grooved, with a double row of ſpines on the flattened ſide. American ocean. This ſhell is very rare.

paphia. * 2. V. ſomewhat heart-ſhaped, with thickened wrinkles; flattened ſide with attenuated wrinkles; lips complicated; 2 inches long, 1¾ broad. American iſlands, Cornwall.

marica. 3. V. heart-ſhaped, with decuſſated ſtriæ, flattened margin, lamellated. American ocean. Very rare.

diſera. 4. V. ſomewhat heart-ſhaped, with tranſverſe, remote, reflected grooves; margin crenulated. American ocean. Very rare.

bajana. 5. V. brittle, glabrous, with a few tranſverſe ſtriæ. Brazil.

excavata. 6. V. lentiform, tranſverſely ſtriated, with a deep, heart-ſhaped depreſſion behind the beaks; flat ſide, broad.

verrucoſa. * 7. V. with membranaceous, tranſverſe, ſtriated grooves, forming tubercles towards the outer margin; margin crenulated; 2 inches long, 2 broad. Mediterranean, Antilles iſlands, Cornwall.

lapicida. 8. V. longitudinally ſtriated forwards, and tranſverſely backwards. American iſlands.

divergens. 9. V. white, with fine, crowded, divergent ſtriæ. American iſlands.

caſſina. 10. V. with tranſverſe, recurved, acute grooves; poſterior margin crenated, and grooved behind the beaks. European ſeas. It is often found in a foſſil ſtate.

cancellata. 11. V. with tranſverſe, membranaceous, remote ſtriæ, and a heart-ſhaped depreſſion behind the beaks; 1 inch long, 1½ broad. Indian ocean.

gallina. * 12. V. radiate, with tranſverſe, obtuſe ſtriæ; hind tooth of the hinge minute; margin crenulated; 1 inch long, 1¼ broad. American and European ſeas, Cornwall.

guineenſis. 13. V. with tranſverſe, acute ſtriæ; lips finely ſtriated and roſy; margin very entire. Africa.

petulea. 14. V. ſlightly grooved, margin crenated; ſize of a hazel-nut. South of Europe.

flexuoſa. 15. V. grooves obtuſe, tranſverſe; lips of the anterior margin with an elevated angle; 1 inch long, 1¼ broad. American and Indian oceans.

erycina. 16. V. grooves tranſverſe, parallel, obtuſe; anterior margin glabrous; depreſſion behind the beaks ovate; 2½ inches long, 3 broad. India.

mercenaria. 17. V. ſtrong and thick, with ſlight tranſverſe ſtriæ, and covered with a brown cuticle; within, pale violet; margin crenated; 3 inches long, and nearly 3 broad. Europe, North America. Shells of this ſpecies are found foſſil in the mountains of Sweden. In North America they are called *clams*, and the Indians make wampum or money of them.

icelandica. * 18. V. thick and ſtrong, with ſlight tranſverſe ſtriæ, and covered with a brown cuticle; within pure white, and ſmooth; margin entire; 3½ inches long, 4 broad. Europe, Africa, Caſpian ſea, Caermarthenſhire, and ſhores of Scotland. The fiſh is employed as food by the Icelanders.

chione. * 19. V. ſmooth, with fine tranſverſe wrinkles; margin entire; hind tooth of the hinge lanceolate; 3 inches long, 3¼ broad. Aſiatic ſeas; Cornwall, where the ſpecies is called *queen*.

maculata. 20. V. ſmooth, with a few faint ſpots; 1½ inch long, 2½ broad. American ocean.

meretrix. 21. V. glabrous, with a brown gibbous ſlope before, and gaping membranes; margin entire. Near the mouths of rivers, Indian ocean.

læta. 22. V. ſmooth, radiated with white; lips of the anterior ſlope violet; 1½ inch long, 1½ broad. Mediterranean and Indian ſeas.

caſtrenſis. 23. V. triangular, rounded, gibbous, ſmooth, and marked with angular characters; 1½ inch long, 2 broad. Indian ocean, Red ſea.

phryne. 24. V. ſmooth, tranſverſely ſtriated before and behind; poſterior ſlope obcordate, with violet veins. Southern ocean.

meroe. 25. V. ovate, compreſſed, tranſverſely ſtriated, with a gaping ſuture behind; 1½ inch long, 2½ broad. American and Indian ocean.

minuta. 26. V. ſubovate, tranſverſely ſtriated, and ſubpellucid; membranes cloſed; from 1 to 2 inches broad, 1½ long. Iceland.

deflorata. * 27. V. oval, longitudinally wrinkled, ſemipellucid, faintly radiated with purple and white; 1½ inch long, 1¾ broad. European and American ſeas, Falmouth.

fimbriata. 28. V. oval, gibbous, longitudinally ſtriated, and tranſverſely grooved; margin crenated; 2 inches long, 3 broad. Eaſt Indies.

reticulata. 29. V. ſtriæ elevated, decuſſated; heart-ſhaped depreſſion behind; margin entire; 2 inches long, 2½ broad. India.

ſquamoſa. 30. V. ſtriæ reticulated, and ſcaly on the back part. India.

puerpera. 31. V. roundiſh with decuſſated, membranaceous ſtriæ; lips flexuous. India.

tripla. 32. V. triangular, ſmooth, retuſe behind and before; 1 inch long, and rather broader. Mediterranean.

plicata. 33. V. with arched, membranaceous, tranſverſe ſtriæ; poſterior ſlope reddiſh, heart-ſhaped; lips oblique. Indian ſeas. Very rare.

rugoſa. 34. V. gibbous, with tranſverſe, membranaceous, arched ſtriæ; poſterior ſlope heart-ſhaped; margin crenated; 2 inches long, 2 broad. India.

caliſke. 35. V. with tranſverſe, acute ſtriæ, anteriorly membranaceous; anterior ſlope ſhort, poſterior indiſtinct. Red ſea.

granulata. 36. V. rounded, with decuſſated ſtriæ; fore-part and crenated margin violet. American ocean.

imbricata. 37. V. with perpendicular, imbricated ribs, tranſverſely ſtriated; margin crenated. It has been found in a foſſil ſtate in France.

divaricata. 38. V. with fine tranſverſe ſtriæ, croſſing ſome diverging longitudinal ones towards the margin; poſterior impreſſion ovate; margin crenated. E. Indies.

contraria. 39. V. oblong, flattiſh, tranſverſe ſtriæ running contrary behind; margin crenated. Guinea.

gallus. 40. V. oblong, ovate, radiated, with thick, crowded, tranſverſe ſtriæ; anterior ſlope broad, ovate; poſterior impreſſion heart-ſhaped; 1½ inch long, 2 broad. Malabar.

flammea. 41. V. tranſverſely ſtriated, the back glabrous; anterior ſlope broad, with brown lines; poſterior impreſſions heart-ſhaped, with brown lines. Red ſea.

corbicula. 42. V. triangular, ſmooth, truncated on each ſide, with yellowiſh rays; ſlopes heart-ſhaped; margin very entire. Atlantic and American ſeas. Rare.

ſinuoſa. * 43. V. thin, convex, ſomewhat triangular, with a deep obtuſe ſinus in the middle of the front. Britain.

herma-phrodita. 44. V. triangular, very ſmooth, olive coloured, obſcurely banded: anterior ſlope heart-ſhaped; poſterior ovate. Rivers of Guinea. Rare.

coaxans. 45. V. green, within white, with tranſverſe, unequal, membranaceous ſtriæ; margin acute; 2½ inches long, 3 broad. Rivers of Ceylon.

caſta. 46. V. gibbous, ſnowy; anterior part convex; within pale violet; anterior ſlope roundiſh, poſterior heart-ſhaped; margin very entire. India.

affinis. 47. V. thin, glabrous, convex; white variegated with brown; poſterior ſlope elongated, with oblique tumid lips; four teeth in the hinge. Mauritius.

opima. 48. V. thick, convex; anterior ſlope ovate, poſterior heart-ſhaped; hinge with three teeth. India.

triradiata. 49. V. convex, gray, with three blackiſh blue rays; poſterior ſlope elongated; lips tumid. Tranquebar.

nebuloſa. 50. V. ochraceous, with cinereous and bluiſh ſpots; anterior ſlope oval; poſterior ſlope ovate, bluiſh. Tranquebar.

contempta. 51. V. thick, triangular, equilateral, ſmooth; beaks convergent; primary tooth of the hinge crenulated: minute. Malabar.

japonica. 52. V. oblong, ovate, inequilateral; lid tranſverſe; ſtriæ crowded at the ſides; poſterior ſlope oblong, ovate. Japan.

ſtriata. 53. V. ventricoſe, anteriorly angular, with tranſverſe, thick, ſmooth and ſlightly arched ſtriæ: poſterior ſlope heart-ſhaped. India. Rare.

textilis. 54. V. Oval, quite ſmooth, inequilateral; ſlopes oblong; margin very entire; 1¼ inch long, 2¾ broad. Malabar, Red ſea.

corrugata. 55. V. ovate, whitiſh; ſtriæ tranſverſe, anteriorly thick and ſtrong, poſteriorly thin and undulating. Mediterranean.

monſtroſa. 56. V. ovate, whitiſh; ſtriæ decuſſated; hinge with only two teeth in the left valve. Nicobar iſlands.

ponderoſa. 57. V. ſolid, weighty, inequilateral, wrinkled on both ſides; margin crenulated; hinge with two teeth. Southern ocean.

ſubviridis. 58. V. greeniſh, glabrous, thick; margin entire; beaks prominent.

roſtrata. 59. V. ovate; ſtriæ perpendicular, ſcaly, croſſing the tranſverſe ones.

fuſca. 60. V. brown, with fine, perpendicular ſtriæ; 1¾ inch long, 2½ broad.

luſitanica. 61. V. oblong, with fine tranſverſe ſtriæ; margin crenated. Seas round Portugal.

punctulata. 62. V. ovate, white, with bay lines, and yellowiſh dots. Corſica.

faſciata. 63. V. round, ſmooth, with bay and yellowiſh rays, partly blue, and partly livid.

carnea. 64. V. oval, inequilateral, ſlightly wrinkled, fleſh-coloured, with three rays; 1½ inch long, 2½ broad.

virgata. 65. V. externally ſteel blue, with yellow rays; internally violet. Indian ocean.

verſicolor. 66. V. oval, obliquely ſtriated, whitiſh; rays white, tawney, bluiſh and red.

variegata. 67. V. ovate, inequilateral, finely ſtriated and dotted with blue: rays browniſh and black.

amethyſtina. 68. V. ovate, violet; ſtriæ perpendicular; 1¾ inch long, 2¼ broad.

callipyga. 69. V. poſteriorly ovate, tranſverſely and unequally ſtriated, and marked with angular lines. Shores of Liſbon.

ſenegalenſis. 70. V. ovate, with fine decuſſated ſtriæ; white or fleſh-coloured, varied with brown; 1½ inch broad, not one inch long. Senegal.

matadoa. 71. V. triangular, white or yellow, with about 40 tranſverſe parallel grooves; 1½ inch long. Senegal.

ſuccincta. 72. V. heart-ſhaped, with tranſverſe, remote, excavated grooves; margin crenulated.

compreſſa. 73. V. heart-ſhaped, much compreſſed, tranſverſely grooved.

auſtralis. 74. V. heart-ſhaped, poliſhed, white, marked with browniſh characters; margin entire. Southern ocean.

gigantea. 75. V. ovate, livid, with numerous, interrupted, bluiſh rays; poſterior ſlope ovate. Shores of Ceylon and Florida.

B. *Orbicular.*

tigerina. * 76. V. lentiform, with crenated, decuſſated ſtriæ; poſterior ſlope impreſſed, ovate. American and Indian ocean, ſhores of Weymouth.

proſtrata. 77. V. orbicular, tranſverſely ſtriated, with rough membranaceous lips; two inches long, not ſo broad. Coromandel.

penſylvanica. 78. V. lentiform, with glabrous wrinkles, white with a longitudinal groove anteriorly on each ſide; 2 inches long. America.

ſpuria. 79. V. white, ſomewhat glabrous, with a longitudinal groove anteriorly, and hinge without lateral teeth. Shores of Iceland and Ferro iſlands.

incruſtata. 80. V. lentiform, glabrous, ſmooth, with excavated dots. India.

punctata. 81. V. lentiform, longitudinally grooved, dotted within; 2 inches long, 2¼ broad. India, but rare.

exoleta. * 82. V. lentiform, tranſverſely ſtriated, pale, with obſolete rays; poſterior ſlope heart-ſhaped: 2 inches long, and 2 broad. Norway, and coaſt of Britain, Cornwall.

undata. * 83. V. thin, convex, orbicular, whitiſh, tinged with yellow, with thin tranſverſe ſtriæ; margin waved. Britiſh ſeas, Falmouth.

tumidula. 84. V. gibbous with tranſverſe, remote, rather obſolete grooves; margin entire.

ſinenſis. 85. V. longitudinally ſtriated, with tranſverſe, white, and violet arches; margin interiorly crenated. Chineſe ſhores.

ſinuata. 86. V. lentiform, tranſverſely ſtriated, with an oblong gaping vent on the anterior ſlope; hinge with 4 teeth. Nicobar iſlands.

borealis. * 87. V. lentiform, with remote, tranſverſe, membranaceous ſtriæ; 1½ inch long, 2 broad. European ſeas, Britain.

pectinata. 88. V. ſublentiform, with wrinkled longitudinal grooves, branched near the anterior margin; 1½ inch long, 2 broad. Indian and American oceans.

ſcripta. 89. V. lentiform, compreſſed, ſtriated, angular; the hinder angle ſtraight. Indian ocean, and Red ſea. Very rare.

2 90. V.

edentula. 90. V. subglobular, lenticular, wrinkled, without teeth; posterior slope ovate. American ocean.

cincta. 91. V. very convex, and surrounded with rings; intermediate grooves crenated; posterior slope heart-shaped; margin crenulated. A minute shell.

concentrica. 92. V. white, sub-orbicular, compressed, with concentric striæ; margin very entire; posterior slope heart-shaped. Atlantic and American seas. A large shell.

juvenilis. 93. V. lentiform, with transverse, crowded striæ; anteriorly circular, and terminating in wrinkles behind; posterior slope heart-shaped; margin very entire. India.

histrio. 94. V. lentiform, with transverse, acute, arched striæ; margin entire; posterior slope heart-shaped. India. Rare.

globosa. 95. V. globular, with fine transverse striæ; margin very entire; hinge with two teeth; 1 inch long, 1½ broad. Red sea. Very rare.

pectunculus. 96. V. orbicular, equilateral, transversely wrinkled, and variegated with rufous. Japan.

albida. 97. V. orbicular, sub-compressed, equilateral, white, with fine transverse striæ. Jamaica.

campeachiensis. 98. V. orbicular, inequilateral, with crowded, acute, transverse striæ; 1½ inch long. Bay of Campeachy.

crassa. 99. V. orbicular, solid, compressed, with fine transverse striæ, and red rays.

purpurascens. 100. V. orbicular, with fine transverse striæ, and purplish rays.

rubra. 101. V. orbicular, inequilateral, chesnut with darker rays, and crowded, thick, transverse striæ. Jamaica.

violacea. 102. V. with perpendicular scaly striæ; margin denticulated, violet within.

spadicea. 103. V. striæ perpendicular, and scaly towards the margin; colour chesnut; 2 inches long, 2½ broad.

cancellata. 104. V. sub-rufous, cancellated; a minute shell.

bengalensis. 105. V. orbicular, nearly equilateral, with thick, perpendicular striæ; beaks turned back. Bengal.

aurea. * 106. V. sub-orbicular, inequilateral, transversely striated, and marked with faint longitudinal striæ: 1 inch long, 1⅛ broad. Dorsetshire.

obscura. 107. V. brown, with thin perpendicular striæ; 1¾ inch long, 2½ broad.

purpurata. 108. V. orbicular, sub-equilateral, perpendicularly wrinkled, and with purple rays; 1½ inch long, 1¾ broad.

nux. 109. V. lentiform, testaceous, wrinkled; posterior slope heart-shaped. Ionian shores.

rugata. 110. V. orbicular, testaceous, sub-equilateral, with distant transverse wrinkles.

gibbula. 111. V. lentiform, transversely striated, anteriorly truncated.

stellata. 112. V. orbicular, smooth, golden, with a white star at the beak. Lisbon.

italica. 113. V. orbicular, pale yellow, with elevated, transverse, distant striæ. Mediterranean.

braziliana. 114 V. lentiform, yellowish brown, with thin, transverse, distant striæ; posterior slope heart-shaped, bluish; anterior slope broad, bluish. Brazil.

pellucida. 115. V. orbicular, pellucid, smooth; anterior slope pale golden, with chesnut spots; posterior slope heart-shaped, with red and green veins. Brazil.

holoserica. 116. V. orbicular, solid, white, with undulated, golden striæ, and a broad yellow band towards the margin, variegated with transverse brown lines.

macassarica. 117. V. orbicular, ventricose, thick, brownish, radiated with white; striæ annular. Macassar.

aurantia. 118. V. sub-orbicular, of an orange colour; 2 inches long, 2½ broad.

fulva. 119. V. lentiform, fulvous, with fine circular striæ.

candida. 120. V. orbicular, white, with reticulated striæ.

albicans. 121. V. orbicular, transversely striated, whitish, with brown spots, lines, and angular characters.

undulata. 122. V. sub-orbicular, transversely striated, white, with reddish undulated lines and dots.

lineata. 123. V. orbicular, equilateral, white, with fine transverse striæ, thicker towards the margin.

lævis. 124. V. smooth, nearly equilateral, whitish.

cornea. 125. V. orbicular, smooth, inequilateral, livid horn-colour, with a white, transverse line.

guttata. 126. V. orbicular, fulvid, dotted with white at the margin.

rufescens. 127. V. inequilateral, reddish, smooth, with a few transverse lines.

virens. 128. V. lentiform, striæ cancellated and radiated; margin crenulated; greenish, with darker spots.

maculosa. 129. V. white, with radiated spots and arched striæ; in the middle a large gray spot, tapering upwards.

costata. 130. V. entirely of a flesh colour, with longitudinal ribs crossing the remote transverse wrinkles; 1½ inch long, 1½ broad.

wauaria. 131. V. thin, convex, with fine transverse striæ; within snowy, without marked with the letter *W*, and many scattered dots: beaks inflated.

tumens. 132. V. tumid, solid, smooth; with a few transverse wrinkles towards the margin; hinge with 4 teeth in each valve; 1¾ inches long, 2 broad. Africa.

diaphana. 133. V. thin, orbicular, pellucid, smooth, snowy; hinge with two teeth in each valve; 1½ inch diameter. Western shores of Africa.

dura. 134. V. sub-orbiculate, compressed, hard, transversely grooved, reddish, with brown rays; 6 inches broad, 4½ long.

eburnea. 135. V. orbicular, compressed, snowy, with longitudinal rounded grooves, crossed with transverse striæ; 9 lines in diameter. Africa.

lucida. 136. V. transparent, pale, fulvous within and without, with fine longitudinal grooves; 16 lines long. Africa.

discors. 137. V. orbicular, a little convex, with longitudinal striæ perpendicular in the middle, obliquely divergent towards the outside, and crossed by transverse ones; intermediate grooves and inner margin crenated.

aculeata. 138. V. orbicular, sub-equilateral, with elevated, acute, tuberculated ribs; margin denticulated, and crenated.

C. *Oval, a little angular near the beaks.*

literata. * 139. V. ovate, anteriorly angular, with undulated transverse striæ; 2 inches long, 2½ broad. Europe and India, coast of Britain.

geographica. 140. V. Inequilateral, thin, with fine decussated striæ; white, reticulated with brown. Mediterranean.

rotundata. 141. V. ovate, anteriorly angular, with transverse striæ; intermediate tooth of the hinge bifid; 1½ inch long, 3 broad. Indian ocean. Rare.

decussata. * 142. V. ovate, with decussated striæ anteriorly angular; 1½ inch long, 2 broad. Mediterranean, British coasts.

virginea. 142. V. ſubovate, anteriorly ſubangular, with unequal, tranſverſe ſtriæ; anterior ſlope tumid. Adriatic.

virginica. 143. V. ovate, tranſverſely wrinkled; 1 inch long, $1\frac{1}{2}$ broad. Virginia.

rhomboides. * 144. V. depreſſed or rhomboid, with concentric ſtriæ; pale brown, variegated; $\frac{3}{4}$ inch long, $1\frac{1}{4}$ broad. Britiſh coaſts.

cruentata. 145. V. ovate, inequilateral, tranſverſely ſtriated and ſpotted with red.

luteſcens. 146. V. ovate, tranſverſely ſtriated; outwardly radiated and marked towards the margin with characters, lines and ſpots; within yellowiſh.

ſanguinolenta. 147. V. oval, ſmooth, yellowiſh, with red ſpots and dots; $1\frac{1}{4}$ inch long, $1\frac{3}{4}$ broad. Shores of Naples.

argentea. 148. V. oblongiſh, ſmooth, ſilvery, with black lines united into bands. Shores of Cadiz.

donacina. 149. V. oblongiſh, flattened, anteriorly tranſverſely grooved; internal margin crenulated; ſlopes linear, excavated; $1\frac{1}{4}$ inch long, $1\frac{3}{4}$ broad.

afra. 150. V. grooved, umbo pointed; poſterior ſlope wrinkled and heart-ſhaped; grooves fine, about 130; 1 inch broad. Africa.

dealbata. 151. V. oblong, thin, flattened, bluiſh when the fiſh is alive, and ſnowy when it is dead; $1\frac{1}{2}$ inch broad, $\frac{3}{4}$ long. Africa.

lithophaga. 152. V. ovate, reticulated, gaping on each ſide; hinge with 2 teeth, alternately bifid. Shores of Croatia, among rocks and ſtones.

34 Spondylus.

Gen. 11. Spondylus.

Gen. Char.—The animal a tethys; ſhell hard, ſolid, with unequal valves, one of them convex, the other rather flat; hinge with two recurved teeth, ſeparated by a ſmall hollow.

Species.

gædaropus. 1. S. ſlightly eared and ſpinous. Mediterranean, Indian, and other ſeas.—This ſpecies varies greatly in ſize, thickneſs, and colours. Sometimes it is entirely purple, orange, white or bloom colour, and ſometimes it is marked with various ſtreaks, ſpots, dots, or bands.

regius. 2. S. without ears, and ſpinous. In this ſpecies the ſhell is ſub-globular, white within, without purpliſh, ſcarlet, flame colour, orange or white: ſpines generally two inches long, ſometimes cylindrical, with a crenated margin. India, Malta. Very rare.

plicatus. 3. S. without ears or ſpines, plaited. India, America, and the Mediterranean. The ſhell is white, with yellowiſh, reddiſh, browniſh, or violet lines and veins.

citreus. 4. S. oblong, plaited, ſpinous. In this ſpecies the ſhell is imbricated, of a citron colour, or red, with the inner margin orange. It is 2 inches long, $1\frac{1}{4}$ broad. The whole ſhell is thin and nearly tranſparent.

35 Chama.

Gen. 12. Chama, or *Gaping Cockle.*

Gen. Char.—The animal a tethys; the ſhell bivalve, rather coarſe; hinge with a callous gibboſity, obliquely inſerted in an oblique hollow; anterior ſlope cloſed.

Species.

cor. * 1. C. roundiſh, ſmooth; beaks recurved; anterior ſloped with a gaping ſent. Adriatic and Caſpian ſeas, Hebrides. Sometimes it is found of a large ſize.

gigas. 2. C. plaited, with arched ſcales; poſterior ſlope gaping, with crenulated margins. Indian ocean.—This ſpecies ſometimes meaſures only about an inch in length, but ſometimes it is found to be the largeſt of ſhells, and equal to 532lb. weight. The fiſh which it contains is ſaid to furniſh a meal to 120 men; and its muſcular ſtrength is ſo great as to cut aſunder a cable, or lop off the hand of a man.

hippopus. 3. C. plaited, muricated, poſterior ſlope retuſe, cloſed, toothed; 5 inches long, 7 broad. Indian ocean.

antiquata. 4. C. ſomewhat heart-ſhaped, with longitudinal grooves, and tranſverſe ſtriæ; ribs from 19 to 22. Atlantic and Indian ſeas.

trapezia. 5. C. trapeziform, gibbous, with longitudinal, crenulated grooves; about the ſize of a pea. Norway ſeas.

ſemiorbiculata. 6. C. ſuborbicular, compreſſed, coarſe, with decuſſated ſtriæ.

canaliculata. 7. C. oblong with imbricated grooves; anterior part retuſe; $\frac{1}{2}$ inch long, $1\frac{1}{2}$ broad. American and Indian ſeas.

cordata. 8. C. heart-ſhaped, tranſverſely ſtriated; one ſide elongated, compreſſed. Indian and Red ſeas.

ſatiata. 9. C. roundiſh, with toothed grooves, mixed with dots; poſterior ſlope retuſe; heart-ſhaped.

oblonga. 10. C. oblong, fore-part angular, with anterior acute teeth. Shores of Guinea.

lazarus. 11. C. imbricated, with jagged lamellæ; beak a little ſpiral obliquely. India.

gryphoides. 12. C. orbicular, muricated; one valve flatter, the other with a ſub-ſpiral, produced beak. Mediterranean, American, and Indian ſeas.

bicornis. 13. C. with conic valves, and horn-ſhaped, oblique, tubular beaks, longer than the valve. Indian and American ſeas.

arcnella. 14. C. grooved, muricated, with excavated dots: hinge with a ſeſſile callus; 2 inches broad and 2 long. American ocean.

moltkiana. 15. C. obtuſely triangular, equilateral, plaited; anterior ſlope elevated, with oblique plates and ſtriæ: ſize of a hazel nut.

concamerata. 16. C. tranſverſely wrinkled, and longitudinally ſtriated. In the middle of each valve within is an additional chamber. American ocean. Small, whitiſh. Very rare.

macrophylla. 17. C. rounded, with lamellæ diſpoſed in rows; internal margin crenulated. American ocean.

foliacea. 18. C. white, with foliaceous, ſerrated, tranſverſe ſtriæ, the interſtices crenated, beaks recurved. Mediterranean and American ſeas.—This ſpecies is found foſſil in Campania: it is ſometimes round, and ſometimes oblong.

arata. 19. C. rounded, white, and undulated with brown, with triangular, wrinkled, perpendicular ribs: margin unequal. Shores of Syracuſe.

fuſca. 20. C. wrinkled, oblong, narrow, brown; lower valves with a projecting, rounded, ſubincurvated beak.

citrea. 21. C. roundiſh, ventricoſe, inequivalve, muricated, with ſcattered, unequal, ſcaly ſpines. America.—This ſhell is of a citron colour.

thaca. 22. C. roundiſh, longitudinally ſtriated; poſterior ſlope retuſe. Shores of Chili, where it buries itſelf in the ſands. The ſhell is white, violet, and yellow, and

and within an elegant purple. It is about 4 inches in diameter. The fish affords a rich and agreeable food.

[ru]gosa. 23. C. suborbicular, with very deep grooves; wrinkles slightly imbricated; margin doubly folded. The grooves are about 30 in number.

[gl]yphica. 24. C. oblique, with a lateral oblique pit, wrinkled; callus of the hinge toothed. Barbary.

[co]ralliophaga. 25. C. cylindrical, white, diaphanous, with decussated striæ; the transverse striæ arched and imbricated.

36 Arca.

Gen. 13. Arca, or *Ark-shell.*

Gen. Char.—The animal a tethys: The shell bivalve, equivalve; the hinge with a number of teeth, sharp, alternate, and inserted all along the rim.

Species.

A. *Margin very entire; beaks recurved.*

[to]rtuosa. 1. A. parallelopiped, deeply striated longitudinally; lesser valve obliquely carinated. Indian ocean. Very rare.

B. *Margin entire; beak inflected.*

[N]oæ. * 2. A. *Noah's ark*; oblong, striated, and emarginated at the tip; beaks very remote, bent in; margin gaping. Mediterranean and Atlantic seas, Cornwall.

[b]arbata. 3. A. oblong, striated, bearded with byssus; beaks approximate; margin closed. Europe and Indian seas.

[m]odiolus. 4. A. oblong, striated, anteriorly angular. Mediterranean.

[...]ella. 5. A. ovate, pellucid, substriated; anterior slope distinct, prominent; hinge ciliar. Mediterranean.

[o]vata. 6. A. ovate, with decussated striæ, snowy, and covered with a russet brown epidermis; margin gaping. Red sea.

[p]ellucida. 7. A. pellucid, brittle, round at each end, obsoletely striated; teeth of the hinge very sharp. Nicobar islands.

[r]ostrata. 8. A. convex, with transverse striæ; hind-part rounded, fore-part extended into an acute beak; 1½ inch long, 1¼ broad. Baltic and Norway seas.

[st]riata. 9. A. lentiform, with numerous decussated striæ; lateritious and reddish within; posterior excavation triangular; hinge arched; an inch broad, and something longer. Red sea.

[p]ulchella. 10. A. roundish, biradiated, with transverse striæ.

[...]fra. 11. A. whitish, covered with a whiter skin, with decussated striæ; grooved, and obliquely truncated; from 4 to 5 lines long, and 3 broad. Africa.

[f]ossilis. 12. A. thick, roundish, longitudinally striated, and transversely ribbed; ribs with undulated striæ; 3 inches long, 3¼ broad. Found in a fossil state in the duchy of Limbourg.

[c]ancellata. 13. A. with cancellated striæ, and bearded; margin gaping in the middle. American ocean.

[m]inuta. * 14. A. a little compressed, transversely striated, tapering at the remoter end, and rounded at the opposite ones; 2½ lines long, and 4 broad. Greenland seas, Sandwich.

C. *Margin crenated; beaks recurved.*

[l]actea. * 15. A. with a rhomboidal, yellowish white shell, and obsolete decussated striæ; size of a horse bean. European seas, Devonshire.

nodulosa. 16. A. oblong, with striated tubercles; beaks incurved, remote; margin entire, closed. Denmark.

antiquata. 17. A. obliquely heart-shaped, with numerous unarmed grooves. Mediterranean and Indian seas.

senilis. 18. A. obliquely heart-shaped, smooth, with grooves; margin plaited; 3 inches long, 4 broad. America, Africa.

granosa. 19. A. slightly heart-shaped, with muricated grooves; 1¼ inch long, 1¼ broad. American and Indian oceans.

corbicula. 20. A. ovate compressed; with perpendicular knotty striæ; beaks obtuse, approximate. Nicobar islands.

decussata. 21. A. lenticular, with longitudinal striæ, crossed by faint, transverse ones; anterior slope closed. American ocean.

æquilatera. 22. A. lenticular, nearly equilateral, perpendicularly striated without and within; white, with chesnut spots. American ocean.

pallens. 23. A. lenticular, a little oblique, with decussated striæ; anterior slope, with a very narrow vent. Indian and American oceans.

cucullus. 24. A. ventricose; striæ decussated; anterior slope heart-shaped; 2 inches long, and 3 broad. Nicobar islands.

magellanica. 25. A. rounded on each side; chesnut, and marked with decussated striæ; external margin inflected, and repand in the middle; beaks approximate. Straits of Magellan.

reticulata. 26. A. rhomboidal, white, with decussated striæ; beaks approximate; anterior slope heart-shaped.

candida. 27. A. pellucid, rhomboid, with decussated striæ; fore-part produced; hind-part truncated. American ocean and African shores.

indica. 28. A. inequivalve, ovate, with flat, longitudinal striæ and deep grooves: anterior slope heart-shaped; ¾ inch long, 1½ broad. Indian ocean.

jamaicensis. 29. A. rounded before and truncated behind, with crenated or nodulous perpendicular ribs. Jamaica.

campeachiensis. 30. A. ovate, with broad, crenated, or scaly, perpendicular striæ; hinge arched. Campeachy bay and Barbadoes.

lata. 31. A. broad, cancellated, truncated before; flattened side heart-shaped.

senegalensis. 32. A. ovate, longitudinally grooved, with slight transverse wrinkles; white; 8 lines long, 10 broad. Africa.

D. *Margin crenated; beak inflected.*

undata. 33. A. lenticular, without ears, smooth, with a plaited margin; 2 inches long, 2 broad. American ocean.

pectunculus. 34. A. lenticular, slightly eared, with slightly imbricated grooves; margin plaited; 1½ inch long, and something broader. American ocean and Red sea.

pectinata. 35. A. lenticular, without ears, with smooth, longitudinal striæ. American ocean.

glycymeris. * 36. A. suborbicular, gibbous, and faintly striated transversely. European and Indian seas, Cornwall.

Arca Pilosa, Montagu.

pilosa. 37. A. suborbicular, equilateral, hairy; 1½ inches long, 2¼ broad. Asiatic and American seas.

nummaria. 38. A. roundish, smooth, slightly eared, and transversely striated. Mediterranean.

* 39. A.

nucleus. * 39. A. obliquely ovate, ſmoothiſh, with a triangular hinge; ſize of a hazel nut. European ſeas. It is ſometimes found foſſil. Shores of Britain.

rhomboidea. 40. A. entirely white, rhomboid, heart-ſhaped, and ribbed; anterior and dorſal ribs knotty; beaks remote. Indian and American oceans.

marmorata. 41. A. equilateral, thin, flattiſh, with fine decuſſated ſtriæ; beaks approximate; hinge arched. American ocean.

angulosa. 42. A. ventricoſe, with longitudinal ſtriæ and lines; and angular on one ſide; beaks approximate: hinge arched; brown with a few ſpots. Shores of Africa and American ocean.

ſcapha. 43. A. oblong, much depreſſed, ſtriated; beak ſlightly prominent. Ceylon.

Oſtrea. 37 Gen. 14. Ostrea, *Oyſter.*

Gen. Char.—The animal is a tethys; the ſhell bivalve, generally with unequal valves, and ſlightly eared; hinge without teeth, but furniſhed with an ovate hollow, and moſtly lateral, tranſverſe grooves.

SPECIES.

A. *Valves furniſhed with ears, and radiated. The* Scallop.

a. *Equilateral; ears of the valves equal.*

maxima. * 1. O. with 14 or 15 rounded ribs, longitudinally grooved, with fine tranſverſe ſtriæ; 5 inches long, 5½ broad: ears large, with decuſſated ſtriæ; lower valve convex, white, often varied with red bands or ſpots; upper valve flat, reddiſh. Found in large beds in moſt European ſeas, where they are dredged up, pickled, and barrelled for ſale. It is ſaid, that the greateſt quantity is taken after a fall of ſnow. This is the ſhell worn formerly by pilgrims on the hat or coat, as a mark that they had croſſed the ſea for the purpoſe of paying their devotions to the Holy Land; in commemoration of this it is ſtill preſerved in the arms of many families.

jacobæa. * 2. O. with about 14 angular and longitudinally ſtriated rays; upper valves flat, with rounded rays, which are finely ſtriated tranſverſely; lower valve with angular rays, which are ſtriated longitudinally. Ears concave and ſmooth on the upper ſide. European ſeas. Dorſetſhire, but rare.

ziczac. 3. O. with 18 flattened rays; ears finely wrinkled; lower valve convex; rays finely ſtriated tranſverſely; upper valve flat, with about twice as many angular lines as there are rays. American ocean.

ſtriatula. 4. O. with 16 faint rays with tranſverſe membranaceous ſtriæ: margin very entire; valves nearly equally flat. Indian ocean.

minuta. 5. O. with 20 convex rays; lower valve white and very convex; upper valve white, clouded with brown, flatter and plaited. Indian ocean.

pleuronectes. 6. O. equivalve, with 12 doubled rays, and ſmooth on the outſide; 4½ inches long, gaping at each end. Indian ocean.

laurentii. 7. O upper valve ſub-convex, with very fine perpendicular lines, croſſing very fine, concentric, tranſverſe ſtriæ; lower valve with 48 rays, and 48 ſtriæ within; 2½ inches long, about the ſame breadth. S. America. Rare.

japonica. 8. O. equivalve, a little convex, margined with yellow; upper valve with faint lines croſſing tranſverſe concentric bands, and 48 elevated ſtriæ within 5½ inches long, about the ſame breadth. Guinea and Japan.

magellanica. 9. O. equivalve, glabrous, with oblong crowded ſtriæ; upper valve more convex, lower flatter than in moſt others. Straits of Magellan.

hybrida. 10. O. with 9 or 10 rays; the interſtices longitudinally ſtriated: margin repand within. Norway ſeas.

radula. 11. O. nearly equivalve; with 12 convex rays croſſed by crenated ſtriæ; 3¼ inches long, 2½ broad. Indian ocean.

imbricata. 12. O. equivalve, flattiſh, with 9 unequal rays, imbricated with ſcales. Red ſea.

ſubrotunda. 13. O. roundiſh with 9 convex cheſnut rays; ears roundiſh, white with a yellowiſh border; 1¼ inches long, 2 broad.

plica. 14. O. nearly equivalve, with 16 convex ſmoothiſh rays, and ſtriated acroſs; 1¼ inch long, 1 inch broad. India.

crenata. 15. O. roundiſh with convex rays, outer ones finely ſtriated longitudinally; margin deeply crenated; ears tranſverſely ſtriated.

ſinouſia. 16. O. ovate with numerous fine ſtriæ; margin crenated within.

ſquamoſa. 17. O. oblong with ſcaly rays; the interſtices broader, and marked with perpendicular ſtriæ; ears wrinkled perpendicularly.

dubia. 18. O. roundiſh, with 18 rays imbricated with ſcales; ears ſtriated tranſverſely; ½ inch long.

ſubruſa. * 19. O. with 20 ſmooth rays, the interſtices tranſverſely ſtriated; margin crenated; 2 inches long, and the ſame breadth. Shores of Britain.

verſicolor. 20. O. flattened, with 18 ſmooth rays, the interſtices cancellated.

roſea. 21. O. rounded with 5 rays; middle-ſized.

fuſca. 22. O. brown with flat rays which diſappear towards the hinge; lower valve convex, upper flat. Indian ocean.

tenuis. 23. O. thin, flat, purple, with very minute perpendicular ſtriæ croſſing circular tranſverſe ones; the ſtriæ are elevated within.

lutea. 24. O. thin, pale yellow, with thick rays.

muricata. 25. O. roundiſh, white, with a mixture of ſaffron; the rays convex, and finely and ſharply muricated; 2½ inches long.

conſperſa. 26. O. roundiſh, tawney, dotted with white and black; the rays thick.

noduloſa. 27. O. roundiſh, brown, with black tranſverſe lines and dots; rays convex and knotty.

radiata. 28. O. thin, whitiſh, roſy, with white ſtripes; rays convex.

punctata. 29. O. oblong, pale yellow, ſpotted with white; beaks varied with white and brown; rays crenated; 2 inches long.

aculeata. 30 O. roundiſh, thin, varied with roſy and whitiſh; rays thick with aculeate ſcales.

plana. 31. O. thin, flat, white, with a ſaffron edge; rays round and broad.

puſilla. 32. O. oblong, red, minutely ſtriated.

flaveſcens. 33. O. convex on each ſide, yellowiſh within; rays convex.

flabellum. 34. O. roundiſh, deep red, with a white hinge and few ſpots; rays ſmooth.

ſpondyloides. 35. O. glabrous, reſembling a ſpondylus; but the ears are equal.

36. O.

iolacea. 36. O. flattiſh on each ſide; outſide brown, inſide violet. Mediterranean.

urantia. 37. O. roundiſh, plaited, and finely ſtriated longitudinally; a white ſemicircular band towards the hinge.

ittata. 38. O. within purple, without alternate brown and red bands; rays convex.

iniata. 39. O. white with confluent red ſpots; rays rough; convex valve, with tranſverſe, criſp lamellæ; $1\frac{1}{2}$ inch long, $1\frac{1}{4}$ broad.

flata. 40. O. convex on each ſide; cloſed, oblong, pellucid; 32 rays; twice as long as it is broad. A rare ſhell.

b. *Ears unequal; one of them generally ciliated, with ſpines within.*

allium. 41. O. *Ducal mantle.* Equivalve, with 12 convex rays, ſtriated, rough, and imbricated with ſcales; red, varied with brown and white; ears ſtriated, crenated or ſcaly. India.

inguino-nta. 42. O. equivalve, with 9 thick obtuſe rays; interſtices longitudinally ſtriated, tuberculated and prickly. Red ſea.

aculoſa. 43. O. equivalve, pale yellow, with tawney ſpots; rays 12, thick and flattiſh; ears white, with tranſverſe ſcaly ribs.

odoſa. 44. O. with 9 rays, covered with apparently veſicular tubercles. American and African oceans.

es felis. 45. O. with 9 ſtriated rough rays; one of the ears very ſmall.

llucens. 46. O. nearly equivalve, with 9 rays; ſmooth, with ſpoon-like hemiſpherical ſcales on the lower valve; minute, pellucid; upper valve ſpotted with red. African ſeas.

literata. 47. O. ſmooth on the outſide, with 24 double rays. Indian ocean.

nguinea. 48. O. equivalve, with 22 rays; ears ſmall; 2 inches long, $1\frac{3}{4}$ broad. Mediterranean and Atlantic ſeas.

aria. * 49. O. equivalve; rays about 30; compreſſed, and beſet with tranſverſe, prickly ſcales; one ear very ſmall; $2\frac{1}{4}$ inches long, 2 broad. European ſeas, coaſt of Britain.

ſio. * 50. O. equivalve, rays about 40, filiform; ſurface often irregular or diſtorted; 2 inches long, $1\frac{1}{2}$ broad. European and American ſeas, Cornwall.

ſoleta. * 51. O. equivalve, ſemi-tranſparent, ſmooth; dark purple; with 8 nearly obſolete rays; $\frac{3}{4}$ inch long. Britiſh coaſts.

vis. 52. O. ſmooth; ears red; $\frac{5}{8}$ inch long. Angleſea, Falmouth.

abra. 53. O. ears nearly equal, equivalve, ſmooth, with from 10 to 15 ſmooth flattiſh rays; inſide with elevated double ſtriæ; 2 inches long, 2 broad. European and American ſeas.

ercularis * 54. O. rays 20; roundiſh and rough, with decuſſated ſtriæ; upper valve a little more convex; $2\frac{1}{2}$ inches diameter. North ſeas, Devonſhire and Cornwall, where it is called *frill* or *queen.*

bba. 55. O. equivalve, gibbous, with 20 glabrous rays. American ſeas.

cata. 56. O. white, with fleſh-coloured ſpots; rays glabrous, 32 on the lower valve, 35 on the upper; $1\frac{1}{2}$ inch long. Malabar.

rionica. 57. O. thin, flattened, pellucid, with fine tranſverſe wrinkles, and 11 rays which are waved.

58. O. orbicular, with purple circles, and about 100 rays; $3\frac{1}{2}$ inches long, $3\frac{1}{4}$ broad. Mediterranean. The fiſh of this ſpecies is employed as food. *icelandica.*

59. O. equivalve, glabrous, immaculate, with minute ſtriæ; upper valve with 3 rays. Norway ſeas. *triradiata.*

60. O. nearly equivalve, ſtriated, ſpotted, rough towards the margin. Found on the fucus ſaccharinus in the North ſeas. *fuci.*

61. O. nearly equivalve, ſtriated, glabrous, red, with whitiſh ſpots. On fuci in the North ſeas. *tigerina.*

62. O. nearly equivalve; ſtriated, glabrous, rays 7, convex. North ſeas. *ſeptemradiata.*

63. O. nearly equivalve; within and without grooved and red; one part rough, the other glabrous. North ſeas. *arata.*

64. O. convex on each ſide, with 22 rounded tranſverſe, wrinkled rays; interſtices with longitudinal, granulated ſtriæ; $2\frac{1}{2}$ inches long. Indian ocean. *ſenatoria.*

65. O. orange, with 22 rounded rays, and plaited margin; lower valve flatter. India. *citrina.*

66. O. equally convex, both ſides with 20 glabrous rays; interſtices with tranſverſe, crowded wrinkles; margin with plaited teeth. Indian and American ſeas. *turgida.*

67. O. flattened, thin, pellucid, ſtriated with numerous imbricated rays; margin with crenated plates, 2 inches long. Red ſea. *ſulphurea.*

68. O. convex, purple, within, white or red, with 25 thick, rounded ſcaly rays; $2\frac{1}{4}$ inches long. Red ſea. *porphyria.*

69. O. hyaline, with an acute margin, very ſlender rays, and concentric ſcaly curves. North ſeas. *vitrea.*

70. O. with 20 rounded rays; interſtices finely wrinkled; margin repand; upper valve more convex. Tranquebar. *tranquebaria.*

71. O. white, with purple ſpots, and numerous unequal rays; margin crenated. Red ſea. *ſauciata.*

72. O. oblong, with undulated rays and ſtriæ; and tranſverſe, interrupted bands; a ſmall ſhell; margin crenulated. *crenulata.*

73. O. roundiſh, ſpotted; with deep grooves finely ſtriated tranſverſely: margin crenulated. Small. *innominata.*

74. O. roundiſh, pale, rufous, with 24 rays; ears with decuſſated ſtriæ; middle-ſized. *rufeſcens.*

75. O. roundiſh; rays thick, with diſtant parallel ſcales, and prickly at the ſides. *ſquamata.*

76. O. rather oblong, with narrow ſcaly rays; interſtices broader, and ſtriated perpendicularly: ears perpendicularly wrinkled. *anonyma.*

77. O. flattened, with 10 ſmooth, flat, unequal rays; ears tranſverſely ſtriated. *decemradiata.*

78. O. thin, with depreſſed, ſcaly rays; ears ſhort. India, and North ſeas. *tenuis.*

79. O. with 20 rays, and tranſverſe, ſemilunar bands. India. *valentii.*

80. O. oblong, with crowded rays, middle-ſized, reddiſh. *media.*

81. O. ſaffron-coloured, with muricated ſcaly rays alternately leſs; ſmall. *crocea.*

82. O. roundiſh, white, with roſy ſpots, radiated; ſmall. *florida.*

83. O. oblong, ochraceous, with rays ſmooth on one part, and granulated on the other; minute. *ochroleuca.*

84. O. pale, tawney, with yellow ſpots and bands, and ſmooth rays; ears tranſverſely ſtriated; $2\frac{1}{4}$ inches long. *muſtelina.*

85. O.

flammea. 85. O. saffron-coloured, oblong, with fine perpendicular striæ; very minute.

incarnata. 86. O. oblong, flesh-coloured, with interrupted red bands, and flattened rays.

guttata. 87. O. yellowish, rounded, dotted with red; rays unequally converging at the hinge.

depressa. 88. O. ochraceous, with flat bifid rays; 1 inch long.

regia. 89. O. roundish, deep-red, with rounded rays.

palliata. 90. O. equivalve, with numerous smooth rays: is less round, and has fewer rays, than *ostrea pallium.*

seminuda. 91. O. orange, oblong, muricated, with scales as far as the middle; rays 22; 1¾ inch long, 1¼ broad.

modesta. 92. O. roundish, hoary, with brownish, reddish, and bluish spots; interstices of the rays broad; 2 filiform bands at the hinge.

principalis. 93. O. purple, with a brown margin; rays scaly from the middle, and smooth at the hinge.

versicolor. 94. O. variegated, with pectinated smooth rays.

c. *Valves more gibbous on one side.*

flavicans. 95. O. nearly equivalve, with 8 striated rays: margin rounded on one side. South sea.

fasciata. 96. O. equivalve, with 20 rough rays; interstices striated; ears equal, small. Atlantic seas.

fragilis. 97. O. equivalve, with 25 rays; margin very entire; ears acute; 1¼ inch long. Nicobar islands.

lima. 98. O. equivalve, with 22 imbricated scaly rays, rounded at one margin; ears obliterated; 3 inches long, 2½ broad. Mediterranean and Indian seas.

glacialis. 99. O. with 50 imbricated, interrupted rays; ears equal; one of them unequally plaited. American ocean.

hians. 100. O. whitish, thin, gaping on each side, and oblique, with obsolete, undulated rays, and transverse, rounded, semilunar striæ; 1½ inch long, ¾ broad. Norway.

excavata. 101. O. dirty white, with longitudinal, undulated striæ, and a few transverse rings; one ear obsolete; margin entire; 5 inches long 3¼ broad. Norway.

B. *Rough, and generally plaited on the outside.* OYSTERS.

malleus. 102. O. equivalve, 3-lobed, 2 of them placed transversely like the head of a hammer; 6 inches long, and 4¾ broad. Deep parts of the Indian and Southern oceans. Very rare.

vulsella. 103. O. sub-pellucid, narrow, elongated, lamellated; one end rounded; 3½ inches long, 1 broad. Red sea.

anatina. 104. O. pellucid, lamellated, and laterally incurved; 1 inch broad, and including the curvature, 3 inches long. Nicobar islands.

diluviana. 105. O. plaited on the outside; margin with erect, acute, angular teeth; size of a common oyster; found in a fossil state in the calcareous mountains of Sweden.

folium. 106. O ovate, obtusely plaited at the sides; parasitical; found adhering to gorgonia in the Indian ocean.

orbicularis. 107. O. orbicular, flat, with an entire crenated margin; size of the end joint of the thumb.

edulis. 108. O. *eatable or common oyster;* orbicular and rugged, with undulated, imbricated scales; one valve flat, and very entire. European and Indian seas.—It is found, either in large beds, or adhering to rocks. The shell is of various sizes, forms, and colours; within white, and often glossy, and of a pearly appearance. The old shells have often an anomia fixed to them, and they are frequently covered with the serpula and lepas, and the sertularia and other zoophytes.

38
Oysters employed as food.

The common oyster has been long known as a nutritious food, and indeed in most countries is greatly esteemed as a delicate luxury of the table. The oyster is supposed by naturalists to be a hermaphrodite animal. The spawn which they cast in May, adheres to the rocks and other substances at the bottom of the sea; and the shell, it is supposed, is formed in the space of 24 hours, and which, according to some, never leaves the spot till removed by violence. But from the observations of M. Dicquemarc, who has particularly studied the economy of the oyster, it appears that it possesses the power of moving from place to place, and that it varies its habits according to circumstances. Oysters which are recently taken up from places which are left dry by the sea open their shell, lose their water, and die in a few days. But the same oysters kept in reservoirs, where they are left occasionally by the sea, exposed to the rays of the sun, to severe cold, or are disturbed in their beds, acquire the habit of keeping the shell close when they are uncovered with water, and exist without injury from this treatment for a long time. The oyster should be fresh, tender, and moist. Those which are most esteemed are caught at the mouths of rivers, and in clear water. The want of fresh water, it is said, renders oysters hard, bitter, and unpalatable. Mud and sea weeds are extremely injurious to the propagation and increase of the oyster. Other shell fish, and crustaceous animals, as mussels, scallops, star-fish and crabs, are their most destructive enemies.

39
Of different kinds.

Oysters are of different colours in different places: in Spain they are found of a red and russet colour; in Illyria brown, with the fish black, and in the Red sea of the colour of the iris. The green oyster, which is eaten in Paris, is brought from Dieppe. This colour is ascribed to the verdure which encompasses the bed on which they are produced. The oysters from Britanny in France, too, have been long famous; but those which are brought from Marennes in Saintogne, are in highest estimation. The oysters which are edged with a small brown fringe or beard, are generally preferred. These are accounted by the epicures *fecundated oysters.*

40
Adhere to trees in warm climates.

In tropical regions, the common oyster is found attached to trees. This assertion of the growth of oysters on trees has been often ranked among the exaggerated or groundless stories of the marvellous traveller; but this circumstance, when properly explained, will not appear different from the usual economy of this testaceous animal. In warm climates where vegetation is so much more luxuriant than in northern latitudes, a great variety of plants, among which are seen large trees, grow on the shores to the very edge of the sea; and particularly on those places which are sheltered from the agitation of the waves. In such places, at the heads of bays and harbours, great abundance of mangrove trees grow up from the bottom, where it is several feet deep, covered with water. It is generally on the mangrove tree that the oyster is found in the West Indies. Without the trouble of picking them from the trees, the branches growing under water to which they are attached, are cut off, carried home in baskets,

baſkets, and in this ſtate brought to table, where they are either eaten raw, or roaſted, as the European oyſter. We have eaten oyſters which were produced in this way, in the lagoons at the head of Port Morant harbour in Jamaica, a few minutes after they were taken from the water. They were of a ſmall ſize, but extremely delicate and high flavoured.

Britain has been noted for oyſters from the time of Juvenal, who, ſatirizing Montanus an epicure, ſays,

> ——*Circæis nata forent, an*
> *Lucrinum ad ſaxum, Rutupinove edita fundo,*
> *Oſtrea, callebat primo deprendere morſu.*

> He, whether Circe's rock his oyſters bore,
> Or Lucrine lake, or diſtant Richborough's ſhore,
> Knew at firſt taſte.

The luxurious Romans were very fond of this fiſh, and had their layers or ſtews for oyſters as we have at preſent. Sergius Orata was the firſt inventor, as early as the time of L. Craſſus the orator. He did not make them for the ſake of indulging his appetite, but through avarice, and made great profits from them. Orata got great credit for his Lucrine oyſters; for, ſays Pliny, the Britiſh were not then known.

Pennant's Br. Zool. vol. iv. p. 102.

The ancients ate them raw, having them carried up unopened, and generally eating them at the beginning of the entertainment, but ſometimes roaſted. They alſo ſtewed them with mallows and ducks, or with fiſh.

41 Oyſters of Britain.

Britain ſtill retains its ſuperiority in oyſters over other countries. Moſt of our coaſts produce them naturally; and in ſuch places they are taken by dredging, and are become an article of commerce, both raw and pickled. The ſhells calcined are employed in medicine as an abſorbent, and in common with other ſhells, prove an excellent manure.

Stews or layers of oyſters are formed in places which nature never allotted as habitations for them. Thoſe near Colcheſter have been long famous; at preſent there are others that at leaſt rival the former, near the mouth of the Thames. The oyſters, or their ſpats, are brought to convenient places, where they improve in taſte and ſize. It is an error to ſuppoſe, that the fine green obſerved in oyſters taken from artificial beds, is owing to copper; this ſubſtance, or the ſolution of it, is deſtructive to all fiſh. The following is the account of the whole treatment of oyſters, from Biſhop Sprat's Hiſtory of the Royal Society, from p. 307 to 309.

"In the month of May the oyſters caſt their ſpawn, (which the dredgers call their *ſpats*): it is like to a drop of candle, and about the bigneſs of a halfpenny. The ſpat cleaves to ſtones, old oyſter-ſhells, pieces of wood, and ſuch like things, at the bottom of the ſea, which they call *cultch.* It is probably conjectured, that the ſpat in 24 hours begins to have a ſhell. In the month of May, the dredgers (by the law of the admiralty court) have liberty to catch all manner of oyſters, of what ſize ſoever. When they have taken them, with a knife they gently raiſe the ſmall brood from the cultch, and then they throw the cultch in again, to preſerve the ground for the future, unleſs they be ſo newly ſpat, that they cannot be ſafely ſevered from the cultch; in that caſe they are permitted to take the ſtone or ſhell, &c. that the ſpat is upon, one ſhell having many times 20 ſpats. After the month of May, it is felony to carry away the cultch, and puniſhable to take any other oyſters, unleſs it be thoſe of ſize, (that is to ſay) about the bigneſs of a half-crown piece, or when, the two ſhells being ſhut, a fair ſhilling will rattle between them.

"The places where theſe oyſters are chiefly catched, are called the *Pent-Burnham*, *Malden*, and *Colne-waters*; the latter taking its name from the river of Colne, which paſſeth by Colcheſter, gives name to that town, and runs into a creek of the ſea, at a place called the *Hythe*, being the ſuburbs of the town. This brood and other oyſters they carry to the creeks of the ſea, at Brickleſea, Merſy, Langno, Fingrego, Wivenho, Toleſbury, and Saltcoaſe, and there throw them into the channel, which they call their *beds* or *layers*, where they grow and fatten; and in two or three years the ſmalleſt brood will be oyſters of the ſize aforeſaid. Thoſe oyſters which they would have green, they put into pits about three feet deep in the ſalt marſhes, which are overflowed only at ſpring-tides, to which they have ſluices, and let out the ſalt water until it is about a foot and a half deep. Theſe pits from ſome quality in the ſoil co-operating with the heat of the ſun, will become green, and communicate their colour to the oyſters that are put into them in four or five days, though they commonly let them continue there ſix weeks or two months, in which time they will be of a dark green. To prove that the ſun operates in the greening, Toleſbury pits will green only in ſummer; but that the earth hath the greater power, Brickleſea pits green both winter and ſummer: and for a further proof, a pit within a foot of a greening pit will not green; and thoſe that did green very well, will in time loſe their quality. The oyſters, when the tide comes in, lie with their hollow ſhell downwards; and when it goes out, they turn on the other ſide; they remove not far from their place, unleſs in cold weather, to cover themſelves in the ooſe. The reaſon of the ſcarcity of oyſters, and conſequently of their dearneſs, is, becauſe they are of late years bought up by the Duţch.

"There are great penalties by the admiralty court laid upon thoſe that fiſh out of thoſe grounds which the court appoints, or that deſtroy the cultch, or that take any oyſters that are not of ſize, or that do not tread under their feet, or throw upon the ſhore, a fiſh which they call a *five-finger*, reſembling a ſpur-rowl, becauſe that fiſh gets into the oyſters when they gape, and ſucks them out.

"The reaſon that ſuch a penalty is ſet upon any that ſhall deſtroy the cultch, is, becauſe they find that if that be taken away, the ooſe will increaſe, and the muſcles and cockles will breed there, and deſtroy the oyſters, they having not whereon to ſtick their ſpat.

"The oyſters are ſick after they have ſpat; but in June and July they begin to mend, and in Auguſt they are perfectly well; the male oyſter is black-ſick, having a black ſubſtance in the fin; the female white-ſick (as they term it), having a milky ſubſtance in the fin. They are ſalt in the pits, ſalter in the layers, but ſalteſt at ſea."

The oyſter affords the curious in microſcopic obſervations

42 Liquid about the oyster seen with the microscope.

vations a very pleaſing entertainment. In the clear liquor many little round living animalcules have been found, whoſe bodies being conjoined, form ſpherical figures, with tails, not changing their place otherwiſe than by ſinking to the bottom, as being heavier than the fluid; theſe have been ſeen frequently ſeparating, and then coming together again. In other oyſters, animalcules of the ſame kind were found, not conjoined, but ſwimming by one another, whence they ſeemed in a more perfect ſtate, and were judged by Mr Leeuwenhoek to be the animalcules in the roe or ſemen of the oyſter.

A female oyſter being opened, incredible multitudes of ſmall embryo oyſters were ſeen, covered with little ſhells, perfectly tranſparent, and ſwimming along ſlowly in the liquor; and in another female, the young ones were found of a browner colour, and without any appearance of life or motion.

Monſieur Joblot alſo kept the water running from oyſters three days, and it appeared full of young oyſters ſwimming about nimbly in it; theſe increaſed in ſize daily; but a mixture of wine, or the vapour of vinegar, killed them.

In the month of Auguſt oyſters are ſuppoſed to breed, becauſe young ones are then found in them. Mr Leeuwenhoek, on the 4th of Auguſt, opened an oyſter, and took out of it a prodigious number of minute oyſters, all alive, and ſwimming nimbly about in the liquor, by means of certain exceeding ſmall organs, extending a little way beyond their ſhells; and theſe he calls their beards. In theſe little oyſters, he could diſcover the joinings of the ſhells; and perceived that there were ſome dead ones, with their ſhells gaping. Theſe, though ſo extremely minute, are ſeen to be as like the large oyſters in form as one egg is to another.

As to the ſize of them, he computes, that 120 of them in a row would extend an inch; and conſequently, that a globular body, whoſe diameter is an inch, would, if they were alſo round, be equal to 1,728,000 of them. He reckons 3000 or 4000 are in one oyſter, and found many of the embryo oyſters among the beards; ſome faſtened thereto by ſlender filaments, and others lying looſe: he likewiſe found animalcules in the liquor 500 times leſs than the embryo-oyſters.

It is not uncommon to ſee on oyſter-ſhells, when in a dark place, a ſhining matter or bluiſh light, which ſticks to the fingers when touched, and continues ſhining and giving light for a conſiderable time, though without any ſenſible heat. This ſhining matter being examined with a microſcope, is ſaid to conſiſt of three ſorts of animalcules; but it is more probable that it is the phoſphoreſcent light which ſeparates from animal matters, particularly fiſh, in the incipient ſtage of the putrefactive proceſs.

ſemiaurata. 109. O. oval, ſlightly eared, ſmooth, with an oblique baſe; 1½ inch long, 1¼ broad. Mediterranean.

ſtriata. * 110. O. oval, with longitudinal, irregular, undulated filiform ridges; inſide ſmooth, gloſſy white, with a pearly hue. European ſeas, ſhores of Britain.

fornicata. 111. O. rough, oblong, linear, with divergent hinges; internally vaulted. Red ſea.

ſinenſis. 112. O. rough, lamellated, unequal, and glabrous within; lower valve large; 4 inches long. Chineſe ſhores.

ſpondyloidea. 113. O. equivalve, pellucid, flattened, oval, with perpendicular, undulated ſtriæ on the upper valve: 3 inches long, 2½ broad. India.

forſkahli 114. O. plaited, and terminating in a long, incurved, hollow beak; middle ribs with imbricated, ſpinous wrinkles; 2 inches long, and 1 broad. Red ſea.

plicatula 115. O. with longitudinal, wrinkled plaits; lower valve ſmaller and flatter; varies much in ſhape and ſize. American and Mediterranean ſeas.

roſtrata. 116. O. oblong, rugged; upper valve lamellated, with a denticulated margin; the lower excavated, and longitudinally grooved. Mediterranean.

viriginic 117. O. nearly equivalve, thick, rough, lamellous; one valve with a prominent beak; 9 inches long, and 4 broad. American and Indian oceans.

cornucop 118. O. upper valve flat, lower one hollow and ſtriated; rough with ſcales, wrinkles and plaits, and terminating in an elongated beak. Indian and African oceans.

paraſitic 119. O. thin; lower valve convex and thicker; the other flat. Atlantic and Indian ſeas.—This ſpecies, like the common oyſter, fixes itſelf to the roots and branches of trees, particularly the mangrove, which grow out of the water. It varies in form and ſize, and is often as large as the palm of the hand.

exalbida 120. O. thin; upper valve longer and more convex. Adriatic.—It is found fixed to other ſhells.

criſtata. 121. O. rugged, with imbricated lamellæ; margin with obtuſely plaited teeth; 1 inch long.

ſenegalenſis. 122. O. equivalve, roundiſh, ſmooth, flat; 2 inches diameter. Shores of Senegal.

ſtellata. 123. O. thin, depreſſed, rough, unequal; upper valve ribbed; ribs with a few ſpines. Guinea.

ovalis. 124. O. oval, thin, terminating in a ſhort, acute, lateral channelled beak; ſtriæ perpendicular, unequal, obſolete; 1 inch long.

papyrac 125. O. roundiſh, ſnowy, thin pellucid; upper valve terminating in a ſhort, acute beak.

annulat 126. O. equivalve, orbicular, white, with concentric ſemicircles. North ſeas.

retuſa. 127. O. equivalve, oblong, white, glabrous, ſtriated; with an umbo or knot remote from the hinge. North ſeas.

C. *Hinge with a perpendicular grooved line.*

perna. 128. O. equivalve, obovate, unequal, rounder at one end; 2½ inches long; has ſome reſemblance to a gammon of bacon. Indian and American ſeas.

iſogonu 129. O. equivalve, with a larger lobe, forming a right angle with the hinge; from 5 to 7 inches long, and 1¼ broad in the middle; ſhell blackiſh, violet without, pearly within. Indian ocean and South ſeas. Is a rare ſhell.

ephippi 130. O. equivalve, orbicular, compreſſed, membranaceous; 5 inches long, 5½ broad. Indian ocean and Cape of Good Hope. Very rare.

picta. 131. O. equivalve, thin, pellucid, and pointed at the hinge; the other end dilated; margin acute; 2 inches long, more than an inch broad. Red ſea.

legume 132. O. flat, hoary, thin, pellucid, lamellated; interſtices of the grooves black; 2 inches long, 4 lines broad. Nicobar iſlands.

133. O.

alata. 133. O. flat, brittle, pellucid; dilated towards the margin. America.

mytiloides. 134. O. nearly equivalve, ovate, ventricofe, ftraight.

torta. 135. O. equivalve, intorted.—This and the preceding fpecies are found foffil in Alface.

pes-lutræ. 136. O. equivalve, fmooth, wedge-fhaped with 6 obtufe plates, varied with purplifh and white, and marked with fine longitudinal ftriæ; margin flightly fcalloped.

Gen. 15. Anomia.

43 Anomia. *Gen. Char.*—The animal is a ligula or ftrap-fhaped body, emarginated and ciliated; the briftles being fixed to the upper valve. There are two linear arms, longer than the body, open, ftretched out, alternate on the valve, ciliated on both fides; the hairs are fixed to both valves; the fhell is inequivalve; one valve being rather flat, the other more gibbous at the bafe, with a produced beak, generally curved over the hinge; one of the valves is often perforated at the bafe; the hinge is without teeth. A fmall linear fcar appears prominent, with a lateral tooth placed within; but on the very margin of the flat valve. There are two bony rays for the bafe of the animal.

Species.

craniolaris 1. A. orbicular; the gibbous valve conico-convex, flat valve with three hollows at the bafe; 1 inch long, ½ broad. Mediterranean feas and Philippine iflands. It is fometimes found foffil.

pectinata. 2. A. oblong, with branched grooves; the gibbous valve with two hollows behind. An inch long, ¾ broad; flat valve perforated. Mediterranean.

ephippium. * 3. A. roundifh, pellucid, with wrinkled plates; flat valve perforated; diameter fometimes 3½ inches, moft frequently about 2. European and American feas, fhores of Britain.—It is often found adhering to the common oyfter. Mr Montagu thus accounts for the perforation in thefe fhells. The teftaceous plug, he obferves, by which the animal fixes itfelf to other bodies, is firmly attached by ftrong ligaments to thefe bodies, and fo clofely cemented, that they become infeparable. When, therefore, the fhell is torn from its native place, the plug is left behind upon the ftone or other fhell to which it adhered.

cepa. * 4. A. obovate, unequal, violet; upper valve convex; lower perforated. European and American feas, fhores of Britain.

electrica. 5. A. roundifh, yellow, fmooth; one valve convex and gibbous; very thin. Coafts of Africa.

fquamula. * 6. A. fmall, orbicular, entire, thin like the fcale of a fifh. European feas, Britain.

patelliformis. 7. A. ovate, convex, fubdiaphanous, ftriated; pofterior beak recurved and fmooth. North feas.

fcobinata. 8. A. roundifh, fmooth, and rough within; beak perforated.

aurita. 9. A. fub-ovate, ftriated, and flightly eared; beak perforated. Norway feas.

retufa. 10. A. obovate, ftriated, retufe with a longitudinal cavity; beak perforated. Norway feas, adhering to zoophytes.

gryphus. 11. A. oblong, fmooth, with an obfolete lateral plate on one valve, and incurved beak; the other valve fhort and flattifh. Frequently found in a foffil ftate.

pecten. 12. A. femiorbicular, depreffed, with numerous ftriæ; one valve flat. Found in a foffil ftate.

ftriatula. 13. A. roundifh, and a little dilated; gibbous on each fide; ftriated; valves equal. Has been only found foffil.

truncata. 14. A. fuborbicular, obfoletely ftriated; hinge truncated. European feas.

reticularis. 15. A. heart-fhaped, with decuffated ftriæ; fhorter valve more gibbous. Found foffil.

plicatella. 16. A. dilated, lunated, plaited with longitudinally ftriated grooves. Found only in a foffil ftate.

crifpa. 17. A. dilated, triangular, plaited with wrinkled grooves; the middle broader. Found foffil in England and Switzerland.

lacunofa. 18. A. roundifh, with numerous grooves; valves plaited at the tip; one of them fhorter and pitted. Found only in a foffil ftate.

pubefcens. 19. A. obovate, grooved; beak of one valve prominent, the other gaping; about the fize of a cucumber feed, covered with fmall, erect, diftant hairs. Norway feas.

cufpidata. * 20. A. conic, pointed, grooved; one valve convex with an incurved beak; the other pyramidal with a large triangular foramen. Found in Derbyfhire in a foffil ftate.

farcta. 21. A. roundifh with numerous grooves; the valves convex, and 8-toothed at the tip. Found foffil in Switzerland and Weftphalia.

caput-ferpentis. 22. A. obovate, ftriated downy; one valve with a longer perforated beak. Norway feas. It is generally found adhering to the madrepora prolifera.

terebratula. 23. A. obovate, fmooth, convex; one valve with three plates; the other with two; the beak of one valve prominent and perforated. Found frequently in a foffil ftate.

angulata. 24. A. with compreffed plates at the fides of the bafe, anteriorly; the middle three-toothed. Found foffil.

hyfterita. 25. A. dilated, fmooth, convex; ftriated with about 3 lobes; anterior part depreffed, with an acute margin. Found foffil in Germany.

biloba. 26. A. two-lobed, equal, ftriated. Only found foffil.

placenta. 27. A. orbicular, flat, pellucid; hinge with two linear callofities growing within the fhell; 5 inches diameter. Indian ocean.

cella. 28. A. nearly quadrangular, convex, and nearly clofed; bronzed; margin repand; 7 inches diameter. Indian ocean.

fpinofa. * 29. A. covered with fpines as long as the fhell. England, in a foffil ftate.

aculeata. 30. A. roundifh, prickly; crown fmooth and recurved behind; lower valve flat, fmooth, and perforated at the crown. Norway feas.

muricata. 31. A. hyaline, ventricofe; crown bent towards the right; upper valve longitudinally ftriated; lower valve flat, very thin, and the circumference of the perforation elevated. Guinea.

fquama. 32. A. oblong, with a rounded margin; one valve flat, thin, fmooth, with a large ovate perforation at the tip; the other convex, and longitudinally ftriated. Seas of Norway.

punctata. 33. A. orbicular, hyaline, thin, punctured; flat valve perforated at the tip; fmall, brittle. Ferro iflands.

undulata. * 34. A. margin crenated; flat valve thin and fmooth, with a large oval perforation; convex valve with tranfverfe arched ftriæ, croffing undulated longitudinal ones. Mediterranean, North feas, Devonfhire.

capenfis. 35. A. longitudinally ftriated, a little truncated; with a rounded notched margin. C. of G. Hope.

detruncata 36. A. truncated, orbicular, longitudinally ftriated; flat valve with three ribs within; other valve longitudinally ftriated within, and divided by a partition in the middle. Mediterranean.

fanguinolenta. 37. A. horny, fmooth, and convex on each fide; upper valve emarginated, and radiated at the fides, with an elevated fanguineous back. India.

vitrea. 38. A. ovate, ventricofe, hyaline; lower valve with two bony rays at the hinge, befides lateral teeth; upper valve with a prominent perforated tip; $1\frac{1}{2}$ inch long, 1 inch broad. Mediterranean.

cranium. 39. A. fmooth, ventricofe, finely ftriated tranfverfely; $\frac{1}{4}$ inch broad, fomething longer. Norway feas.

dorfata. 40. A. heart-fhaped, folid, with arched tranfverfe ring and wrinkles, and longitudinal ftriæ and grooves. Magellanic feas.—Is often found foffil.

pfittacea. 41. A. horny and finely ftriated longitudinally; fhorter valve gibbous; longer one flat, with an incurved tip, triangularly perforated; rather large, pellucid. Greenland. Very rare.

tridentata. 42. A. yellowifh, pellucid, thin, finely ftriated tranfverfely; tricufpidate with tubular points; valves united. Mediterranean.

fpondyloides. 43. A. ovate, antiquated, with an obtufe channelled beak.

ventricofa. 44. A. fubovate, folid, with a channelled beak.

gryphoides 45. A. oval, fmooth, folid, opaque; leffer valve with a ftraight, obtufe, truncated beak.

flexuofa. 46. A. very thin, lamellated, hollowed in the middle; upper valve flat; lower valve convex towards the crown, with an orbicular perforation beneath it. Norway feas.

rugofa. 47. A. obovate; upper valve convex and finely wrinkled; lower valve thin and fmooth, with a kidney-fhaped perforation. Norway feas.

cylindrica. 48. A. very thin, cylindrical, and narrowed outwardly; upper valve gibbous, lower hollow. North feas.

nucleus. 49. A. glabrous, oval, longitudinally grooved. North feas.

avenacea. 50. A. pyriform, protracted, and flightly compreffed towards the hinges. North feas.

fandaleum. 51. A. turbinated; back flat, with a ftriated cavity; lid flat and hemifpherical. Germany, in a foffil ftate.

44 Mytilus.

Gen. 16. Mytilus, *The Muffel.*

Gen. Char.—The animal is allied to an afcidia; the fhell bivalve, rough, generally affixed by a byffus or beard of filky filaments; hinge moftly without teeth, with generally a fubulate, excavated, longitudinal line.

Species.

A. *Parafitical, affixed as it were by claws.*

crifta-galli. 1. M. plaited, fpinous; both lips rough. Indian ocean and Red fea.

hyotis. 2. M. plaited and imbricated, with broad compreffed fcales; both lips fmooth. Inhabits the ocean, on beds of coral.

2

frons. 3. M. plaited, fmoothifh; one lip rough. American ocean.

B. *Flat, or compreffed into a flattened form, and flightly eared.*

margaritiferus. 4. M. *Pearl-bearing muffel.* Flattened, nearly orbicular, with a tranfverfe bafe; imbricated with toothed tunics. American and Indian feas.—This fpecies is about 8 inches long, and fomewhat broader; the infide is finely polifhed, and produces the true mother-of-pearl; and frequently alfo it affords the moft valuable pearls. When the outer coat of the fhell, which is fometimes fea-green, or chefnut with white rays, or whitifh with green rays, is removed, it exhibits the fame pearly luftre as the infide; the younger fhells have ears as long as the fhell, and refemble fcallops.

unguis. 5. M. roundifh; longitudinally ftriated, pellucid, and flightly eared. Mediterranean.

C. *Ventricofe or convex.*

lithophagus. 6. M. cylindrical; rounded at both ends. European, American, and Indian feas. It is about an inch broad, and 3 long.—It perforates and eats away coral rocks, and even the hardeft marbles. Thofe which are found in Europe have a thin brittle fhell: the fhell of thofe found in India is foft, and nearly coriaceous.

rugofus. 7. M. rhombic, oval, brittle, rugged, antiquated, and round at the ends. Seas and lakes, north of Europe.—It is ufually found lodged in limeftone; each individual in a feparate apartment, with apertures too fmall for the fhell to pafs through.

bilocularis. 8. M. ftriated with vaulted knobs, and a white partition. Nicobar iflands.

exuftus. 9. M. convex; one of the margins angular; the anterior extremity crenated; $1\frac{1}{4}$ inch long. American ocean and Red fea.

barbatus. 10. M. fmoothifh; ferruginous on the outfide, and bearded at the tip; $\frac{3}{4}$ inch long. Mediterranean and Norway feas.

edulis. * 11. M. *Eatable or common muffel.* Smooth, violet; valves flightly recurved on the obtufe fide, and fomewhat angular on the acute fide; beaks pointed; from 2 to 3 inches long. European and Indian fea.—This fpecies is obferved to be larger within the tropics, and to diminifh gradually towards the north. It is found in large beds, and generally attaches itfelf to other bodies by means of its long filky beard. The fifh is employed as food in many parts of the world, and is efteemed rich and nutritious.

incurvatus. * 12. M. very crooked on one fide near the beaks, then generally dilated; within with a violet tinge. Coaft of Anglefea.

pellucidus. * 13. M. oval, tranfparent, and elegantly radiated lengthwife with purple and blue; two inches long. Anglefea, in oyfter beds.

umbilicatus. * 14. M. contracted into a deep rugged cavity, oppofite the hinge, forming a deep hollow when the valves are clofed; 5 inches long. Anglefea.

curtus. * 15. M. fhort, ventricofe, obtufe at the beaks, and dirty yellow. Weymouth.

ungulatus. 16. M. fmooth, flightly curved; hind margin inflected; hinge terminal, two-toothed. Mediterranean, Cape of Good Hope, and New Zealand. Found at the latter place refembling *M. edulis*; but is 5 inches long, and $2\frac{1}{2}$ broad.

17. M.

bidens. 17. M. ſtriated, ſlightly curved; hind margin inflected; hinge terminal, two-toothed; ſcarcely an inch long. Mediterranean and Atlantic ſeas.

modiolus. * 18. M. ſmooth, blackiſh, obtuſe at the ſmaller end, and rounded at the other; one ſide angular, near the beaks; from 6 to 7 inches long, 3 broad. European, American, and Indian ſeas, Devonſhire, Weymouth.

cygneus. * 19. M. ovate, very brittle, tranſverſely wrinkled; anterior end compreſſed, the other rounded; hinge lateral; from 2 to 5 inches broad, and 3 long. Frequent in the lakes and rivers of Europe, Britain.—It is the largeſt of Britiſh freſh-water ſhells. It arrives at the greateſt ſize in ponds and ſtagnant waters.

anatinus. 20. M. oval, a little compreſſed; brittle and ſemi-tranſparent, with a membranaceous margin. Freſh waters of Europe.—It reſembles the laſt, but is longer and narrower. Ducks and crows, it is ſaid, are extremely fond of both this and the laſt ſpecies.

viridis. 21. M. ſmooth, ovate, membranaceous, pellucid, with a terminal hinge. Southern ocean.

ruber. 22. M. wrinkled; valves oblique and anteriorly dilated. Southern ocean.

albus. 23. M. tranſverſely ſtriated; beaks gibbous; hinge lateral; 6 inches long, 3½ broad. Shores of Chili.—The fiſh is white, and affords a grateful food.

ater. 24. M. grooved, and ſcaly behind. Chili.—The fiſh is black, and unfit for being eaten.

diſcors. * 25. M. oval, horny, ſubdiaphanous; extremities longitudinally ſtriated; middle tranſverſely. European and ſouthern ſeas, Cornwall and Devonſhire. From the South ſeas it is 1½ inch broad; in Britain it rarely exceeds ½ inch.

hirundo. 26. M. ſmooth; valves 2-lobed; lobe at the hinge longer and thinner. American, Mediterranean, and Indian ſeas.

pholadis. 27. M. oblong; more obtuſe on the fore-part; rough, with tranſverſe wrinkles; 1½ inch long, 1¼ broad. North ſeas.—This ſpecies penetrates beds of coral and other rocks, like the pholas.

ſtriatulus. 28. M. finely ſtriated, hinge terminal, 1 tooth; 1¼ inch long, 1½ broad. Northern and Indian ſeas.

vulgaris. 29. M. flattened on one ſide and inflected; beaks incurved, convergent; hinge 1-toothed. American ocean.

plicatus. 30. M. rhombic, inequilateral; tranſverſely ſtriated and wrinkled; beaks incurved. Nicobar iſlands.

niveus. 31. M. ovate, ſubdiaphanous; finely ſtriated longitudinally; margin acute; hinge 2-toothed; ſhell ſnowy and poliſhed within. Nicobar iſlands. Very rare.

afer. 32. M. nearly triangular, dilated before, and flattiſh gaping behind; beaks pointed, turned back; margin very acute; 4 inches long, 2 broad. Mediterranean and African ſhores.

ſmaragdinus. 33. M. nearly triangular, flattiſh; hinge 2-toothed in one valve, 1-toothed in the other. Tranquebar, Guinea.

verſicolor. 34. M. nearly triangular, flattiſh; hinge 1-toothed; margin glabrous, acute; 3 inches long, 2 broad. Guinea.

coralliophagus. 35. M. carinated in the middle, and crenated at the margin, with an obtuſe knob; ¼ inch long. Indian and American oceans. Perforates rocks like a pholas.

lineatus. 36. M. triangular and dilated outwards, with angular, decuſſated, and confluent lines; hinge 2-toothed. A minute ſhell.

faba. 37. M. oval, rufous, ſtriated, with a crenulated margin. Seas of Greenland.—This ſpecies is the food of the *anas hiemalis* and *hiſtrionica*.

fluviatilis. 38. M. thin, ſlightly wedged; beaks recurved and large. Freſh waters of Europe.

fuſcus. 39. M. oblong, narrow, finely ſtriated tranſverſely; one ſide emarginated, the other rounded; beaks prominent, curved. A minute brown ſhell.

mammarius. 40. M. broad, ſhort, and rounded behind; beaks conic, protuberant.

perſicus. 41. M. broad, and curved with a rough, rugged, yellow coat; within milky. Perſian ſea.

pictus. 42. M. broad, very ſmooth, flammeous or roſe-coloured, with white bands; beaks obtuſe. Portugal.

faſciatus. 43. M. pellucid, ſhining, bluiſh, with a claret colour and pale red bands. Brazil.

undatus. 44. M. broad and rounded at both ends; claret colour, with waved, bluiſh, and greeniſh ſtriæ; margin ſerrated. Portugueſe ſea.

purpureus. 45. M. rounded behind; pale fleſh-colour; purple within; margin denticulated. Shores of Brazil.

ſaxatilis. 46. M. ear-ſhaped, with granulated wrinkles on the outer ſide, dilated and rounded. Amboyna.

argenteus. 47. M. tranſverſely ſtriated, rounded at each end; brown, ſilvery within; beaks rounded.

fulgidus. 48. M. narrow, ſhining bluiſh colour, with violet ſpots at the ſides; beaks rounded, dilated. Seas of Magellan.

azureus. 49. M. gibbous, azure, with yellowiſh ſtripes beneath; beaks obtuſe; 1 inch broad, ¾ long.

murinus. 50. M. mouſe-coloured, with violet ſpots, and a broad, rounded, roſy margin; beaks pointed ſtraight. Guinea.

teſtaceus. 51. M. long, narrow, covered with a teſtaceous ſkin; ſhining ſilvery beneath, varied with blue, red, yellow, and brown.

virgatus. 52. M. dilated outwardly; greeniſh yellow, with roſy ſtripes; beaks obtuſe, curved.

cordatus. 53. M. oblong, very thin, white, with obſolete ſtriæ, and a heart-ſhaped gap behind. Indian and Southern oceans.

ſtagnalis. 54. M. oval, flattiſh, and tranſverſely ribbed; eight inches broad, 4½ long. In freſh waters.

zellenſis. 55. M. oval, convex, rounded behind; elongated, and obtuſely pointed before; beaks obſolete; 7 inches broad, 3 long. Stagnant waters of Germany.

roſeus. 56. M. ſuborbicular, with 15 triangular creſted grooves, and alternate triangular teeth; 3 inches broad. Africa.

puniceus. 57. M. gibbous, pointed, with 15 grooves; margin toothed; 14 lines long, and half as broad; hinge with 4 minute teeth. Africa.

niger. 58. M. flat, thin, with fine grooves; covered with a black ſkin, under which it is milky, and finely poliſhed; 1½ inch long; grooves about 100. Africa.

lævigatus. 59. M. flat, ſmooth, covered with a thick fulvous ſkin, under which it is roſy; 2¼ inches long. Africa.

dubius. 60. M. tranſverſely wrinkled; obtuſe at each end; fulvous, within pearly; beaks obſolete; hinge without teeth; 5 inches broad, 2 long. Freſh waters of Senegal.

polymorphus. 61. M. 5-celled; valves carinated and flattiſh on the incumbent ſide; beaks obtuſe and inflected backwards; ſize of a plum ſtone. Ruſſian ſea, and in freſh waters, where it is much larger.

62. M.

canaliculatus. 62. M. ſmoothiſh, cheſnut brown; within party coloured; ſocket of the hinge channelled.

roſtrum. 63. M. oblong, thin, truncated; beaks ſharp and carinated; valves gaping at the end. Amboyna.

camellii. 64. M. oblong, thin, truncated; beaks ſharp and carinated; valves completely cloſed. Japan.

avonenſis. * 65. M. with a ſuboval ſhell, of an olivaceous brown colour, with concentric wrinkles; ſize of the M. *anatinus*, but broader in proportion to its length. The poſterior ſide generally more obtuſe and rounded. River Avon in Wiltſhire. *Montagu, Teſt. Brit.* 172.

45 Pinna.

Gen. 17. Pinna, *Sea-Wing.*

Gen. Char.—The animal a limax; the ſhell bivalve, fragile, upright, gaping at one end, and furniſhed with a byſſus or beard. Hinge without teeth; the valves united into one.

Species.

rudis. 1. P. vaulted with arched ſcales, arranged in rows; from 12 to 16 inches long, and from 4 to 8 broad; red; from 6 to 8 grooves. Atlantic, Indian, and Red ſeas.

pectinata. 2. P. longitudinally ſtriated half way; one ſide ſlightly wrinkled tranſverſely; 3 inches long, 4 broad. Indian ocean.

nobilis. 3. P. ſtriated, with channelled, tubular, ſubimbricated ſcales; 7½ inches long, 3½ broad. Mediterranean, Adriatic, and American ſeas.

muricata. * 4. P. ſtriated with concave, ovate, acute ſcales; from 3 to 9 inches long, and 1 to 3 broad. European and Indian oceans, Weymouth.

rotundata. 5. P. with obſolete ſcales, margin rounded; ſometimes 2 feet long. Mediterranean.

ſquamoſa. 6. P. with fine undulated ſcales, and flexuous, broad wrinkles; ſmaller end pointed and naked; 13 inches long, 6½ broad. Mediterranean.

carnea. 7. P. thin, fleſh colour, naked, longitudinally grooved; external margin acute and rounded.

ſaccata. 8. P. ſmooth, ſatchel-ſhaped; a little erect, and ſlightly faſtigiated; 3¼ inches long, 2¼ broad. Mediterranean and Indian ſeas.

digitiformis. 9. P. ſmooth, tubular, finger-ſhaped, incurved; extreme margin membranaceous; pellucid.

lobata. 10. P. naked, lobed, ſtraw-coloured, with purple ſtriæ.

vitrea. 11. P. hyaline, with longitudinal, waved ſtriæ; the ſtriæ with a few ſcales, and croſſed by other tranſverſe ſtriæ at the margin. Indian ocean. Very rare.

incurva. 12. P. narrow, long, naked, carinated, with tranſverſe, undulated wrinkles. Indian ocean.

bicolor. 13. P. thin, inflected at the lateral margin; yellowiſh, with black brown rays; thinly ſtriated longitudinally. Red ſea.

nuſta. 14. P. flattiſh, horny, with blackiſh rays, ſpots, and clouds; and many ſmooth ſtriæ. Southern ocean of India. Red ſea.

vexillum. 15. P. truncated at the outer margin; dilated, naked, with a few black clouds; ſtriated longitudinally on the fore-part, and tranſverſely wrinkled behind. India. Very rare.

papyracea. 16. P. thin, brittle, horny, longitudinally ribbed; extreme margin roundiſh. Indian ocean.

ſanguinea. 17. P. flattiſh, ſlightly incurved, red, with a few perpendicular ſmooth ſtriæ; 3 inches long.

bullata. 18. P. very ſtraight, thin, and perpendicularly ſtriated, with tranſverſe, ſpinous wrinkles, on the lower margin.

General Obſervations.—It has been doubted whether the animal which inhabits the pinna be a limax or ſlug, according to the opinion of Linnæus; and it is even aſſerted, that it has not the ſmalleſt affinity with this animal, but approaches much more nearly to that which belongs to the mytilus. In proof of this, it is ſaid that the pinna poſſeſſes no locomotive power, but remains fixed by its byſſus or beard to other bodies; and ſo firmly attached, that it can by no means be diſengaged at the will of the animal; for the fibres are ſtrongly agglutinated to the ſand, gravel, or other extraneous bodies within reach. Indeed it ſeems not at all improbable that all teſtaceous animals, furniſhed with a ſimilar beard, are intended by this ſtructure to remain attached to the ſpot where they are originally produced.

This ſhell-fiſh was celebrated among the ancients on account of the cloth which was made of the fine byſſus or beard by which it is attached. As a rare and coſtly production it brought a high price, and was held in great eſtimation. At the preſent day even, according to the information of modern travellers, the inhabitants of Palermo and Naples manufacture gloves and ſtockings from the ſame ſubſtance.

The pinna has obtained a little reputation for the practice of ſome of the moral virtues, in treating a ſmall ſpecies of crab with hoſpitality and friendſhip, by receiving it into the ſhell, and defending it againſt its enemies. In return for this kindneſs, the crab, like the jackall with the lion, acts the parts of a provider and monitor, by warning its hoſt of the preſence of its prey or of the approach of an enemy. But this friendly intercourſe accords ill with the nature of the animals between whom it is practiſed. The crab, it is far more probable, is a troubleſome intruder; and notwithſtanding all the ſervice he can repay, is conſidered as a very unwelcome gueſt, and is indebted for his lodging to his own activity, and the ſluggiſh nature of his hoſt, rather than to his kindneſs and hoſpitality.

III. UNIVALVE SHELLS.

46 Argonauta.

Gen. 18. Argonauta.

Gen. Char.—The animal is a ſepia or clio. The ſhell is univalve, ſpiral, involute, membranaceous, one-celled.

Species.

argo. 1. A. *The paper nautilus.* Keel or ridge of the ſhell ſlightly toothed on each ſide. The ſhell, which is thin as paper, brittle, and tranſparent, is white or yellowiſh, with ſmooth or knotty ſtriæ or ribs, which are ſometimes forked; the keel is generally browniſh. This ſhell preſents conſiderable varieties. Sometimes the keel is narrow, and marked with cloſe bifurcated wrinkles; ſometimes it has a broad keel with tuberculated ribs; and ſometimes a broad tuberculated keel with few and ſmooth ribs.

The ſingular ſtructure and wonderful economy of this

this animal very early attracted the attention of naturalists. To its progressive motion on the surface of the ocean, mankind are indebted, it is said, for the first hint of the art of navigation. This is alluded to in the numbers of Pope.

> Learn of the little nautilus to sail,
> Spread the thin oar, and catch the driving gale.

What is the particular organization which enables this animal to rise to the surface or to sink to the bottom at pleasure, seems not to be understood by naturalists; whether it is by throwing out a quantity of water by which it becomes specifically lighter than the element in which it lives, or by taking in a quantity of air, which will produce the same effect. It is only when the sea is calm and unruffled that the nautilus, with his feeble bark, appears on the surface. In rising through the water, the shell is reversed, the sharp edge of the keel presenting less resistance to the liquid; and when it reaches the surface, the animal, by exerting its arms, restores it to a proper position for its voyage. A quantity of water is taken into the shell to balance it. The animal then employs its arms as oars; or if a gentle breeze sweep the surface, it stretches two of them perpendicularly, by which means the membrane between them is extended in form of a sail; the other arms serve as oars to direct the course, or to keep the bark steady, as well as part of the body which hangs over the shell, and seems to answer for a rudder. Thus equipped, the solitary navigator glides smoothly along the bosom of the ocean. But, on the approach of the smallest danger, the appearance of an enemy, or the slightest ruffling of the surface of the water, it instantly retires within the shell, and taking in a quantity of water, or ejecting a quantity of air, quick as thought it sinks to the bottom. Mediterranean and Indian ocean.

vitreus. 2. A. keel of the shell toothed in the middle. The shell is conic, transversely ribbed, with a convex keel; aperture oval. It is a very rare species.

cymbium. 3. A. keel of the shell wrinkled, and without teeth; depressed, thin, wrinkled, with fine longitudinal striæ crossing the wrinkles. Mediterranean.

cornu. 4. A. keel with 4 smooth elevated rings; 1 line high, 5 broad. Cape of Good Hope.

arctica. 5. A. shell perforated, with an entire keel; $3\frac{1}{2}$ lines diameter. Greenland seas, where it is frequently seen floating in spring and autumn.

Some species of the argonauta are met with in all climates, from the Indian ocean to the shores of Greenland.

47 Nautilus.

Gen. 19. Nautilus.

Gen. Char.—The nature of the animal which inhabits this shell is not well known. The shell is univalve, divided into several compartments, communicating by an aperture with each other.

SPECIES.

A. *Spiral, rounded, with contiguous whorls.*

pompilius. 1. N. aperture of the shell heart-shaped; whorls obtuse; smooth. Indian and African ocean.—This species is often very large, and it is finely variegated with brown flexuous streaks, spots, and marks, under the epidermis, which is white; within it exhibits a beautiful pearly gloss. It is employed for drinking cups by the inhabitants of the east.

* 2. N. aperture of the shell linear; whorls with elevated joints; minute, white, opaque. Sheppey island. *calcar.*

* 3. N. with lateral spires, with about 20 flexuous, crenated joints in the exterior whorl; marked by elevated striæ; aperture semicordate; syphon central; very minute. Mediterranean, Sheppey island, and Sandwich. *crispus.*

4. N. aperture obovate; 4 or 5 volutions, with deep sulcated joints; 10 in the first spire, frequent on most shores; minute. *beccarii.*

* 5. N. similar to the preceding species, but with the spires reversed. Shores of Britain, frequent. *perversus.*

* 6. N. spiral, with smooth joints; semipellucid, white, glossy; very minute. Sandwich. *levigatulus.*

* 7. N. spiral, slightly umbilicated on each side, with many depressed joints. Reculver, England. Very minute, and rare. *depressulus*

* 8. N. spiral, umbilicated, with furrowed joints; colour opaque, white. Sandwich. Minute, not common. *umbilicatulus.*

* 9. R. thick, spiral, doubly umbilicated, with fine joints; opaque, white. Reculver, England. Minute, rare. *crassulus.*

* 10. N. spiral, lobate; spires rounded on one side, depressed on the other. Whitstable. *lobatulus.*

* 11. N. oblong, carinated; aperture oval, narrow. Sandwich. Minute, rare. *carinatulus.*

12. N. a little bending, with raised joints; length one-tenth of an inch. *subarcuatulus.*

* 13. N. compressed, subcarinated, spiral, smooth, glossy, horn-coloured, with 3 visible volutions; diameter one-fifth of an inch. Brooks, Kent; marshes, Rotherhithe. Not unfrequent. *Lightfoot, Phil. Trans.* 76. *Helix nitida*, Lin. This is supposed to be the only species of fresh-water nautilus which has been described. *lacustris.*

14. N. white, convex; aperture linear; first spire largest. Baltic. *balthicus.*

15. N. spires of the shells concealed; very small. Found in a fossil state on St Peter's mountain at Maestricht. *helicites.*

16. N. aperture linear; spires compressed, with thickened margins. Southern ocean. Very small. *rugosus.*

17. N. aperture compressed, linear; spires compressed; umbilicus concave; minute. Croatia. *umbilicatus.*

B. *Spiral, rounded, with separate whirls.*

18. N. aperture orbicular; whirl cylindrical; one inch in diameter. American and Indian oceans. *spicula.*

19. N. smooth, with 4 conic tubercles; very minute. India. *spengleri.*

20. N. diaphanous, middle partitions protuberant outwards; surface with six conic tubercles; minute. India. *unguiculatus.*

C. *Elongated, and nearly straight.*

* 21. N. incurved, spiral at the tip; whirls contiguous; minute, convex; the partitions appearing outwardly. Croatia, Sandwich. Rare. *semilituus.*

22. N. subconic; globular divisions growing gradually less; tip incurved, spiral. Red sea. Frequently found fossil. *lituus.*

23. N. with a slight curvature; divisions obliquely striated; *obliquus.*

ſtriated; ſyphon central. Mediterranean and Adriatic ſeas.

raphaniſtrum. 24. N. ſubcylindrical, with thick diviſions, marked with 12 elevated ſtriæ; ſyphon central. Adriatic and Mediterranean ſeas.

raphanus. 25. N. jointed, diviſions thick, with 17 elevated ſtriæ; ſyphon ſublateral, oblique. Adriatic and Mediterranean.

granum. 26. N. ovate, oblong, with thick diviſions, marked with 8 interrupted elevated ſtriæ; ſyphon oblique; minute. Mediterranean.

radicula. * 27. N. oblong, ovate, with 8 or 9 ſubgloboſe articulations; aperture a ſmall ſyphon. Adriatic, Sandwich.

faſcia. 28. N. diviſions ſtriated; joints ſmooth, elevated; obtuſe at the tip; denticulated at the margin; ſyphon central. Adriatic. Very ſmall.

inæqualis. 29. N. cylindrical, with 8 diviſions; aperture margined; very minute. Red ſea.

ſiphunculus. 30. N. ſmooth, with cylindrical, remote diviſions; joints tapering, cylindrical. Seas of Sicily.

legumen. * 31. N. compreſſed, jointed, margined at one end; ſyphon lateral. Adriatic, Sandwich. Very rare.

coſtatus. * 32. N. ſtraight, ſubcylindrical, tapering; joints 12, raiſed, with 4 equidiſtant, ſtrong, longitudinal ribs the whole length; $\frac{1}{4}$ inch long. Coaſt of Kent. *Montagu, Teſt. Brit.* 199. A variety of this has been diſcovered with only 6 joints.

orthocera. 33. N. whirls of the ſhell with carinated ſtriæ. The ocean. Frequently found foſſil.

belemnita. 34. N. *Thunder-ſtone.* Equal, ſmooth, conic, acute; varies in ſize, from $\frac{1}{2}$ inch to 8 inches; found foſſil in moſt parts of Europe. It has ſome degree of tranſparency; and when burnt or rubbed, emits a ſmell like raſped horn.

48 Conus.

Gen. 20. Conus, *Cone-ſhell.*

Gen. Char.—The animal is a limax. The ſhell univalve, convolute, turbinate; aperture effuſe, longitudinal, linear, without teeth, entire at the baſe; pillar ſmooth.

Species.

A. *Spire or turban nearly truncated.*

marmoreus. 1. C. conic, brown, with ovate, ſubangular, white ſpots; whirls of the ſpire channelled. American ocean.

imperialis. 2. C. whitiſh, with longitudinal, livid bands, and divided brown and white linear belts: ſpire flat, painted with brown undulated ſtripes, often emarginated. A rare ſhell.

literatus. 3. C. conic, white, with brown dots; ſpire marked with brown ſtripes. Aſiatic ocean.

generalis. 4. C. conic, poliſhed, with a pointed, muricated ſpire; whirls channelled. India.

virgo. 5. C. conic, with a bluiſh baſe. African ocean.

capitaneus. 6. C. conic, glabrous, with a brown baſe: ſpire a little convex, ſometimes flat, and generally ſtriped. Aſia.

tribunus. 7. C. white, with three yellowiſh bands; ſpotted with cheſnut: ſpire convex; baſe tranſverſely ſtriated.

miles. 8. C. conic, rough with a brown baſe: ſpire convex. India.

cingulum. 9. C. conic, yellowiſh, with a ſingle elevated belt in the middle: ſpire acute. Friendly iſlands.

B. *Pyriform with a rounded baſe; cylinder half as long again as the ſpire.*

princeps. 10. C. yellow, with purpliſh brown; longitudinal branched lines, marked with two white bands, which have a few brown ſpots: ſpire obtuſe and finely ſtriated tranſverſely: $2\frac{1}{2}$ inches long. Indies.

ammiral. 11. C. with rough punctures at the baſe.—This ſpecies is divided into the following varieties. 1. Without bands. 2. With irregular bands. 3. With one regular band. 4. With two regular bands. 5. With three regular bands. 6. With four regular bands. 7. With five or more regular bands. 8. With punctated, reticulated belts. To this laſt diviſion belongs the *cedo nulli*, or celebrated admiral ſhell, which has been eſteemed the rareſt and moſt precious of teſtaceous productions. Some ſpecimens of the C. *cedo nulli* have brought the extravagant price of 100 guineas. The endleſs varieties of this ſpecies are found in the ſeas of South America.

vacarius. 12. C. teſtaceous, ſpotted with white; with four yellow, immaculate bands; the ſecond angularly divided. Southern ocean.

ſenator. 13. C. conic, ſmooth, glabrous; with obtuſe, ſculptured whirls: yellow ſpotted with white.

nobilis. 14. C. ſubcylindrical, ſmooth, glabrous; finely poliſhed; yellow or brown, ſpotted with white.

genuanus. 15. C. with linear belts, articulated with white and brown: red, with bands alternately teſſelated with brown and red.

glaucus. 16. C. emarginated at the baſe, ſtriated; ſpire unarmed, with contiguous whirls. India and Africa.

monachus. 17. C. gibbous, clouded with bluiſh brown; acute, ſtriated at the baſe; ſometimes dotted in rows.

minimus. 18. C. grayiſh, ſurrounded with oblong dots.

ruſticus. 19. C. ovate, rugged, and muricated at the baſe; ſpire conico-convex. Var. 1. Without band. 2. With a band clouded whitiſh. Africa.

mercator. 20. C. ovate, white, with reticulated yellow bands. Africa.

betulinus. 21. C. ſlightly emarginated at the baſe and wrinkled; ſpire flattiſh, mucronate. India. A large ſhell.

figulinus. 22. C. ſlightly emarginated at the baſe, and wrinkled; ſpire acuminated, with flattiſh whirls: three inches long. India.

ebræus. 23. C. ovate, white, with black band, compoſed of tranſverſe ſpots; a ſmall ſhell.

ſtercus muſcarum. 24. C. emarginated at the baſe, and ſtriated: whirls of the ſpire channelled. Aſia.

varius. 25. C. elongated, muricated: the ſpire crowned and acute. Indian ocean.

achatinus. 26. C. elongated, finely ſtriated tranſverſely; variouſly clouded, and ſpotted with white: ſpire ſhort, ſpotted with brown, and tipt with red. American ocean.

radiatus. 27. C. with white rays and bands.

leoninus. 28. C. pale yellow or cheſnut ſpots, with white or yellow tranſverſe bands; ſpire rather acute.

jaſpideus. 29. C. light olive, with multifarious white dots, and an oblique band: oblong. Small.

nebuloſus. 30. C. brown with blue clouds and white ſpots.

oculatus. 31. C. conic, yellow, with white eyes and band: baſe obliquely ſtriated.

coffeæ. 32. C. ſhort, brown, with two white bands: that neareſt the ſpire ſpotted with brown.

33. C.

amadis. 33. C. pale brown, with a broad band, and articulated belts above and beneath: ſpire acute, crowned with tubercles, and finely ſtriated tranſverſely.

fulmineus. 34. C. with cheſnut ſtripes the whole length: ſpire acute, and with the pillar lip ſpotted with cheſnut; the baſe acute and obliquely ſtriated.

arachnoideus. 35. C. reticulated with cheſnut, with two or three darker bands; ſpire crowned and acute. A very rare ſpecies.

coſtatus. 36. C. brown, with a white band; undulated with reddiſh, thick, and broad ſtriæ; ſpire nodulous, with a granulated band.

leucoſtictus. 37. C. white, clouded, ſtriped, and ſpotted with brown; with numerous rows of white and brown dots: ſpire crowned with tubercles. American ocean.

citrinus. 38. C. citron with black lines, interrupted beneath; ſpire crowned with tubercles, with the baſe white. Curaçoa.

inſularis. 39. C. white, with cheſnut clouds, ſpots, and dots; ſpire acute.

coronatus. 40. C. with alternate articulated belts and teſſelated ſpots; ſpire crowned with tubercles; ſhell often minute, and with a white band.

punctatus. 41. C. with two yellowiſh brown bands, and numerous lines of dots; ſpire varied with yellow dots and lines.

zeylanicus. 42. C. ſnowy, with roſy and brown clouds, and numerous articulated belts, varied with white and cheſnut; ſpire pointed.

ſolidus. 43. C. conic, thick, tranſverſely ſtriated; clouded with white and brown, with a broad white band, and pyramidal ſpire; whirls channelled.

C. *Elongated and rounded at the baſe; cylinder as long again as the ſpire.*

clavus. 44. C. with convex ſmooth ſtriæ; the baſe bluiſh. Indian ocean. Very rare.

nuſſatella. 45. C. ſubcylindrical, red, rough; ſtriæ tuberculated. Iſland of Nuſſatella in Aſia, but very rare.

terebellum. 46. C. white, ſhaded with blue; ſubcylindrical, with annular ſtriæ and yellow bands.

coccineus. 47. C. red, with tranſverſe lines, dotted with black; with a white band, and ſpire ſpotted with red.

lætus. 48. C. ſubcylindrical, with annular ribs; red, with darker clouds, and barred with white; ſpire ſpotted.

ochroleucus. 49. C. ſubcylindrical, yellow; the baſe obliquely ſtriated, with a white band near it; ſpire pointed with ſtriped ſpots.

lævis. 50. C. rufous with fulvous ſpots, and tranſverſe ſtriæ; ſpire ſpotted with yellow; baſe obliquely ſtriated.

affinis. 51. C. bluiſh white, with four fulvous linear bands, and intermediate dull purple dots.

violaceus. 52. C. white with violet clouds and bands; rays pale brown; ſpire pyramidal, with ſix whirls.

granulatus. 53. C. rough, unarmed, with ſmooth, grooved ſtriæ. African ocean. Shell red, with white bands, and purple linear dots.

polyzonias. 54. C. white within; outſide yellowiſh brown and rough, with fine granulated lines, with a white band at the ſpire denticulated beneath; another at the baſe with a paler tinge; ſpire flattened, with ſtriped ſpots; baſe outwardly duſky, and violet within.

bifaſciatus. 55. C. white, with angular cheſnut lines, and two orange bands; ſpire prominent; baſe ſurrounded with orange lines, and intermediate teſſelated ſpots.

niveus. 56. C. conic, ſnowy; ſpire prominent, and crowned with tubercles; aperture large.

arauſiacus. 57. C. *orange flag*, ſmooth, with whitiſh bands; whirls grooved at the tips. India.

magus. 58. C. ſubcylindrical, with longitudinal bands, dotted with white. India.

ſtriatus. 59. C. ovate, oblong, gibbous, clouded with fine parallel brown ſtriæ; 4 inches long. Africa.

textile. 60. C. with reticulated yellow veins, and yellow and brown ſpots. Aſia.

aulicus. 61. C. white, with brown reticular veins and interrupted longitudinal bands. Aſia. It varies much in its colours.

thomæ. 62. C. ſmooth, white, with bay characters and rows of dots, with three white belts and ſpots; the tip reddiſh; ſpire conic, with grooved whirls. Indian ocean.

D. *Ventricoſe in the middle, and contracted at each end.*

ſinenſis. 63. C. ventricoſe, yellow with white eyes; baſe tranſverſely ſtriated.

E. *Thin, ventricoſe, and tinkling when thrown upon its back on a table.*

ſpectrum. 64. C. bluiſh, with yellow clouds and yellowiſh thick dots and ſtriæ; ſpire rather acute. Aſiatic ſeas.

bullatus. 65. C. yellow clouded with white; aperture large and bluiſh; ſpire ſometimes flat, ſometimes acute.

tulipa. 66. C. oblong, gibbous, ſmooth; aperture gaping. India, South America.

geographicus. 67. C. oblong, gibbous, crowned; aperture gaping; wrinkled at the baſe, and a little narrower; aperture white; ſpire ſometimes roſy. Indian and African ſeas.

nubecula. 68. C. white, clouded and ſpotted with orange, with ſcattered white dots; ſpire prominent, acute.

ſpurius. 69. C. white, with alternate rows of irregular cheſnut, or blackiſh ſpots, and interrupted, punctured bands.

vexillum. 70. C. brown, ſhaded with white, with a white interrupted band; the white band is ſometimes cruciate.

ventricoſus. 71. C. brown, barred with white, beneath narrower, ſhaded with bluiſh, and ſmooth; ſpire conic, exſerted.

Gen. 21. CYPRÆA, *Cowrie.*

49 Cypræa.

Gen. Char.—The animal is a ſlug; ſhell univalve, involute, ſubovate, ſmooth, obtuſe at each end; aperture effuſe at each end; linear, extending the whole length of the ſhell, and toothed on each end.

SPECIES.

exanthema. 1. C. ſlightly turbinated, ferruginous, with whitiſh round ſpots and eyes; line down the back a little branched. American and Atlantic ſeas.

mappa. 2. C. ſlightly turbinated, and marked with irregular characters; line down the back branched. Indian and African ſeas.

arabica. 3. C. ſlightly turbinated with irregular characters; ſtripe down the back ſimple. India.

argus. 4. C. ſlightly turbinated, ſubcylindrical, ſprinkled with

with eyes; beneath 4 brown ſpots; about 4 inches long. Indian and Atlantic ſeas.

teſtudinaria. 5. C. obtuſe, ſub-cylindrical; extremities depreſſed. Perſian gulf and Indian ocean. This is the largeſt ſhell of this genus.

ſtercoraria. 6. C. ſlightly turbinated, gibbous, with livid and teſtaceous ſpots; emarginate on each ſide, and flat beneath. Guinea.

carniola. 7. C. ſlightly turbinated, pale, with fleſh-coloured bands; mouth violet; 2½ inches long. Aſiatic ocean.

zebra. 8. C. turbinated, cinereous, with brown bands; is twice as large as the laſt, and the ſpire more prominent. India.

talpa. 9. C. ſlightly turbinated, ſub-cylindrical, teſtaceous, with pale bands; beneath thickened and brown; 3 inches long. India.

amethyſtea. 10. C. ſlightly turbinated; ſides gibbous and decorticated, 4 clouded, browniſh bands above. Madagaſcar.

lurida. 11. C. ſlightly turbinated, lurid and ſlightly barred; extremities pale yellow, with 2 black ſpots. Mediterranean and Atlantic ſeas.

venelli. 12. C. ſlightly turbinated, ſpotted, and marked with yellowiſh dots: extremities ſpotted with brown; throat rufous.

lota. 13. C. ſlightly turbinated, white, with ſubulate denticles. Sicily.

fragilis. 14. C. turbinated, ovate, glaucous, with longitudinal teſtaceous waves, and pale bands. Mediterranean.

guttata. 15. C. thin, gibbous, fulvous, dotted with white, with a horizontal line in the middle; beneath white with yellow teeth.

cinerea. 16. C. thin, ventricoſe, reddiſh gray, with paler bands.

plumbea. 17. C. ſlightly turbinated thin; black lead colour, with four bands varied with blue and brown; undulated with browniſh at the margin, and marked with blue and brown lines. Guinea.

oculata. 18. C. ſlightly turbinated, ruſſet brown, with white eyes, and three paler bands on the back. American ocean.

hiſtrio. 19. C. ovate, ſlightly turbinated, with livid eyes; beneath flat, white; ſides thickened, black, ſpotted with brown. Indian ocean.

aurantium. 20. C. ſlightly turbinated, orange, with a white immaculate edge; throat bright red. Friendly iſlands.

ferruginoſa. 21. C. thin, elongated, yellowiſh or bluiſh, with ferruginous ſpots; within blue.

livida. 22. C. thin, elongated, uniformly ſtraw-coloured, pale yellow or reddiſh; beneath dotted with brown; teeth ſubulate.

gibba. 23. C. thin, gibbous; back clouded, and tranſverſely barred.

turbinata. 24. C. turbinated, ovate, glaucous, with angular pale ſpots.

venerea. 25. C. oblong, brown, with ſtripped gold ſpots; within blue.

purpuraſcens. 26. C. oblong, purpliſh; beneath ſurrounded with a white line.

albida. 27. C. oblong, whittiſh; ends of the lips ſpotted with

rufeſcens. fulvous.

tranſlucens 28. C. oblong, reddiſh brown; beneath whitiſh.

punctulata 29. C. cylindrical, cinereous with pellucid bands.

30. C. cylindrical, fragile, white, with tranſverſe bands of reddiſh dots.

tigrina. 31. C. obtuſe, ovate, ſlightly turbinated with a longitudinal teſtaceous line.

dubia. 32. C. oblong, ferruginous, with paler bands.

trifaſciata. 33. C. turbinated, thin, bluiſh brown, with three yellowiſh bands varied with brown at each end. Rare.

conſpurcata. 34. C. turbinated, bluiſh, white, dotted and clouded with brown.

bifaſciata. 35. C. oblong, ſhaded with purple, with a ſtraw-coloured band, and another narrower white one, and a brown border; 4 inches long.

cylindrica. 36. C. cylindrical, above; pale-violet, and ſpotted with brown at the ſides, with two brown ſpots at each end.

teres. 37. C. cylindrical, milk-white; one ſide bordered and varied with a few pale yellow, narrow marks, backed with three browniſh waved bands.

ovata. 38. C. ovate, a little depreſſed; one ſide ſlightly bordered; back whitiſh, with crowded yellowiſh brown dots and waves, and 3 obſolete darker bands; 1½ inch long, ½ broad.

minuta. 39. C. oblong, of one colour, with a tinge of bloom; beneath dotted with white, with the border of one ſide and the teeth of the lip white; above yellow at each end; ſpire tipt with black.

ſanguinolenta. 40. C. thin, oblong, barred with brown, and dotted with red at the ſides.

faſciata. 41. C. turbinated, glaucous, margined; above gibbous, with tranſverſe browniſh bands; throat glaucous.

regina. 42. C. gibbous, glaucous, brown, with triangular, teſtaceous and whitiſh ſpots, and 3 tranſverſe bands; throat blackiſh, glaucous.

undulata. 43. C. turbinated, undulated with browniſh, clouded with pale ochre; and deeper bands. Mauritius iſland.

B. *Obtuſe, and without a manifeſt ſpire.*

caput-ſerpentis. 44. C. triangularly gibbous, and rather obtuſe behind; brown, ſpotted and white; beneath white; 1½ inch long. Mauritius and Nuſſatella iſlands.

reticulum. 45. C. roundiſh, gibbous, brown, with white, confluent, reticulated eyes, and a white horizontal line in the middle of the back; beneath white.

mauritiana. 46. C. triangularly gibbous; behind depreſſed, acute; beneath black; a large ſhell, ſpotted with brown. Java, Mauritius, and Nuſſatella.

vitellus. 47. C. livid, with ſmall white ſpots; 2 inches long. Indian ocean.

mus. 48. C. retuſe, gibbous, cinereous, with a longitudinal brown band; teeth of the aperture blackiſh. American and Mediterranean ſeas.

tigris. 49. C. obvate, obtuſe behind, and rounded before; ferruginous, with deep brown ſpots, and a yellow longitudinal, dorſal line; 4½ inches long. Indian ocean.

flammea. 50. C. ovate, obtuſe behind, and rounded before, with waved yellow ſpots: a rare ſhell.

olivacea. 51. C. ovate, olive, clouded with yellow, and ſpotted with brown; beneath flat, pale-brown: teeth of the lip white.

feminea. 52. C. ovate, thin, white, with greeniſh yellow dots diſpoſed in rows; within violet.

lynx. 53. C. oblong, ovate, with brown dots, and a yellowiſh line; hind part a little acute, with a rufous mouth; 2 inches long. Madagaſcar.

54. C.

isabella. 54. C. ſub-cylindrical, with pale yellow extremities; 1½ inch long. Mauritius.

ambigua. 55. C. pyriform, duſky, with paler clouds and ſpots.

ſcurra. 56. C. ovate, oblong; beneath flat; yellowiſh, with greeniſh and livid confluent drops; ſides varied with ſcattered brown dots. India.

C. *Umbilicated or perforated.*

onyx. 57. C. beneath brown, above whitiſh; ſmall. Aſia.

clandeſtina. 58. C. with fine tranſverſe lines here and there meeting together. India.

ſuccincta. 59. C. interior lip rounded at each extremity.

zig-zag. 60. C. pale yellow, with brown dots; the extremities with 2 brown ſpots.

hirundo. 61. C. above bluiſh; extremities marked with 2 brown ſpots. Maldivia iſlands.

aſellus. 62. C. white, with 3 brown bands; oblong; minute. Madeira iſlands.

erronea. 63. C. with an equal teſtaceous ſpot.

urſellus. 64. C. oblong, white; above ſmooth, varied with brown, and marked with 2 brown dots at the umbilicus or perforation.

pyrum. 65. C. pale brown, with paler bands and ochraceous ſpots; beneath and at the ſides fulvous; within blue.

maculoſa. 66. C. narrow, long, with fleſh-coloured ſpots above, varied with pale, fulvous, and glaucous ones; ſides cheſnut.

pulla. 67. C. thin; ſides ruſſet brown; above white, or pale brown, with tranſverſe bands, or a fainter horizontal line.

indica. 68. C. cylindrical, marked above with characters, eyes, and a paler horizontal line; ſides bloom-colour, dotted with black. India.

ovum. 69. C. thin, oblong, olivaceous, with ſcattered ferruginous ſpots; beneath white.

felina. 70. C. oblong, narrow, plumbeous, with ferruginous dots and ſpots, and paler bands; marked at each extremity with 2 brown ſpots.

atomaria. 71. C. oblong, ſnowy, dotted with brown; each end marked with 2 duſky dots; ½ inch long.

nebuloſa. 72. C. oblong, gibbous; brown, with cheſnut ſpots.

ochroleuca. 73. C. thin, ochraceous, with paler ſpots.

ſtellata. 74. C. thin, cinereous, dotted with brown, and marked with tranſverſe, elevated ſtriæ.

ſubflava. 75. C. oblong, gibbous, ſmooth, yellowiſh.

leucogaſter 76. C. oblong, purple; beneath white.

varioloſa. 77. C. oblong, duſky, with two bands on the back, and whitiſh ſpots.

fulva. 78. C. ſolid, oblong, fulvous, with brown ſpots, diſpoſed in rows, and two duſky bands; ſides ſaffron.

leucoſtoma. 79. C. oblong, gibbous, clouded with brown and blue; ſides ſpotted with black; mouth white.

lineata. 80. C. ovate, marked above with lines; borders ſpotted.

cancellata. 81. C. ovate, gibbous, with cancellated ſpots, and a horizontal line above.

lutea. 82. C. browniſh, with two white bands; beneath pale yellow, dotted with brown.

badia. 83. C. oblong, gibbous; above bay, with brown and white dots.

punctata. 84. C. ovate, white, with teſtaceous dots.

zonaria. 85. C. ovate, ſmoothiſh, yellowiſh, with four brown lunules. Shores of Guinea. Very rare ſhell.

conoidea. 86. C. lip toothed within; with three rows of tubercles; pillar lip without teeth.

D. *Margined.*

cribraria. 87. C. umbilicated, pale yellow, with white round ſpots.

moneta. 88. C. whitiſh, with a knotty margin. Mediterranean, Atlantic, Ethiopic, and Indian ſeas.—This ſpecies is collected in great quantities, and tranſported to Bengal, Siam, and other parts of India, where it is employed by the natives as the medium of commerce.

annulus. 89. C. ſurrounded on the back with a yellow ring. Amboyna and Alexandria.

caurica. 90. C. gibbous, unequal, whitiſh; margin dotted with brown; back marked with teſtaceous clouds. Indian ocean.

eroſa. 91. C. with a jagged margin; yellow, dotted with white; ſides with a browniſh ſpot. Mauritius and Aſcenſion iſlands.

deroſa. 92. C. with a jagged margin, fleſh-colour, with a greeniſh back, marked with fulvous dots; ſides dotted with brown. Mediterranean.

flaveola. 93. C. with a jagged margin; yellow, dotted with white; ſides marked with obſolete, ſcattered, brown dots.

ſpurca. 94. C. ſlightly margined, yellowiſh with deeper ſpecks; ſides dotted with brown. Mediterranean.

oblonga. 95. C. oblong, ovate; above bluiſh, dotted and ſpotted with brown; beneath and at the ſides white.

ſtolida. 96. C. cinereous, variegated with teſtaceous; white beneath, and at the ſides; 1½ inch long. Amboyna.

helvola. 97. C. triangularly gibbous, dotted with white, jagged behind; beneath yellow, immaculate. Indian ocean.

ocellata. 98. C. ſlightly margined, pale yellow with black eyes; margin white, dotted with brown; 1½ inch long.

poraria. 99. C. pale violet, dotted with white; a very ſmall ſhell.

pediculus. * 100. C. with numerous tranſverſe furrows, ſome of which are forked; a ſmall ſhell, and ovate, with various tints of red or white; ſometimes it is marked with a longitudinal groove. Frequent on moſt ſhores. Britain.

nucleus. 101. C. margined on each ſide, ſlightly produced and rugged, with raiſed tubercles above; 1 inch long. Nuſſatella iſland.

madagaſcarienſis. 102. C. whitiſh, produced on each ſide; back tuberculated, and marked with tranſverſe undulated ſtriæ. Madagaſcar.

ſtaphylæa. 103. C. ſomewhat produced, with elevated dots; extremities pale yellow.

cicercula. 104. C. produced on each ſide, and ſprinkled with raiſed dots. Mediterranean and Indian ſeas.

globulus. 105. C. produced on each ſide, and ſmooth, white or yellow. Amboyna.

affinis. 106. C. oblong, ſlightly produced, ſmooth, yellow; ocellated on each ſide before.

ſqualina. 107. C. thin, oblong, white, with ferruginous ſpots and dots.

fimbriata. 108. C. white or gray, with obſolete ferruginous ſpots and tranſverſe bands; lips of the mouth marked with violet ſpots.

cruenta. 109. C. gibbous; above bluish with rufous dots; beneath and at the sides white; lips citron.

reticulata. 110. C. reticulated; margin varied with striped spots.

rubiginosa. 111. C. oblong, white; within violet; back with a ferruginous blotch; each end marked with two pale yellow spots; teeth of the lips yellowish.

miliaris. 112. C. thin, short, yellowish green, with milk-white eyes, and marked with a lateral horizontal line.

acicularis. 113. C. solid; above yellowish dotted with brown, with a horizontal pale line; beneath milk-white, with impressed dots at the margin.

crassa. 114. C. thick, yellowish, with 3 whitish bands; mouth bluish; 4 inches long.

vinosa. 115. C. above white, with a claret stain, and marked with purple eyes, surrounded with a black circle, and a horizontal white line; blue within. Mediterranean.

angustata. 116. C. narrow, brown, with reddish spots at the side.

similis. 117. C. oblong, gibbous, yellowish, dotted with white, with a blackish spot at the margin.

striata. 118. C. convex, bluish white, dotted with brown; beneath yellow, striated on one side.

sinensis. 119. C. oblong, solid, variegated with orange lips.

pusilla. 120. C. bluish, spotted with brown, and marked with 3 bands.

Bulla.[50]

Gen. 22. Bulla, *Dipper*.

Gen. Char.—The animal a limax; the shell univalve, convoluted, unarmed with teeth; aperture a little straitened, oblong, longitudinal, very entire at the base; pillar oblique, smooth (B).

Species.

ovum. 1. B. ovate, obtuse, slightly doubly beaked; one of the lips toothed, from which it has the appearance of a cypræa; 4 inches long. Amboyna and Friendly islands.

volva. 2. B. two beaked; the beaks long, striated and acute. Jamaica. A rare shell.

birostris. 3. B. two-beaked, margin thickened outwardly; beaks long, smooth; size of a bean. Java.

spelta. 4. B. oblong, rather obtuse at both ends; equal; lip arched; margin thickened within; twice the size of a grain of wheat. Mediterranean and Adriatic.

verrucosa. 5. B. transversely angular, ovate, with a bony dot on each side. India.

gibbosa. 6. B. angular, with an elevated belt. Brazil.

naucum. 7. B. rounded, pellucid, slightly striated transversely; perforated at each end; an inch long. African and Indian seas.

aperta. * 8. B. roundish, pellucid, transversely sub-striated; outside a little wrinkled; glossy; one inch long. Europe, Africa, Devonshire.

hydatis. * 9. B. rounded, pellucid, slightly striated longitudinally; crown umbilicated; size of a pea. Mediterranean, Devonshire.

* 10. B. rounded, obtuse at one end; crown umbilicated. Frequent on most shores; Britain. *ampulla.*

* 11. B. oblong, oval, transversely striated; crown narrow, and slightly umbilicated; 3 inches long. European shores, Britain. *lignaria.*

* 12. B. thick, white, opaque; aperture compressed in the middle; minute. Reculver, England.—*Bulla obtusa*, Montagu, Test. Brit. 223. *regulbie-sis.*

13. B. rounded, glabrous, pellucid, marked with transverse lines; spire retuse. India. *physis.*

14. B. roundish; spire elevated, obtuse, with flesh coloured bands; shell white. Asia. *amplustr.*

15. B. obovate, with a clavated crown, indistinct spire, and elongated beak; surface marked with reticulated striæ; 3 inches long. American and Indian oceans. *ficus.*

16. B. rounded, turbinated, slightly striated, with a curvated beak, and finely wrought spire; from 2 to 3 inches long. Indian ocean. *rapa.*

17. B. cylindrical; whirls of the spire grooved. *canaliculata.*

18. B. oblong, turbinated, smooth; base a little striated; sutures crenulated; size of an acorn. *conoidea.*

* 19. B. ovate, pellucid; spire obsolete; whirls contrary, or turning from right to left; aperture ovate, oblong; ½ inch long. Shores of the Danube; lakes and rivers of Europe; Britain. *fontinalis.*

* 20. B. ovate, pellucid; spire contrary, prominent; aperture ovate, lanceolate. Europe, Britain.—Linnæus supposes that this species may be a variety of the last; but, according to Mr Montagu, the form of the shell, the structure of the animal, and its *habitat*, are always distinct. Linnæus says, that this species is found among wet moss. Mr Montagu found it only in ditches, and in a place occasionally overflowed by the river Avon. *hypnorum.*

21. B. polished, with a pointed spire; aperture oblong. Northern Europe, in ditches and wet meadows. *turrita.*

22. B. brittle, with a depressed contrary spire; aperture ending in a beak; 2½ lines long. Rivers of Denmark. *gelatinosa.*

23. B. sides cylindrical, with a subulate spire, truncated at the base; 2 inches long. Indian ocean. *terebellum.*

24. B. ovate; spire indistinct, prominent at the top; aperture more dilated behind; pillar twisted; size of an acorn. Mediterranean. *cypræa.*

25. B. with party-coloured double bands, and purple truncated pillar: aperture semilunar. Rivers of Asia. *virginea.*

26. B. conic, pointed with transverse bands and undulated spots; aperture white. South America, India. *fasciata.*

27. B. conic, pointed, glabrous, with undulated fulvous streaks; 2 inches long; 8 whirls in the spire. *strigata.*

28. B. conic, white, striated; pillar straight and reflected. *striatula.*

29. B. oblong, pointed, white, grooved; spire with 6 or 7 whirls. *exarata.*

30. B. tapering, erect; white, with 2 broad, reddish bands at the aperture; a land species. *bifasciata.*

31. B.

(B) In some of the species belonging to this genus, it appears that the animal possesses different characters from those of the limax, and particularly that which inhabits the bulla lignaria, a British shell, which is furnished with a gizzard, of a testaceous nature. See Lin. Trans. vol. ii. p. 15.

ambigua. 31. B. a little tapering and compreffed; pale, flefh-coloured, with two remote bands; one broader and brown, the other blue.

zebra. 32. B. ovate, pointed, with longitudinal brown bands; pillar inflected, entire. Tranquebar. A land fpecies.

achatina. 33. B. ovate, pointed, with a wide crimfon mouth and lip; pillar truncated; 8 inches long. American ocean.

hyalina. 34. B. oblong, horn-coloured; fpire retufe; thin; ½ inch long.

ovata. 35. B. fubovate, flightly two-beaked; ftriated on the back, and gibbous in the middle; chefnut with white fpots and bands; within violet.

ferruginofa. 36. B. fub-ovate, equable, pale gray, undulated with brown, and marked with ferruginous fpots, and two white bands; 1½ inch long.

velum. 37. B. thin, umbilicated on each fide; white, with capillary brown lines, and a fnowy band, edged with brown on each fide; 1 inch long.

vefica. 38. B. ovate, oblong, within milk-white, folid, pellucid; aperture wide; two grooves on the back. Brazil.

cylindrica. * 39. B. cylindrical, fmooth, white, thin, flightly umbilicated; twice as large as a grain of wheat. Europe, Britain.

oliva. 40. B. cylindrical, aperture fub-orbicular, and dilated beneath.

voluta. 41. B. fmooth, cylindrical, olive; aperture effufe; pillar inflated, truncated; 7 whirls in the fpire.

dominichenfis. 42. B. fub-cylindrical, fpiral, reddifh, with longitudinal ftriæ, and fpotted; futures crenulated; pillars finuated and truncated. St Domingo.

purpurea. 43. B. ventricofe, rugged, and longitudinally ftreaked; aperture ovate, with a pointed lip, and deep black border within. Africa, in rice fields.

fpreta. 44. B. ovate, thin, brown, and rough.

folida. 45. B folid, red, varied with violet; margin red; fpire a little prominent.

ftercus-pulicum. 46. B. inflated, glabrous, horny; cinnamon colour; five rows of dots; pillar finuated, with an acute lip; extremity thin and ovate.

fcabra. 47. B. ovate, rough, flightly carinated on the back, and marked with decuffated ftriæ; white with rofy lines; pillar fcalloped, reflected. Java.

akera. * 48. B. ovate, pellucid, with a truncated channelled crown; 6 lines long. Norway feas, Banff in Scotland, and near Portfmouth.

foluta. 49. B. cylindrical, horny, tranfverfely ftriated, with a retufe top or crown; whirls margined, channelled.

carnea. 50. B. ovate, flefh-coloured, gibbous; lip arched, thickened and toothed within. Shores of Africa.

patula. * 51. B. fmooth, gloffy, white, pellucid, oblong, involuted; aperture large, terminating in a fhort canal, moft contracted at the top; length 1 inch. Weymouth.

haliotoidea. * 52. B. fub-oval, thin, pellucid, white, refembling a haliotis; a little wrinkled; aperture oval; length ¾ inch. Weymouth.

plumula. * 53. B. ovate, oblong, depreffed, pellucid, thin; ftrongly wrinkled concentrically; length ½ inch. Milton fands, Devonfhire. *Montagu, Teft. Brit.* p. 214.

catena. * 54. B. pellucid, white, finely ftriated tranfverfely; the ftriæ, magnified, have the appearance of the links of a chain; one-tenth inch diameter. Devonfhire.

umbilicata. * 55. B. oblong, oval, fmooth, white; apex rounded, umbilicated; aperture very narrow; ⅛ inch long. Falmouth.

truncata. * 56. B. fub-cylindrical, opaque, white; upper part longitudinally ftriated, lower plain; apex truncated, and largely umbilicated. Falmouth.

diaphana. * 57. B. fmooth, gloffy, pellucid, white, fuboval; body large, ventricofe; apex pointed; aperture fub-oval; ⅛ inch long. Salcomb bay. Rare.

Gen. 23. Voluta, *Volute*.

51 Voluta.

Gen. Char.—The animal a limax; the fhell is one-celled, fpiral; aperture without a beak, and fometimes effufe; pillar twifted or plaited, generally without lips or perforation.

Species.

A. *Aperture entire.*

auris-midæ. 1. V. contracted, oval, oblong, with a rugged fpire; pillar 2-toothed; 4 inches long. India. In marfhy woods and fwamps.

flammea. 2. V. oval, oblong, with a wide aperture; pillar one-toothed.

fulcata. 3. V. contracted, oblong, oval, grooved; white dotted with yellow; pillar with two plaits; ¼ inch long.

bifafciata. 4. V. thin, tranfverfely ftriated, flefh-colour, with two white bands; pillar one-toothed; not one inch long.

flava. 5. V. contracted on the upper part; yellow, with a crenulated lip; pillar with two plaits; 4½ lines long.

minuta. 6. V. oval, oblong, banded; pillar with three plaits.

pufilla. 7. V. thin, brown; whirls of the fpire cancellated; pillar three-toothed; very minute.

glabra. 8. V. oval, oblong, glabrous, with a reflected grooved lip; pillar one-toothed.

auris-fileni. 9. V. oval, gibbous, umbilicated; pillar with one thick, flexuous plait; two inches long.

auris-judæ. 10. V. contracted, oblong; fpires fmooth; pillar 3-toothed. Fens of India.

auris-malchi. 11. V. fufiform, granulate, with an ovate aperture; pillar cut, fpreading; three inches long. New Caledonia.

tornatilis. * 12. V. oval, pointed at each end, and fpirally ftriated; pillar with a fingle fold: ¾ inch long. Europe, Wales.

ionenfis. * 13. V. thin, brittle, with two fmall fpires; mouth rounded, wide. Ifland of Iona, Scotland.

alba. * 14. V. white, opaque, longitudinally ftriated. Sandwich. Very minute.

folidula. 15. V. contracted, oblong, ovate, opaque, ftriated; fpire elevated and a little pointed; pillar flightly plaited.

livida. 16. V. contracted, ovate, cylindrical; fpire a little elevated, obtufe; pillar with five plaits; one inch long. Africa.

coffæa. 17. V. contracted, fmooth, with an obtufe fpire; aperture toothed on each fide.

B. *Subcylindrical, emarginated.*

porphyria. 18. V. fmooth; fpire obliterated at the bafe; lip retufe

tufe in the middle ; pillar obliquely ftriated ; five inches long. Brazil.

oliva. 19. V. fmooth ; fpire reflected at the bafe ; pillar obliquely ftriated. Indian feas.

annulata. 20. V. fmooth, white, with a keel-fhaped ring on the back ; fometimes with reddifh waves.

utriculus. 21. V. elongated, fmooth, with a prominent fpire. Indian and Ethiopic feas.

hiatula. 22. V. thin, with a cinerous fpotted back, callous beneath ; aperture large ; pillar toothed at the bafe. Shores of Spain.

jafpidea. 23. V. white dotted with greenifh brown, or violet ; fpire prominent ; whirls with a band compofed of fpots at the bafe ; an inch long. Shores of Spain.

nivea. 24. V. fnowy, elongated, fmooth, banded. Spanifh feas.

ifpidula. 25. V. fmooth with a prominent fpire and fingle margin ; pillar obliquely ftriated ; from one to two inches long. India.

carniolus. 26. V. orange with blue bands ; fpire flattened ; aperture white.

C. *Oboval, effufe, emarginated.*

dactylus. 27. V. fmooth, with decuffated ftriæ, obtufe ; pillar with fix plaits : $\frac{1}{2}$ inch long. India.

miliaria. 28. V. flightly emarginated, white, with an obliterated pale yellow fpire ; pillar obliquely ftriated. Mediterranean.

monilis. 29. V. entire white with an obliterated white fpire ; pillar obliquely ftriated ; $1\frac{1}{2}$ inch long. China ; where it is employed for making beads and necklaces. A variety is found in Africa only $2\frac{1}{2}$ lines long, with 8 or 10 thin plaits in the pillar.

exilis. 30. V. obovate, entire, yellowifh, with two brown bands ; fpire prominent ; pillar obliquely ftriated.

perficula. 31. V. fmooth, with a retufe umbilicated fpire ; pillar with feven plaits ; lip with a crenated margin : one inch long. African fea.

pallida. * 32. V. fhell entire, oblong, ovate, with an elevated fpire ; pillar with four plaits. African and European fhores, Britain.

faba. 33. V. flightly emarginated, fmooth, a little plaited ; fpire prominent ; pillar with four plaits ; lip with a crenulated margin ; one inch long. African ocean.

glabella. 34. V. very entire, fmooth, with a levigated fpire ; pillar with four plaits ; lip gibbous ; margin toothed : from one to two inches long. African and American feas.

prunum. 35. V. very entire, fmooth, with a levigated fpire ; pillar with four plaits ; lip without tooth, or margin ; $1\frac{1}{2}$ inch long. Ifland of Goree.

reticulata. 36. V. with flight decuffated grooves ; lip internally ftriated ; pillars flightly perforated ; two inches long. American ocean and Guinea.

mercatoria 37. V. ftriated, with an obtufe fpire ; pillar retufe, toothed ; lip gibbous, denticulated ; $\frac{3}{4}$ inch long. Mediterranean, American, and Indian feas.

ruftica. 38. V. fmooth with a prominent fpire ; pillar retufe, toothed ; lip gibbous, denticulated. Mediterranean and American feas.

paupercula 39. V. entire, fmooth, with a ftriated bafe ; fpire a little prominent ; pillar with four plaits ; lip obtufe. Mediterranean and Indian feas.

mendicaria 40. V. flightly ftriated, with a flightly granulated fpire ; pillar fmooth ; lip gibbous and denticulated ; fize of a kidney bean. Mediterranean and Indian feas.

cancellata 41. V. entire, plaited, and crofswife reticulated ; pillar with three plaits, flightly umbilicated, and a little produced. African ocean.

elegans. 42. V. fmooth, white, with blue bands and yellow mouth ; fpire nearly obliterated ; pillar fix-toothed ; fcarcely one inch long.

ovum. 43. V. fmooth, greenifh white, with numerous bands ; lip inflected ; pillar with four plaits ; $2\frac{1}{4}$ inches long.

marginata 44. V. fpire obfolete ; fides with thickened margins ; four plaits in the pillar.

nucea. 45. V. fubftriated, glabrous ; fpire obtufe, fmooth, prominent ; five plaits in the pillar. Indian ocean.

conus. 46. V. conic, white, with hollow punctured grooves at the bafe ; whirls crenated ; fix plaits in the pillar.

D. *Fufiform.*

tringa. 47. V. nearly entire, oblong, fmooth, with a prominent excoriated fpire ; three plaits in the pillar ; lip flightly toothed inwardly. Mediterranean.

cornicula. 48. V. flightly emarginated, oblong, fmooth ; fpire longifh ; four plaits in the pillar ; lip equal and unarmed. Mediterranean.

virgo. 49. V. entire, tapering, plaited and tranfverfely ftriated ; three plaits in the pillar, which is perforated. About a finger's length, and marked with about twelve grooves.

fcabriufcula. 50. V. emarginated, ftriated, and tranfverfely wrinkled ; four plaits in the pillar, which is perforated ; lip notched ; two inches long. India.

ruffina. 51. V. nearly entire, tranfverfely wrinkled ; four plaits in the pillar ; lip crenulated. India.

nubila. 52. V. nearly entire, fmooth, yellowifh with red clouds tranfverfely ftriated ; lip crenulated ; four plaits in the pillar. Friendly iflands.

fanguifuga 53. V. emarginated, longitudinally grooved and tranfverfely ftriated ; lips fmooth ; four plaits in the pillar ; $1\frac{1}{2}$ inch long. Mediterranean and Indian feas.

caffra. 54. V. emarginated, round, fmooth ; whirls of the fpire with plaited ftriæ ; four plaits in the pillar ; $2\frac{1}{2}$ inches long. Afiatic fea.

morio. 55. V. flightly emarginated, round, fmooth ; about three plaits in the pillar.

acus. 56. V. tapering, marked with tranfverfe rays of red dots ; fpire pointed, fmooth : fcarcely an inch long.

vulpecula. 57. V. emarginated, fubangular, unarmed, and tranfverfely ftriated ; four plaits in the pillar ; throat ftriated ; two inches long. India.

plicaria. 58. V. emarginated, angular, anterior angles a little fpinous ; four plaits in the pillar ; lip fmooth ; two inches long. Indian ocean.

bullata. 59. V. cylindrical, glabrous, reddifh, with fublivid belts ; four plaits in the pillar within ; aperture effufe. Indian ocean.

crenula. 60. V. cylindrical with decuffated ftriæ, and impreffed dots ; white with yellowifh clouds ; lip and whirls nodulous ; margin of the whirls crenulated ; eight plaits in the pillar. Indian ocean.

fcutulata. 61. V. tapering, black with white fpots, tranfverfely ftriated, firft whirl a little ventricofe ; four plaits in the pillar. Indian ocean.

62. V.

nigra. 62. V. tapering, emarginated, blackiſh; whirls flattiſh; four plaits in the pillar. Guinea, Greenland.

ſubdiviſa. 63. V. tapering, emarginated, longitudinally ribbed, plaited, and tranſverſely ſtriated; three plaits in the pillar. Indian ocean.

cruentata. 64. V. tapering, emarginated, barred and tranſverſely ſtriated with longitudinal knotty ribs, ſpotted with red; pillar with three plaits. Indian ocean.

exaſperata. 65. V. tapering, emarginated, granulous, with decuſſated ſtriæ and longitudinal ribs barred with brown; five plaits in the pillar. Indian ocean.

granoſa. 66. V. tapering, emarginated, tranſverſely ſtriated and longitudinally grooved, with elevated dots and reddiſh lines; three plaits in the pillar. Indian ocean.

caſta. 67. V. tapering, ſmooth, brown with white bands; ſix plaits in the pillar, which is emarginated at the baſe. Shores of Amboyna.

leucogonias. 68. V. tapering, cheſnut, with flexuous white bands; pillar obſoletely plaited: two inches long.

maculoſa. 69. V. tapering, white with reticulated and ſpotted brown bands: one inch long.

noduloſa. 70. V. tapering, brown, cancellated; angles of the ſection nodulous, and whitiſh: four plaits in the pillar.

ſpadicea. 71. V. tapering, cheſnut with yellow clouds and ſpots; eight whirls in the ſpire, which are longitudinally plaited and tranſverſely ſtriated; five plaits in the pillar.

aurantia. 72. V. tapering, orange; a white band in the four firſt whirls of the ſpire; lip denticulated; four plaits in the pillar.

decuſſata. 73. V. tapering, with decuſſated ſtriæ; the longitunal one undulated; about four plaits in the pillar.

polygona. 74. V. tapering, punctured, whirls longitudinally ribbed, and finely ſtriated tranſverſely; three firſt angular; about five plaits in a ſlightly umbilicated pillar.

acuminata. 75. V. tapering, cancellated; beak ſhort and cancellated; four plaits in the pillar. Tranquebar.

biplicata. 76. V. tapering, ſmooth, white with yellow ſpots and black dots; pillar doubly plaited.

turricula. 77. V. tapering, two plaits in the pillar: whirls turgid, with a band of black dots; firſt whirl double.

lineata. 78. V. tapering, with perpendicular black lines croſſing a white band; 3 plaits in the pillar.

diſcors. 79. V. tapering; beneath brown dotted with white; above white, with perpendicular waved yellow ſtripes; a minute ſhell.

ſtriata. 80. V. tapering, finely ſtriated tranſverſely; duſky, with red dots, and two paler bands; minute.

ſulcata. 81. V. tapering and grooved longitudinally; brown, with a tranſverſe white nodulous band; pillar five-toothed.

lævigata. 82. V. tapering, ſmooth, brown; ſpire with a paler band; narrow, ſmall.

ocellata. 83. V. tapering, cheſnut, with white eyes; minute.

naſuta. 84. V. tapering, red, with rows of black dots; lip prominent; beak reflected.

marmorea. 85. V. tapering, varied with white and brown; lip inflected.

barbadenſis. 86. V. tapering, reddiſh, finely ſtriated tranſverſely; aperture oblong, oval; ſpire obtuſe; $1\frac{1}{2}$ inch long. American ſeas.

87. V. tapering, cancellated, with an obtuſe ſpire: lip margined; beak reflected. American ocean. *clathrata.*

88. V. tapering, gibbous, yellow; each whirl with a white band, teſſelated with black; 3 plaits in the pillar. *tricolor.*

89. V. tapering, cheſnut brown, with undulated brown lines; aperture ſtriated; 3 plaits in the pillar. *turrita.*

90. V. tapering, ſmooth, white, with perpendicular, waved, blackiſh yellow ſtripes. Syracuſe. *ſyracuſana*

91. V. tapering, poliſhed, cheſnut; within white; pillar with 4 plaits. *nitens.*

92. V. tapering, citron, with rufous bands; $2\frac{1}{2}$ inches long. *citrina.*

93. V. tapering pale brown, and longitudinally ſtriated; ſpire perforated; pillar perforated, and 4-plaited. *mucronata.*

94. V. tapering, a little ventricoſe; longitudinally wrinkled, and tranſverſely ſtriated; whitiſh with piceous lines. *rugoſa.*

95. V. tapering, cinereous, ſtriated with red; ſpire glabrous; whirls rather tumid. *ſtrigoſa.*

96. V. tapering, glabrous; 5 plaits in the pillar; has been only found in a foſſil ſtate. *foſſilis.*

97. V. tapering, thin, glabrous; brown ſurrounded with lines of white dots. Friendly iſlands. *leucoflecta.*

98. V. tapering, whitiſh, cancellated; whirls with a band of yellow ſpots. *clathrus.*

99. V. tapering, tranſverſely ribbed, with a tranſverſe brown band, and longitudinal waved ſpots; two inches long. *virgata.*

100. V. tapering, cancellated; varied with tawney and white, with waved brown ſpots; mouth ochraceous. *leucoſtoma.*

101. V. tapering, tranſverſely ſtriated; yellow with a brown band and ſpots. *variegata.*

102. V. emarginated, tapering, marked with decuſſated ſtriæ, and red threads; pillar 3-plaited. *filaris.*

103. V. cylindrical, whitiſh, glabrous; ſpire projecting, obtuſe, emarginated at the baſe; pillar 4-plaited; 2 inches long. Shores of Guinea. *volva.*

104. V. ovate, bay, longitudinally wrinkled; beneath tranſverſely grooved; ſpire obtuſe, and crenated at the ſuture; 4 plaits in the pillar; lip denticulated. *ziervoyelii.*

105. V. ovate, triangular, rugged, knotty, tranſverſely grooved and umbilicated; pillar 3-plaited; lip toothed; throat ſtriated; whirls muricated with knobs. Shores of New Guinea. *rhinoceros.*

106. V. tapering, white; ſpire with fine tranſverſe ſtriæ, and rounded ribs; firſt whirl with 3 brown bands; 4 plaits in the pillar. *coſtata.*

107. V. ovate, white; ſpire ſpotted with brown; 6 brown bands in the firſt whirl; tail emarginated; lip impreſſed; pillar 6-plaited. *ſpuria.*

108. V. emarginated, ſtriated, and marked with hollow punctures; lip denticulated; 5 plaits in the pillar; 3 inches long. India. *pertuſa.*

109. V. emarginated, tranſverſely ſtriated; white with rows of teſſelated cheſnut ſpots; pillars 5-plaited Indian ocean. *cardinalis.*

110. V. emarginated, ſmooth; margin of the whirls entire; lip denticulated; 4 plaits in the pillar; 5 inches long. India.—The animal of this ſhell is ſaid to be poiſonous when it is eaten, and has the power of inflicting a wound on thoſe who touch it, with a kind of pointed trunk. The natives of the iſland Tanna employ the ſhell as a hatchet, fixing it in a handle. *epiſcopalis.*

111. V.

papalis. 111. V. emarginated, tranſverſely ſtriated; margins of the whirls and lip denticulated; pillar 4-plaited. Indian ocean,

patriarchalis. 112. V. obovate, ſolid, tranſverſely ſtriated, marked with nodulous plaits; whirls crowned with tubercles. India.

muſica. 113. V. margined, with obtuſe ſpines in the whirls; lip ſmooth and very thick; pillar 8-plaited. American ocean. The plaits in the pillar are from 9 to 12 in ſome varieties.

veſpertilio. 114. V. emarginated, with acute ſpines on the whirls; lip ſmooth; pillar 4-plaited; from 3 to 6 inches long. Indian ſeas.

arabica. 115. V. emarginated; whirls tuberculated, and marked with black characters; 5 plaits in the pillar.

hebræa. 116. V. emarginated; whirls with ſubacute ſpines; 5 ſtronger and 3 obſolete plaits in the pillar; 6 inches long. India, Jamaica. Very rare.

turbinellus 117. V. nearly entire, turbinated, with conic ſomewhat erect ſpines; upper ones larger; pillar 4-plaited; 3 inches long. Indian ocean.

capitellum. 118. V. ovate, rugged, knotty; 3 plaits in the pillar; $2\frac{3}{4}$ inches long. Indian and American ſeas.

ceramica. 119. V. ovate, acute, with divergent ſpires; about 5 plaits in the pillar; ſpines on the outer whirls gradually leſſening into tubercles. Coromandel and Ceram.

pyrum. 120. V. obovate, ſlightly tailed, with ſtriated whirls on the ſpire; tip produced and quite glabrous; pillar 3-plaited; 7 inches long. Tranquebar and Ceylon.

laponica. 121. V. obovate, ſmooth, with a pointed ſpire, and ventricoſe; pillar 5-plaited. Indian and American ſeas.

vexillum. 122. V. ventricoſe, yellowiſh-white, with orange bands; firſt whirl tuberculated and larger than the reſt; pillar 6-plaited. Indian ocean. Very rare.

flaveſcens. 123. V. pyriform, ſmooth, with yellowiſh clouds; ſpire varied with cheſnut ſpots; 4 plaits in the pillar.

rupeſtris. 124. V. elongated, ribbed; ribs croſſed with fine tranſverſe lines; lip margined; ſpire papillary at the tip; many plaits in the pillar; 4 inches long.

naſſa. 125. V. ventricoſe; ſpire ribbed with fine tranſverſe ſtriæ croſſing the ribs; lip margined, umbilicated; 3 plaits in the pillar; 1 inch long. Mauritius and Guinea.

craticulata 126. V. tapering and tranſverſely ſtriated; white with longitudinal cheſnut ribs; lip denticulated, ſtriated; 3 plaits in the pillar; 3 inches long.

ſpiralis. 127. V. longitudinally ribbed, and finely ſtriated tranſverſely; a row of acute tubercles on the two firſt whirls; 3 plaits on the pillar. Indian ſeas.

magellanica. 128. V. ventricoſe, ochraceous, with white and brown lines; lip ſubulate; whirls of the ſpire convex; firſt largeſt; 2 inches long.

filoſa. 129. V. finely reticulated and ſtriated, with elevated tranſverſe belts; lip crenated; 4 plaits in the pillar, which is a little umbilicated.

fuſcata. 130. V. coarſe, brown, ſmooth; baſe tranſverſely ſtriated; ſpire obtuſe; firſt whirl ventricoſe, with 4 narrow bands; the reſt with a broad white band; pillar with 3 plaits and umbilicated.

E. *Ventricoſe; the ſpire papillary at the tip.*

æthiopica. 131. V. emarginated; ſpire crowned with vaulted ſpines; 4 plaits in the pillar; 7 or 8 inches long. Perſia, Aſia, and the Cape of Good Hope.

cymbi[um] 132. V. emarginated; whirls of the ſpire with grooved margins; 4 plaits in the pillar; lip callous. Spain, Africa, and America.

olla. 133. V. emarginated; ſpire ſmooth; pillar 3-plaited; 4 inches long. Spain, America, Philippine iſles.

ampla. 134. V. elongated, with a broad aperture; lip acute; whirls of the ſpire ſcarcely viſible; 1 inch long.

neptun[i]. 135. V. emarginated; covered with a brown cuticle, under which it is reddiſh; lip a little prominent; 4 plaits in the pillar; 4 whirls in the ſpire; 8 inches long; nearly as broad. Perſian gulf.

navicu[la] 136. V. emarginated; lip a little prominent; pillar 4 plaited; 2 inches long.

papilla 137. V. elongated, yellow, with a long tubercle at the tip, which is ſometimes oblique.

indica. 138. V. elongated, yellow, with 3 bands of brown dots; 4 plaits in the pillar. India.

ſcapha. 139. V. coarſe, clouded, with zig-zag brown lines; lip ſubulate, pillar bluiſh with 4 plaits. Cape of Good Hope. Very rare.

cymbio[la] 140. V. ovate, glabrous; whitiſh with longitudinal red lines; whirls knotty; 3 plaits in the pillar; 2 inches long. Indian ocean.

præpu[sta] 141. V. ſubovate, teſtaceous, with reddiſh bay ſpots, emarginated at the baſe; 4 plaits in the pillar. Coromandel coaſt.

glans. 142. V. cylindrical, yellowiſh, emarginated; aperture effuſe, ſpreading; 3 plaits in the pillar. Eaſtern ſhores of Africa.

reticul[ata] 143. V. white, ſmooth, reticulated with gold, emarginated; 4 plaits in the pillar; ſpire conic; firſt whirl cylindrical and ventricoſe; 2 inches long. Java.

ſpectab[ilis] 144. V. browniſh yellow, ſtriated with brown; 3 plaits in the pillar; $5\frac{1}{2}$ inches long. Straits of Magellan.

Gen. 24. Buccinum, *Whelk.* 52 Buccin[um]

Gen. Char.—The animal is a limax; the ſhell univalve, ſpiral, gibbous; aperture ovate, terminating in a ſhort canal, leaning to the right, with a retuſe beak or projection; pillar lip expanded.

Species.

A. *Inflated, rounded, thin, ſubdiaphanous, and brittle.*

olearium 1. B. roundiſh, ſurrounded with obtuſe grooves, between which is an elevated line; aperture without teeth; 4 inches long. Indian ſea.

galea. 2. B. obovate, ſurrounded by grooves which are double on the fore-part; aperture without teeth; pillar umbilicated. Mediterranean and Adriatic ſeas.—This ſhell is nearly as large as a man's head.

perdix. * 3. B. ovate, inflated, ſlightly grooved, and undulated with white; aperture without teeth; 6 inches long. India, America, Weymouth.

pomum 4. B. ovate, ſurrounded with obtuſe grooves; aperture toothed: $2\frac{1}{2}$ inches long. Java, Amboyna, Mexico.

dolium 5. B. ovate, ſurrounded with remote obtuſe grooves; beak a little prominent. Sicily, Africa, India.

caudal[e] 6. B. ovate, ſurrounded with rounded ribs; beak a little prominent; $\frac{3}{4}$ inch long.

7. B.

niveum. 7. B. Snowy, ribbed; outer whirls of the ſpire ſcarcely prominent.

clathratum. 8. B. ovate, longitudinally wrinkled and tranſverſely plaited; with a ſhort recurved beak; pillar lip erenated and grooved within.

lineatum. * 9. B. pyramidal or ſharp-pointed at bottom; white, with dark brown ſpiral lines; very ſmall. Cornwall.

breve. * 10. B. white, with 5 whirls, which are longitudinally ribbed, and tranſverſely ſtriated. Pembrokeſhire coaſt.

minimum. * 11. B. with 5 ſpines, ſpirally ſtriated, and tranſverſely ribbed; leſs than a pea. Norway, England.

obtuſulum. * 12. white, opaque, with 3 ſpires; aperture oval. Feverſham ereek, England. Minute and rare.

B. *With a ſhort exſerted, reflected beak; lip outwardly unarmed.*

minutum. * 13. B. white, opaque, with three whirls, whieh are longitudinally ribbed; very minute. Pembrokeſhire coaſt.

læve. * 14. B. ſmooth, with 3 whirls and a long beak; very ſmall. Pembrokeſhire coaſt.

obtuſiſſimum. * 15. B. ſmooth, with 3 whirls, and a long beak; aperture contracted; very minute. Pembrokeſhire coaſt.

echinophorum. 16. B. with 4 tuberculated belts and prominent beak. Adriatie and Mediterranean ſeas.

plicatum. 17. B. a little plaited forwards, marked with decuſſated ſtriæ; aperture toothed; beak reeurved. Jamaiea.

cornutum. 18. B. *Great ſpiked caſket.* Turbinated, or erowned with ſpines; aperture toothed, beak recurved; from 9 to 12 inches long. India.

rufum. 19. B. *Red helmet.* With deeuſſated ſtriæ, and knotty belts, between which is a double line; aperture toothed; beak reeurved. America and India.

tuberoſum. 20. B. *Perſian whelk.* With two tubereulated belts, and reeurved beak; 10 inehes long. American oeean.

flammeum. 21. B. ſlightly plaited and crowned; aperture toothed; beak reeurved; 5 inches long. Ameriean ocean.

teſticulus. 22. B. obovate, with decuſſated ſtriæ, and elevated longitudinal ones; aperture toothed; beak reeurved; 4 inches long. America and India.

decuſſatum 23. B. with decuſſated ſtriæ, and eovered with ſmall ſquare ſeales; aperture toothed; beak reeurved. Africa, Mediterranean.

areola. 24. B. *Small diced caſket.* Subſtriated and ſurrounded with four rows of ſquare ſpots; aperture toothed; beak reeurved; 3 inches long; outer pillar lip with a toothed inner margin. India, Mediterranean.

tigrinum. 25. B. ovate, ſmooth, bluiſh, with tranſverſe yellow bands; ſpotted with brown, and intermediate brown characters. New Zealand.

undulatum 26. B. with ſometimes tranſverſe, ſtriated and waved ſpots; ſpire obtuſe; inner lip glabrous.

cicatricoſum. 27. B. ovate, ſmooth, and eovered with hollow punctures; ſpire elongated; lips toothed; beaks reeurved. India.

teſſelatum. 28. B. thin, cinereous, with white bands teſſelated with brown; whirls with 5 rows of tubercles; 6 inehes long. South ſeas. Very rare.

pennatum. 29. B. white, with variegated yellowiſh, eheſnut, and white bands; beaks recurved. India.

maculoſum 30. B. with four ſpotted bands; whirls a little prominent, and longitudinally ribbed; the firſt crowned with tubereles; $3\frac{1}{2}$ inehes long.

bilineatum * 31. B. tranſverſely ſtriated; ſpire obtuſe; whirls with a ſpotted band and 2 lines. Weymouth.

gibbum. 32. B. coarſe, tranſverſely ſtriated and wave ſpotted; ſpire aeute, pyramidal; 2 inches long.

ventricoſum. 33. B. ventrieoſe, ſtriated, pillar lip thin; beak ſhort.

ſtrigoſum. 34. B. tranſverſely ſtriated; ſpire acute; the 2 firſt whirls erowned with ſpines; outer pillar lip ſpotted within, and emarginated without.

rugoſum. 35. B. ſmooth, with undulated ſpots; ſpire rugged and ſtriated; beak with 5 plaits; outer pillar lip ſtrong and ſtraight.

ponderoſum. 36. B. eoarſe, and with a ſlightly prominent, aeute ſpire; firſt whirl crowned with tubercles; outer pillar ribbed within.

recurviroſtrum. 37. B. ſmooth, and marked with a band of rufous ſpots; ſpire a little prominent; firſt whirl inflected; $2\frac{1}{2}$ inches long. Barbadoes.

trifaſciatum. 38. B. tranſverſely ſtriated, and ſpotted here and there, with three equal bands; aperture bluiſh within; outer pillar lip toothed; inner with rows of tubercles; 3 inehes long.

ſenegalicum. 39. B. finely ſtriated tranſverſely, and with three ſpotted bands; ſecond whirl of the ſpire ſurrounded with a turgid ring; outer pillar lip crenated. Senegal.

ochroleucum. 40. B. ochraceous, tranſverſely ſtriated; firſt whirl crowned with ſpines; outer pillar lip toothed; inner repand; $2\frac{1}{2}$ inches long.

ſtriatum. 41. B. tranſverſely ſtriated; ſpire depreſſed; outer whirl knotted at the margin; aperture toothed; beak reeurved. Ameriea.

caſſis. 42. B. obovate, umbilicated, fulvous, with numerous tranſverſe ſtriæ; pillar lip membranaeeous; united lip of the aperture acute. Mediterranean.

ſtrigatum. 43. B. ovate, tranſverſely grooved, whitiſh with reddiſh bands, varicoſe; ſpire conic, with deeuſſated ſtriæ; aperture oblong, toothed; inner pillar lip plaited, granulated; lip of the aperture fringed, ſpotted. India.

tyrrhenum 44. B. globular, yellowiſh, grooved and ſtriated; ſpire eonic; aperture white; lip margined, and ſlightly toothed within. Seas round Tuſcany.

abbreviatum. 45. B. ovate, white, tranſverſely ſtriated, and grooved; ſpire conie; lip of the aperture doubled, and toothed within; pillar lip reflected and wrinkled; beak very ſhort. India and Ameriea.

C. *Lip prickly outwardly behind.*

erinaceus. 46. B. *Small curled caſket.* A little plaited, and crowned with papillæ. Ameriea, India.

glaucum. 47. B. *Smooth gray caſket.* Smooth, crowned with papillæ; 5 inehes long. Indian ſea.

vibex. 48. *Smooth ſpotted-lipped caſket.* Entirely ſmooth, with yellowiſh, waved, brown ſpots. America, India.

teſſelatum. 49. B. ventricoſe; whirls of the ſpire with a band at the baſe, teſſelated with black.

noduloſum. 50. B. ſlightly plaited and crowned with papillæ; lip ſmooth, with two rows of ſharp ſpines behind; 1 inch long.

fimbria. 51. B. grooved, with an acute ſpire; whirls with rows of tubercles.

papillosum. 52. B. *Small bugle netted whelk.* Covered with tubercles, in rows; 2¾ inches long. Indian sea. Rare.

glans. 53. B. smooth, inner pillar lip with two teeth; 2 inches long. Indian ocean. Very rare.

D. *Pillar lip dilated and thickened.*

arcularia. 54. B. plaited and crowned with papillæ. Indian ocean.

pullus. 55. B. *Small coffer shell.* Gibbous, obliquely striated and tuberculated; aperture wrinkled; not an inch long. Mediterranean and European coasts, Britain.

gibbosulum 56. B. gibbous, smooth, snowy, tinged or spotted; small. Mediterranean and Indian seas.

mutabile. 57. B. smooth, rugged; spire exserted; inner lip extended forward, and thickish. Mediterranean.

neriteum. 58. B. convex, obtuse, smooth; inner pillar lip obsolete; size of a pea. Mediterranean.

E. *Pillar lip appearing as if worn flat.*

harpa. 59. B. *Musical-harp shell.* With equal, longitudinal, distinct mucronate veins; pillar lip smooth; from 3 to 5 inches long. Indian sea.

costatum. 60. B. with equal, longitudinal, crowned mucronate veins; pillar lip smooth. Falkland islands. Very rare.

persicum. 61. B. flat, with the lip crenulated, and the pillar flat; 4 inches long. India, and Persian gulf.

monodon. 62. B. rough with a crenulated lip; pillar flat, protruding obliquely a subulate spine; gray, white within. America.

patulum. 63. B. muricated; the lip crenated without; the pillar falcated; 4 inches long. America and Ethiopia.

hæmastoma. 64. B. slightly muricated; lip striated within; the pillar rather flat; throat fulvous; 2 inches long. Mediterranean and Ethiopic seas.

lapillus. * 65. B. *Purple whelk.* Ovate, acute, spirally striated, without protuberances; pillar flattish; 1¼ inch long. The colour is white, cinereous, or yellowish; the shell is often transversely bored or grooved; it is sometimes thin and without teeth in the aperture, and sometimes more solid, and the aperture toothed. Shores of Europe, Britain.—This is one of the species which yields a fine purple dye.

smaragdulus. 66. B. ovate, acute and glabrous; pillar flattish and slightly plaited; grooved; shines with a green gloss, and like mother-of-pearl.

tuba. 67. B. fusiform, yellowish brown; the spire cancellated; first whirl smooth, and three times longer than the rest; ventricose above. India.

pyrum. 68. B. turbinated; aperture red; pillar smooth; the spire short; first whirl ventricose. India, Red sea. Very rare.

spadiceum. 69. B. oblong, turbinated; chesnut, with transverse undulated white lines.

fossile. 70. B. convex, transversely plaited; spire short; pillar callous. Found fossil in Germany.

umbilicatum. 71. B. oblong, turbinated and plaited; spire knotty; aperture grooved within; pillar slightly umbilicated.

candidum. 72. B. oblong, turbinated; solid, smooth and white.

scala. 73. B. oblong; aperture oval, emarginated, four-toothed; base white; spire acute; the whirls distant; the first with four glabrous ribs.

crassum 74. B. ventricose, coarse, gray, glabrous; aperture oval; pillar callous; base with two callosities; spire scarcely prominent; has 5 whirls.

margin tum. 75. B. subglobular, glabrous; aperture oval, margined on each side; lip toothed; pillar a little striated; spire scarcely prominent. Found in a fossil state.

labyrinthus. 76. B. ponderous, convex, glabrous; whirls distant and margined; aperture oval, ample; pillar obliquely plaited. Holland.

rusticu 77. B. coarse, ovate, oblong, white with transverse brown striæ; aperture oval; beak prominent; first whirl ventricose. India, Africa.

varium 78. B. ovate, coarse, yellow, with elevated knotty, transverse darker ribs; aperture oval, without teeth.

filosum. 79. B. ovate, whitish, surrounded with red threads; spire a little prominent; aperture oval; lip striated with red; pillar slightly umbilicated.

coronat 80. B. ovate, striated, whitish with chesnut shades; a white band in the middle, edged with brown spots on each side; gibbous in the middle.

squalid 81. B. subglobular; whitish with leek-green and lurid tessellated spots in rows; 4 whirls in the spire.

crassum 82. B. subcylindrical, transversely striated, reddish with chesnut bands; lip denticulated. Ceylon.

fornicatum. 83. B. striated; brown, spotted and barred with white; whirls channelled with 4 rows of knots; 1½ inch long.

F. *Smooth, and not included in the former divisions.*

spiratum 84. B. *Diced whelk.* Smooth; whirls 6 or 7 in the spire, separated by a canal; pillar abrupt and perforated; 2 inches long. India and China.

pyrozon 85. B. with transverse plaits and undulated striæ; the base and spine a little prominent; each of the whirls with a fulvous band; the first double.

læviusculum. 86. B. oblong, finely striated, pale brown with darker bands; aperture oval, terminating in a canal; first whirl gibbous and large; whirls 5 or 6. India.

ocellatu 87. B. smooth, black, with rows of white spots and dots; spire prominent; first whirl ventricose.

pyramidale. 88. B. obtusely pyramidal and transversely striated; white, with blackish and brown clouds and stripes. Tranquebar,

glaberrimum. 89. B. quite glabrous and minute; sometimes with a tessellated band on the two first whirls.

strigosu 90. B. minute, transversely striated; toothed or spotted in the aperture.

trifasciatum. 91. B. glabrous with 3 broad red bands within; first whirl of the spire ventricose; 1 inch long.

leucozonias. 92. B. glabrous, and marked with a white band and chesnut lines. Minute.

cancella 93. B. glabrous, with decussating bands and lines.

obtusum 94. B. glabrous, ochraceous; spire with an obtuse blue tip; first whirl ventricose; two inches long.

glabratu 95. B. glabrous, with obtuse whirls; the lowest slightly channelled and produced at the base; 4 inches long. America, Africa.

stromboides. 96. B. glabrous; 5 or 6 whirls distinct; lip prominent; base obliquely striated.

prærosu 97. B. ovate, smooth, black with a carious spire; pillar glabrous; size of a bean; crowned jagged, abrupt. Southern Europe.

australe 98. B. oblong, smooth, thin, banded; aperture oval, entire; 3 inches long. Rivers of New Zealand.

99. B.

orbita. 99. B. ovate, thick, whitifh, tranfverfely ribbed and grooved; aperture oval; lip plaited within; pillar lip flat. Shores of New Zealand.

turgidum. 100. B. obovate, flightly umbilicated; yellowifh, with rows of red fpots; lips finuated. New Zealand.

G. *Angular, and not enumerated in the former divifions.*

undofum. 101. B. ovate, with tranfverfe, elevated, glabrous ftriæ; belly obtufely 5-angular; lip ftriated within; 2 inches long. Malacca.

affine. 102. B. ovate, with tranfverfe, elevated, glabrous ftriæ; belly cylindrical; lip ftriated within.

tranquebaricum. 103. B. ovate; fpire with 12 angles and tranfverfely ftriated; aperture toothed; lip orange; pillar perforated. Coromandel coaft.

verficolor. 104. B. coarfe, dirty brown, tranfverfely ftriated; 2 rows of black dots in the interftices of the ftriæ; 4 channelled whirls in the fpire. India.

cruentatum. 105. B. tranfverfely ftriated with red parallelogram fpots.

fulcatum. 106. B. ovate; brown with fnowy fpots; whirls of the fpire grooved; lip crenulated; throat ftriated.

rumpfii. 107. B. thin, narrow, ventricofe; fpire conic, depreffed; firft and fecond whirls crowned with fpines.

bezoar. 108. B. roundifh, wrinkled; whirls lamellated on the fore-part; pillar perforated. China.

glaciale. 109. B. ovate-oblong fmooth, a little ftriated; lower whirl flightly keeled; 2 inches long. Northern feas.

undatum. * 110. B. *Waved whelk.* Oblong, coarfe, with deep, tranfverfe, undulated ftriæ; whirls 7, with many curved angles; 3 to 4 inches long. India, Europe; very common on the fhores of Britain.—The fifhermen, from fuppofing that it is deftructive to the large fcallop) *oftrea maxima*), by infinuating its tail, as they term it, into the fhell, either ufe it for bait, or deftroy it, when they take it in dredging. The fpawn of this fpecies is often found in clufters in many parts of the coaft.

ftriatum. * 111. B. ovate-oblong, with tranfverfe elevated ftriæ, which are undulated near the tip; 4 inches long. Coafts of Britain.

ciliatum. 112. B. elongated, flightly tailed; angular; longitudinally ciliated; pillar flightly plaited; whirls 5; 6 inches long. Greenland feas.

viridulum. 113. B. oblong, pointed, glabrous; minutely ftriated tranfverfely, and longitudinally ribbed; 4 lines long. Greenland feas.

carinatum. 114. B. oblong, conic, and tranfverfely ftriated; upper whirls with many oblique and obtufe angles, lower ones with a fingle ridge. South fea.

folutum. 115. B. ovate with unequally diftant longitudinal tubercles on the belly; lip channelled and a little diftinct; ribs 6; firft and fecond whirls broadeft; fpire obtufe. Shell whitifh mixed with yellow.

tænia. 116. B. oblong, glabrous, brown, with a yellowifh band in the middle of the firft whirl.

lineatum. 117. B. cinereous, with longitudinal, undulated, and interrupted tranfverfe brown ftriæ; margin white, fpotted with brown; aperture white.

maclovienfe. 118. B. oblong, with waved fpots and clouds; fpire fhort; firft whirl gibbous; tail narrow, prominent.

foliorum. 119. B. thin, with a fhort, acute, flightly ribbed fpire; the firft whirl a little globular; 1 inch long. India, among the leaves and branches of maritime fhrubs.

textum. 120. B. ventricofe, cancellated; whirls diftant; 1 inch long.

ftrigofum. 121. B. oblong; longitudinally plaited, and tranfverfely ftriated; the ftriæ brown and black, and ftriated with white; ventricofe; aperture ribbed; pillar flightly plaited; 2 inches long.

anglicum. * 122. B. oblong, with tranfverfe elevated ftriæ; 6 brown whirls in the fpire; a little ventricofe. Britain.

porcatum. * 123. B. ventricofe, ribbed, brown; the firft whirl covering the next. Britain.

læviffimum. 124. B. glabrous, white; fpire bluifh at the tip, obtufe; firft whirl largeft, ventricofe.

igneum. 125. B. oblong, narrow, glabrous; yellowifh, with red waved fpots and clouds; outer whirls perpendicularly ftriated.

plumatum. 126. B. oblong, narrow, chefnut with darker belts; throat narrow, black or blue, with ftriated teeth; lip ftriated within; fpire acute. South American iflands.

lyratum. 127. B. oblong, narrow, horizontally ribbed; ribs tranfverfely ftriated; pillar fmooth.

clathratum. 128. B. ovate, ventricofe, hoary; longitudinally ribbed, and tranfverfely plaited; lip grooved within; fpire acute; beak fhort, recurved.

reticulatum. * 129. B. *Reticulated whelk.* Oblong, ovate, tranfverfely ftriated, and longitudinally wrinkled; aperture toothed, gloffy; fize of a nut. European and Ethiopic feas, Britain.

minutum. * 130. B. with 5 whirls, fpirally ftriated and tranfverfely ribbed; lefs than a pea. Norway, Britain.

niveum. 131. B. ovate, cancellated, white; 5 whirls, firft ventricofe; 1 inch long. Tranquebar.

fcalare. 132. B. yellow, with pale brown bands; fpire with 6 whirls cancellated; whirls flat, diftant, the firft a little convex; aperture triangular; lip toothed; pillar plaited, verrucofe, umbilicated. A very rare fhell.

indicum. 133. B. with decuffated ftriæ, brown, within white. India.

nodulofum. 134. B. white, varied with brown; tranfverfely ftriated; here and there knotty. Shores of American iflands.

pifcatorium. 135. B. cancellated and nodulous in the angles of the fection; aperture toothed on each fide, and acute. India.

mauritii. 136. B. white, within yellowifh; lip 6-toothed; whirls crowned with fpines, the firft with 4 rows. Mauritius.

armillatum. 137. B. oblong; aperture fimple, and without teeth; each whirl crowned with a row of tubercles.

plicatulum. 138. B. oblong; perpendicularly plaited, and tranfverfely ftriated; with alternate white and brown bands; violet within. India.

vulgatum. * 139. B. ventricofe, oblong; with longitudinal plait-like ftriæ, croffed with fine undulated tranfverfe ones. Mediterranean, fhores of England.

ftolatum. 140. B. with party-coloured bands, tranfverfely ftriated; fpire horizontally ribbed, part of the firft whirl glabrous. Tranquebar.

nanum. 141. B. white, cancellated; fpire acute; minute.

exile. 142. B. narrow, cancellated; aperture large, crenated and fpotted; fmall.

chalys. 143. B. cancellated; with perpendicular ribs; the interftices

interſtices ſmooth and flat; aperture ovate; ſpire hardly prominent; a minute ſhell.

verrucoſum. 144. B. ſtriæ decuſſated, knotted in the angles of ſections; ventricoſe; pale yellow, with a bluiſh band on each whirl; 1½ inch long.

alatum. 145. B. gibbous, with decuſſated ſtriæ, knotty in the angles of ſection, the tranſverſe ſtriæ undulated; lip winged; 1 inch long.

nigropunctatum. 146. B. narrow, rugged; wrinkles tuberculated with white, and dotted with black; ¾ inch long.

nitidulum. 147. B. ovate, oblong, poliſhed; barred and marked with longitudinal rugged ſtriæ; lip ſlightly toothed within. Mediterranean.

lævigatum. 148. B. ovate, oblong, poliſhed, ſtriated with brown, and ſmooth; aperture without teeth or pillar lip; ſpire without plaits. Mediterranean.

lamelloſum 149. B. ſlightly plaited, tranſverſely ribbed, grooved, tuberculated, lamellous; barred with cheſnut, brown, and white. New Zealand.

ſcutulatum. 150. B. ſmooth, cheſnut-brown, veined, with flattiſh whirls, and obtuſe beak. New Zealand.

hauſtorium 151. B. ovate, ventricoſe, black, with a ſhort ſpire; pillar depreſſed, white; throat white; lip ſtriated and crenulated within. New Zealand.

ventricoſum. 152. B. ovate, oblong; brown ſtriated with white, and ſlightly plaited.

teſtudineum. 153. B. ovate, ſmooth, with alternate whitiſh and browniſh ſpots in interrupted rows. Shores of New Zealand.

catarrhacta. 154. B. ovate, rough, with crowded tranſverſe grooves, and flame-coloured undulations. New Zealand.

tahitenſe. 155. B. tapering; tranſverſely ribbed and grooved; with a nodulous ſpiral ſtria at the ſuture of the whirls; aperture ovate; lip ſlightly plaited. Otaheite.

lamellatum. 156. B. imperforated, lamellated; white, within purple; lip white; 1½ inch long.

H. *Tapering, ſubulate, ſmooth.*

maculatum 157. B. ſomewhat ſpindle-ſhaped, with ſmooth, undivided, entire whirls; ſpire with 14 or more whirls. Aſia, Africa.

ſubulatum. 158. B. ſubulate, ſmooth, undivided, very entire; firſt whirl not gibbous; 5 inches long. Indian ocean.

crenulatum. 159. B. whirls of the ſpire bifid, with a crenated margin; 5 inches long. Africa and India.

hecticum. 160. B. whirls of the ſpire bifid; upper margin compreſſed, tapering; 4 inches long. Africa.

vittatum. 161. B. ſubſtriated, with a double crenated ſuture on each of the whirls; 2 inches long. Africa and India.

ſtrigilatum 162. B. whirls of the ſpire 16 or 20, bifid and obliquely ſtriated; 2¼ inches long. Southern ſeas of Africa.

duplicatum 163. B. whirls of the ſpire biparted and ſtriated; 4 inches long. India.

lanceatum. 164. B. ſmooth with entire whirls, and longitudinal teſtaceous lines; thin; ſpire acute. India.

dimidiatum. 165. B. whirls of the ſpire bifid, ſmooth; 4 inches long. Africa and India.

murinum. 166. B. whirls of the ſpire ſubangular, with 3 muricated ſtriæ; black; baſe gibbous; whirls white at the baſe. Africa.

tigrinum. 167. B. pellucid, white with reddiſh dots; the whirls ſlightly emarginated, on the back; a very minute ſhell.

acus. 168. B. acute, whitiſh, with undulated horizontal lines; whirls bifid, crenulated, and wrinkled; pillar ſpirally twiſted; 1½ inch long.

ſuccinct. 169. B. ſubulate, horizontally ſtriated; whirls girt; white or ſtraw colour. Indian ocean.

commalatum. 170. B. ſubulate, varied with yellow or reddiſh patches; whirls flattiſh, tranſverſely ſtriated, and ſurrounded with an elevated belt.

haſtatum. 171. B. ventricoſe; whirls perpendicularly ſtriated with alternate brown and white bands; 1¼ inch long.

acicula. 172. B. white, with brown bands of hollow dots.

phallus 173. B. whirls of the ſpire longitudinally ribbed, the baſe with a rugged ſuture; lip a little prominent and emarginated above; 9 whirls in the ſpire; ribs a little curved. India.

flumineum. 174. B whirls of the ſpire convex, diſtant, tranſverſely ſtriated; upper ones horizontally ribbed; 3½ inches long. Found in freſh waters.

aſperum. 175. B. whirls of the ſpire ribbed, and tranſverſely ſtriated, the firſt gibbous; beak a little prominent, 1½ inch long.

muricinum. 176. B. reticulate, wrinkled, with an incurved ſpire; aperture crenated; pillar wrinkled; lip thickened.

tuberculatum. 177. B. the whirls ſurrounded with a row of tubercles; minute.

punctulatum. 178. B. ſubulate, punctured, tranſverſely ſtriated; aperture obovate; whirls of the ſpire ſurrounded with a band, the firſt ventricoſe; 1 inch long.

acicula. 179. B. ſubulate, ſmooth, thin, and finely ſtriated tranſverſely; whirls of the ſpire contiguous; tapering to a point. In freſh waters.

faſciolatum. 180. B. aperture ovate, oblong; whirls ventricoſe, diſtant and horizontally ſtriated; the ſtriæ elevated and ſeparated by an intermediate band.

niveum. 181. B. ſubulate, ſmooth, ſnowy, with two bands; whirls of the ſpire contiguous.

mucronatum. 182. B. a little ventricoſe; white, with brown undulations; aperture oval; whirls 5; 3 inches long.

digitellus 183. B. coarſe, with a ſubincurved obtuſe lip; ½ inch long. India.

obliquum 184. B. whirls of the ſpire entire, with oblique decuſſated ſtriæ; a finger's length, thickneſs of a quill. India.

chalybeum 185. B. ſubangular, grooved; ſteel-blue or dotted with white and black; 1¼ inch long. India.

fluviatile. 186. B. thin, with contiguous whirls; beak ſlightly emarginated; 4 to 5 inches long. India, in the mouths of muddy rivers.

radiatum 187. B. ſubulate; whitiſh with reddiſh rays; whirls convex, ſurrounded with granulated ſtriæ; firſt largeſt and ventricoſe.

lividulum 188. B. whirls of the ſpire longitudinally wrinkled, and marked with tranſverſe granulated ſtriæ, the firſt twice as large as the next; 1 inch long.

edentulum 189. B. whirls ſpotted; aperture long, without teeth; pillar plaited.

pugio. 190. B. longitudinally ſtriated, with punctured ſpotted bands between the whirls.

canaliculatum 191. B. ſpotted with 17 grooved whirls.

varicoſum 192. B. whirls of the ſpire convex, and twice crowned;

crowned; the first with 3 rows of punctures; $3\frac{1}{2}$ inches long.

cuspidatum 193. B. subulate, spotted; whirls convex, subremote.

cinereum. 194. B. subulate, smooth, cinereous, with obsolete bands; whirls undivided and longitudinally striated at the suture; whirls 14; 2 inches long.

virgineum. 195. B. greenish yellow, with 2 red bands; whirls of the spire flattish; aperture large, oval. Rivers of Virginia.

proximatum. 196. B. whirls of the spire bifid; lower one substriated, upper one filiform; subulate, glossy.

monile. 197. B. whirls of the spire bifid; upper one grooved; lower one moniliform, subulate; yellowish white.

cingulatum 198. B. with 3 elevated belts grooved above and beneath; size of a cherry. Iceland.

geminum. 199. B. whirls of the spire bifid; the lower one substriated, upper one more protuberant; white; subulate.

obtusulum. * 200. B. white, glossy, semipellucid; 5 whirls in the spire; aperture oval. Faversham, England.

53 Strombus. Gen. 25. STROMBUS.

Gen. Char.—The animal a limax; the shell univalve, spiral; aperture much dilated; the lip expanding, and produced into a groove leaning to the left (c).

SPECIES.

A. *The lip projecting into linear divisions or claws.*

fusus. 1. S. tapering, smooth, with a subulate beak and toothed lip. Red sea.

pes-pelicani. * 2. S. *Corvorant's Foot;* lip with four palmated angular claws; mouth smooth; whirls tuberculated; 2 inches long. European and American seas, shores of Britain.

chiragra. 3. S. lip with 6 curved claws, and recurved beak; lip striated; two hind claws divergent and bent outwards; beak tuberculated. Indian ocean. Rare shell.

scorpius. 4. S. lip with 4 knotty claws; hinder one very long; 4 inches long.

lambis. 5. S. lip with seven straightish claws; mouth smooth. Asia. A large shell.

millepeda. 6. S. lip with 10 inflected claws; mouth substriated; back compressed; gibbous. Asia. Rare.

clavus. 7. S. tapering, smooth, with a subulate beak, and simple lip.

B. *Lobed.*

lentiginosus. 8. S. lip thickened and 3-lobed on the fore-part; back warty, and crowned with tubercles; beak obtuse; $3\frac{1}{2}$ inches long. Asia, America.

fasciatus. 9. S. lip entire; back crowned with 3 rows of protuberances, and rosy between them. Africa.

raninus. 10. S. lip thin, rugged, repand above; back orange, transversely striated, and crowned with tubercles; aperture white, polished.

gallus. 11. S. lip mucronate on the fore-part, and very long; back crowned with tubercles; beak straight; 6 inches long. Asia and America.

auris-dianæ. 12. S. lip projecting into a sharp point: back muricated; beak erect and acute; 3 inches long. Asia.

pugilis. 13. S. anterior lip prominent, rounded, smooth; spire spinous; beak 3-lobed, obtuse. South America.

alatus. 14. S. anterior lip rounded, prominent, smooth; spire unarmed; beak 3-lobed, obtuse.

marginatus. 15. S. lip a little prominent; beak entire; back margined, smooth.

luhuanus. 16. S. lip a little prominent; back smooth; whirls rounded, equal; $2\frac{1}{2}$ inches long. Asia.

gibberulus. 17. S. lip a little prominent; beak smooth; whirls gibbous, unequal. Asia.

oniscus. 18. S. obovate, with knotty belts, and a subulate, smooth projection; an inch long. South America.

C. *Dilated.*

lucifer. 19. S. lip rounded, entire on the fore-part; belly doubly striated; spire crowned with tubercles; upper ones minute. South America.

gigas. 20. S. lip rounded, and very large; shell crowned; belly and spire with conic expanded spines; glossy white; within, a rich rose colour; 10 inches long. South America.

latissimus. 21. S. lip rounded, very large: belly unarmed; spire a little knotty; 14 inches long. Asia.

epidromis. 22. S. lip rounded, short; belly smooth; spire a little knotty; $3\frac{1}{2}$ inches long. Southern Asia.

minimus. 23. S. lip retuse, gibbous; belly and spire with knotty plaits; aperture 2-lipped, smooth; $1\frac{1}{2}$ inch long. India.

canarium. 24. S. somewhat heart-shaped; with a round, short, retuse, smooth lip; pillar smooth; $2\frac{1}{2}$ inches long. Asia.

vittatus. 25. S. lip rounded, short; belly smooth; spire elongated; whirls divided by an elevated suture; 4 inches long.

succinctus. 26. S. lip rounded, retuse; belly smooth, with 4 pale, linear, punctured belts. Asia.

spinosus. 27. S. lip tapering, entire, slightly plaited, and crowned with fine spines; spire prickly. Hitherto found in a fossil state only.

fissurella. 28. S. lip continued into a longitudinal cleft ridge. India. Frequently found fossil in Campania.

urceus. 29. S. lip tapering, retuse, short, striated; belly and spire with knotty plaits; aperture 2-lipped, unarmed; $2\frac{1}{2}$ inches long. Indian ocean.

tridentatus. 30. S. thin, white, with orange spots and clouds; back smooth, plaited; whirls grooved; lip 3-toothed; beak violet. Indian ocean.

dentatus. 31. S. lip tapering, short-toothed; belly and spire plaited; $1\frac{1}{2}$ inch long.

costatus. 32. S. very thick; first whirl crowned with tubercles; interstices of the tubercles plaited; the next whirl transversely ribbed; the rest transversely striated; 6 inches long.

33. S.

(c) It ought to be observed, that these shells, in their young state, want the lip, and then have a thin turbinated appearance; from which circumstance they have been sometimes referred to a different genus.

bryonia. 33. S. conic, with a mucronate, 8-toothed lip; spire knotty; 7 inches long; very rare.

affinis 34. S. transversely striated, gibbous; spire unarmed; first whirl crowned with tubercles.

lotus. 35. S. lip a little prominent, and twice emarginated beneath; first whirl of the spire smooth in the middle, and transversely striated on each side; the rest crowned with obtuse knots.

levis. 36. S. smooth, silvery, radiated with brown; with obsolete transverse plaits; spire elongated, with inflated, rounded whirls, above 2 inches long.

vexillum. 37. S. solid, subcylindrical, with alternate, reddish and ochraceous bands; lip denticulated within; pillar flat, glabrous, and emarginated at the base. Indian ocean; very rare.

norwegicus. 38. S. oblong, subulate, white, with round whirls; aperture spreading; ovate; beak a little ascending.

D. *Tapering, with a very long spire.*

tuberculatus. 39. S. oblong, ovate, tuberculated; lip thickened.

palustris. 40. S. smoothish; lip separated behind. Savannahs of the Indian ocean.

ater. 41. S. smooth; lip separated before and behind; 26 lines long. Fens of Amboyna.

lineatus. 42. S. subulate, brown; with 7 spiral impressed lines; aperture ovate; 11 lines long.

punctatus. 43. S. shell subulate, yellowish, with a white band; striated with red near the suture; lesser whirls grooved, 6 larger ones smooth; spire with 12 or 13.

vibex. 44. S. subulate, cinereous, transversely striated; whirls 8 to 11, knotty, and marked with red streaks. Coromandel, Friendly islands.

auritus. 45. S. barred with brown; whirls 7, muricated; each with 7 yellow compressed tubercles; aperture ovate; 10 lines long. Africa.

aculeatus. 46. S. brown, tuberculated; whirls 12, with 5 rows of tubercles on each; minute; lip depressed, crenulated; 18 lines long. Marshes of Africa.

agnatus. 47. S. smooth; lip very prominent, and emarginated behind.

dealbatus. 48. S. with black whirls transversely striated; outer ones smooth; margin of the lip and pillar white.

fuscus. 49. S. brown, with numerous tubercles and whirls; lip separated before and behind; within striated with brown.

marginatus. 50. S. brown; lowest whirl edged with white.

lividus. 51. S. subangular, with spinous knots; lip separated on the fore-part; brown, transversely striated.

striatus. 52. S. convex, striated, white, with a few fulvous streaks; pillar sinuated, inflected, thin, pellucid; $2\frac{1}{2}$ inches long.

sinister. 53. S. whirls reversed, thin, longitudinally striated; $1\frac{3}{4}$ inch long, with 10 whirls. Hitherto found in a fossil state only in Helvetia.

54 Murex.

Gen. 26. MUREX.

Gen. Char.—The animal a climax; the shell univalve, spiral, rough, with membranaceous sutures; aperture oval, terminating in an entire, straight, or slightly ascending canal.

SPECIES.

A. *Spinous, with a produced beak.*

haustellum. 1. M. ovate, tuberculated; with a long subulated, straight, muricated beak. Asia, America, Red sea.

tribulus. 2. M. *Thorny woodcock.* Ovate, with a triple row of setaceous spines; beak elongated, subulate, with similar spines. Var. 1. With spines shorter than the beak. 2. With spines as long as the beak. This last is rare. Asia, America, Red sea.

cornutus. 3. M. roundish, surrounded with subulate, oblique spines; beak long, subulate, straight, with a few short spines; 8 inches long; spines 2 inches. Africa. Very rare.

brandaris. 4. M. subovate, surrounded with straight spines; beak subulate, straight, obliquely surrounded with spines. Mediterranean, Adriatic.

trunculus. 5. M. ovate, knotty, and surrounded with spines on the fore part; beak short, perforated, truncated. Mediterranean, Jamaica.

pomum. 6. M. ovate, knotty, with 3 to 7 protuberances; beak broad; coarse and ponderous. Eastern shores of Africa.

decussatus. 7. M. ovate, transversely grooved, with transverse ribs crossed by perpendicular knots; beak imperforated; 7 distinct whirls in the spire. Africa.

triacanthus. 8. M. turgid, knotty, transversely striated, with a triple row of spines. Found in a fossil state.

melanamathos. 9. M. transversely striated with 8 rows of hollow black spines; spire a little knotty and prickly; beak subulate.

radix. 10. M. white with numerous rows of leafy, black, undulated spines. A very rare shell.

candidus. 11. M. white, with rows of spines, and very short beak; some of the spines black; 2 inches long.

fasciatus. 12. M. inflated with rows of spines, white, barred with brown; 4 distinct turgid whirls in the spire.

B. *Suture expanding into crisped foliations; beak abbreviated.* PURPURA.

ramosus. 13. M. a triple row of foliations; spire contiguous; beak truncated. America, Asia, Red sea.

foliatus. 14. M. a triple row of foliations; aperture 1-toothed. North America.

scorpio. 15. M. 4 rows of foliations; spire capitate; beak truncated. Asia. Very rare.

saxatilis. 16. M. 5 rows of foliations; spire contiguous; beak abbreviated. Mediterranean, Asia.

diaphanus. 17. M. white, diaphanous; 6 rows of foliations, which are tipt with black.

cichoreum. 18. Ochraceous, transversely striated, with numerous rows of foliations.

versicolor. 19. M. varied with white and red; with flat acute foliations; pointed with black.

erinaceus. * 20. M. subangular; whirls crowned with tubular and subspinous rays; scales or points; beak short and covered; 2 inches long. European seas, shores of Britain.

striatus. 21. M. 7 rows of foliations, white, with elevated transverse, brown striæ; 7 whirls in the spire. India.

tripterus. 22. M. shell elongated, triangular, with membranaceous foliations at the angles; 5 whirls in the spire. Found fossil in Campania.

sacellum. 23. M. umbilicated with muricated ribs; whirls flattish above, with acute margins; lip crenated; beak straight, ascending. Nicobar.

motacilla. 24. M. triangular, knotty, transversely grooved, with a triple row of tubercles; beak long, subulate, straight; mouth white. India.

25. M.

triqueter. 25. M. long, ſubulate, triangular; ribs reticulated; beak ſtraight, cloſed; ſpire pyramidal, with 6 whirls.

C. *With thick, protuberant, rounded ſutures.*

lyratus. 26. M. protuberances croſſed by ſmooth belts; aperture ovate.

rana. 27. M. rough, with oppoſite, impreſſed protuberances, with one or two muricated belts. Aſia.

gyrinus. 28. M. protuberances oppoſite, continued, and barred with tuberculated dots; aperture orbicular. Mediterranean, Atlantic, India.

affinis. 29. M. turgid, with oppoſite continued protuberances; ſpire pointed; whirls ſurrounded with a crown of tubercles; the outermoſt glabrous.

lampas. 30. M. protuberances nearly oppoſite, gibbous, with longitudinal tuberculated protuberances; from 4 to 14 inches long. Indian ocean.

olearium. 31. M. protuberances alternate, and numerous tubercles; back unarmed and ſtriated behind; aperture toothleſs. Mediterranean and African ſeas.

femorale. 32. M. protuberances decuſſated, triangular, wrinkled and knotty on the fore-part; aperture ovate, toothleſs; from 5 to 7 inches long. Aſia, Guinea, and America.

cutaceus. 33. M. with a ſingle protuberance; angular, and a little wrinkled with knots; pillar perforated; aperture toothed; 3 inches long. Barbary, Guinea, South America.

lotorium. 34. M. protuberances decuſſated, angular, with longitudinal tuberculous knots; beak flexuous; aperture toothed. Mediterranean.

pileare. 35. M. protuberances decuſſated, and a little wrinkled with knots; aperture toothed; beak ſubaſcending. Mediterranean.

bufonius. 36. M. ſix oppoſite, continued, vaulted protuberances, and knotty belts; beak oblique. A rare ſhell.

pyrum. 37. M. varicoſe, ovate, tranſverſely grooved and knotty; beak long, flexuous, ſubulate. Indian ocean.

caudatus. 38. M. thin, tranſverſely ſtriated; beak ſubulate; ſpire a little prominent, tipt with brown; whirls grooved; firſt gibbous.

rubecula. 39. M. protuberances decuſſated, obtuſe, with knotty wrinkles; belly equal; aperture toothed. Africa, India, South America. Rare.

ſcrobiculata. 40. M. protuberances hollowed, ſmooth, nearly oppoſite; aperture toothed. Mediterranean.

reticularis. 41. M. protuberances nearly oppoſite, reticulated with tuberculated ſpots; pillar almoſt toothleſs; beak aſcending; 6 inches long. Mediterranean, America.

lamelloſus. 42. M. protuberances membranaceous, continued through the ſpire, and terminated with a ſpine. Falkland iſlands.

nodatus. 43. M. whirls knotty; aperture violet; lip toothed; beak ſtraight. New Holland.

anus. 44. M. protuberances and lips membranaceous, dilated; gibbous and reticulated with tubercles; aperture ſinuous; beak erect; 3 inches long. Mediterranean and Aſia.

miliaris. 45. M. varicoſe, with tuberculated belts; aperture a little toothed; beak elongated; whirls ventricoſe.

ſenegalenſis. 46. M. tranſverſely ſtriated, with ſpinous protuberances; the ſpines decreaſing towards the head; $2\frac{1}{2}$ inches long. Senegal.

carinatus. * 47. M. ventricoſe, with 5 or 6 whirls, forming angular ridges; aperture ſemicircular; beak a little reflected; 4 inches long. Europe, Britain.

D. *More or leſs ſpinous, and without manifeſt beak.*

ricinus. 48. M. obovate, with ſubulate ſpines in rows; aperture and lip toothed; $1\frac{1}{2}$ inch long. Aſiatic ocean.

nodus. 49. M. obovate with conic ſpines; lip toothed; pillar ſmooth, coloured; $3\frac{1}{2}$ inches long.

neritoideus. 50. M. knots in numerous rows; lip with pointed angles; pillar flattiſh. India.

fucus. 51. M. coarſe, ventricoſe, tranſverſely ſtriated, with 4 rows of knots; pillar impreſſed; outmoſt whirls flattiſh.

loco. 52. M. obovate and knotty on the fore part; aperture ſuborbicular, toothleſs; 4 or 5 inches long. Chineſe ſhores. Yields a purple fluid.

hyſtrix. 53. M. ſubovate, with acute ſpines in 4 rows; aperture toothleſs, repand.

mancinella. 54. M. ovate, with obſolete ſpines, which are blackiſh: aperture toothleſs; pillar tranſverſely ſtriated.

hippocaſtanum. 55. M. ovate, ſtriated, with 3 or 5 rows of obtuſe ſpines or tubercles; aperture tranſverſely ſtriated. Guinea, India.

ſenticoſus. 56. M. *Small prickly whelk.* Tapering, longitudinally ribbed, and tranſverſely cancellated; aperture ſtriated; ribs prickly; 2 inches long. Indian ocean.

melongera. 57. M. obovate, glaucous, with a ſubſpinous whirl; ſpire ſomewhat prominent; aperture ſmooth; $5\frac{1}{4}$ inches long. India, America.

conſul. 58. M. thick, ventricoſe, tranſverſely grooved and knotted; aperture repand, ovate; lip ſinuous, inwardly plaited and denticulated. India.

lima. 59. M. brown, ſubovate, ſlightly beaked with crowded, nodulous, paler belts. George's bay.

E. *With a long, ſtraight, ſubulate, cloſed beak, and unarmed with ſpines.*

carioſus. 60. M. without beak, ſlightly plaited, ovate, pointed; lip carious. Found in the aqueduct at Seville.

babylonius. 61. M. tapering with acute ſpotted belts, and ſtraight tail; lip cleft; 4 inches long. Indian and American iſlands.

javanus. 62. M. tapering, with immaculate knotty belts; lip with a ſeparate ſcoop. India.

ſinenſis. 63. M. ventricoſe, pointed with a cancellated, reflected beak; aperture oval; whirls with tranſverſe, granulated ſtriæ; baſe crowned with ſpines. Senegal.

ſtramineus. 64. M. ſpire with elevated rings; interſtices filled with ſhort, ſtraw-like projections; whirls crowned with tubercles at the baſe; 3 inches long. Southern ocean.

auſtralis. 65. M. ovate, longitudinally ſtriated; lip undulated; whirls channelled; firſt turgid, and 4-plaited; the next 3-plaited; $2\frac{1}{2}$ inches long. South ſea.

uncinatus. 66. M. ſpire pointed, and tranſverſely ſtriated; 4 firſt whirls with a callus, armed with hooks in the middle, 5 and 6 ribbed, the reſt glabrous.

turris. 67. M. tapering; whirls crowned with tubercles, and ſurrounded with a granulate belt; the firſt finely ſtriated tranſverſely.

coſtatus. 68. M. beak a little reflected, and obliquely ſtriated; 3 firſt whirls of the ſpire ribbed; other 4 cancellated;

firſt

first obconic; pillar with a single plait. Found fossil in Campania.

asper. 69. M. longitudinally plaited, and transversely ribbed; spire a little prominent; aperture ovate; lip crenulated.

colus. 70. M. tapering, striated, knotty; carinated, with a long straight beak; lip crenulated; beak 3 inches long. Indian ocean.

morio. 71. M. black, with a white band; beak dilated; pillar wrinkled; whirls knotty; 6 inches long. Africa.

cochlidium. 72. M. beak dilated; whirls of the spire flat above. Indian ocean.

spirillus. 73. M. beak long, spire mucronated; whirls convex above. Tranquebar.

canaliculatus. 74. M. beak dilated; whirls of the spire separated by a small canal. Canada, Frozen sea.

ficus. 75. M. beak dilated; whirls separated by a small canal; first crowned with knobs at the base.

carica. 76. M. transversely striated; beak dilated; spire a little prominent; whirls crowned with spines at the base; 8 inches long.

rapa. 77. M. solid, umbilicated, with a triple row of knots transversely striated; aperture largely striated. India.

niveus. 78. M. beak dilated; whirls of the spire separated by a small groove; the first with transverse carinated ribs. Brazil.

granum. 79. M. hemispherical, glabrous, diaphanous; beak straight, spreading; crown papillary. North America.

aruanus. 80. M. beak dilated; spire crowned with spines. New Guinea.

perversus. 81. M. beak dilated and repand; spire recurved and slightly crowned. American ocean. Exceedingly rare.

antiquus. * 82. M. beak dilated; shell oblong; 8 round whirls, first ventricose; 4 to 6 inches long. European seas, Scotland.

despectus. * 83. M. oblong, striated, and somewhat rugged; beak dilated; whirls 8, with two elevated lines; five inches long. European seas, shores of Britain.

fornicatus. 84. M. ovate oblong; beak dilated; whirls ventricose; a little angular and longitudinally striated; 7 inches long. Greenland seas.

incrassatus 85. M. oblong, transversely wrinkled, and longitudinally striated; lip denticulated within, and thickened without.

truncatus. * 86. M. oblong, longitudinally ribbed; beak a little reflected, emarginated and truncated; very minute; whirls 6. Coasts of Europe, and shores of Britain.

acuminatus. * 87. M. narrow, oblong, ribbed; spire pointed. Shores of England.

argus. 88. M. gibbous, with transverse tuberculated ribs; brown, with darker bands; within white; aperture ovate.

maculosus. 89. M. cancellated, yellow, with alternate white bands, and chesnut patches; 11 round whirls in the spire. India. Very rare.

magellanicus. 90. M. ventricose, umbilicated, transversely striated; whirls of the spire with parallel ribs; the first large. Straits of Magellan.

cancellatus 91. M. ovate, solid, opaque, cinereous; whirls of the spire cancellated, and separated by a groove.

scolopaceus. 92. M. whirls surrounded with grooves, and tubercles above; tip of the tubercles and aperture white.

literatus. 93. M. ventricose, tapering, spotted with black; beak short; pillar with a single plait; spire with 8 prickly whirls.

trigonus. 94. M. subtriangular, cancellated; spire with 7 inflated contiguous whirls; the first with a large distinct tubercle; 2 inches long. Senegal.

semilunaris. 95. M. longitudinally ribbed, and finely striated transversely; spire with flattish distant whirls, with rows of tubercles; aperture semilunar; 1 inch long. Senegal.

sulcatus. 96. M. rounded with annular grooves; aperture oval; first whirl of the spire turgid; 1¼ inch long. Senegal.

tritonis. 97. M. ventricose, oblong, smooth, with rounded whirls; aperture toothed; beak short; 16 inches long. India and the South seas.—This shell is used by the natives of New Zealand as a musical instrument, and by the Africans and many nations of the East, as a military horn.

pusio. 98. M. ventricose, oblong, smooth; spire striated with rounded whirls; aperture smooth; beak short; 1½ inch long. Mediterranean and Africa. Rare.

tulipa. 99. M. ventricose, oblong, smooth; whirls rounded with a double suture; pillar with two plaits; beak dilated, striated. South America.

clathratus. 100. M. oblong beak, and grooved with longitudinal membranaceous plaits. Iceland.

nassa. 101. M. solid, black or pale brown, with a white subdiaphanous band; whirls knotty; pillar a little plaited.

plicatus. 102. M. whirls of the spire plaited and knotty.

scala. 103. M. umbilicated with distant, wedged, ribbed, and transversely striated whirls; aperture heart-shaped.

fiscellum. 104. M. angular, longitudinally plaited, and transversely striated; lip toothed; mouth violet; beak straight, short. China.

corona. 105. M. fastigiated with brown and yellowish bands; beak straight, entire. Mexico.

dolarium. 106. M. ovate, with a few elevated obtuse belts on the whirls; size of a walnut. The ocean.

corneus. * 107. M. oblong, slender, white; margins of the whirls complicated; aperture toothless; 3 inches long. British and North seas.

lignarius. 108. M. oblong, coarse, with obtusely knotty whirls; aperture toothless; beak short.

trapezium. 109. M. oblong, obtusely angular, with slightly knotty whirls; aperture toothed; six inches long. Indian ocean.

vespertilio. 110. M. solid, ventricose, smooth, with an oblong oval aperture; beak and crowned spire striated; four inches long. Indian ocean.

scolymus. 111. M. thin, diaphanous, ventricose, and transversely striated; middle of the beak smooth; spire with obtuse, undulated knots; pillar 3-plaited.

harpa. 112. M. ventricose, longitudinally ribbed; ribs transversely striated; spire a little prominent; whirls distant.

tuba. 113. M. fusiform, transversely striated; white, with a brown tip to the spire, which has 8 whirls, distant, and crowned at the base with knots. China.

syracusanus. 114. M. oblong, with striated plaited whirls, covered

vered with tuberculated ridges; aperture toothlefs; beak fhort. Mediterranean; rare.

craticulatus. 115. M. oblong, with rounded, plaited, and tranfverfely reticulated whirls; aperture toothed, ftriated within. Mediterranean.

fcriptus. 116. M. nearly without beak; fufiform, fmooth, pale, with longitudinal brown ftriæ; lip toothed; very fmall. Mediterranean.

ternatanus 117. M. tranfverfely ftriated, with diftant undulately tuberculated whirls; aperture oblong; beak ftraight; 4 inches long; yellow. Ternate ifland.

infundibulum. 118. M. umbilicated, undulately knotty; ftriæ elevated, brown; perforation funnel-fhaped; pillar two-plaited; 4 inches long; very rare.

polygonus. 119. M. ventricofe, undulated with tubercles; ftriated, grooved, and obtufely angled; black, with an oval aperture, and fhort beak; 3½ inches long. Indian ocean.

icelandicus. 120. M. tranfverfely ftriated; fpire papillous at the tip, with round whirls; firft large and ventricofe; 5 inches long. Iceland.

lævigatus. 121. M. fufiform; fpire tranfverfely ftriated; whirls diftant, flattifh; the firft round, fmooth; 3¼ inches long. Found foffil in Campania.

foffilis. 122. M. fufiform, incancellated, with a long beak; 1¼ inch long. Found foffil in Campania.

candidus. 123. M. fnowy, tranfverfely ftriated; fpire with diftant whirls; keeled in the middle, and crowned with tubercles; lip grooved within, and denticulated at the margin; 9½ inches long.

anfatus. 124. M. brown, tranfverfely ftriated, fpire mucronated; whirls diftant, convex, and knotty at the bafe; beak long.

undatus. 125. M. folid, ventricofe, with waved angles; and finely ftriated tranfverfely; fpire mucronate; whirls knotty at the bafe; lip denticulated; 8½ inches long; ponderous. India.

longiffimus 126. M. thin, ftriated, with an obtufe, knotty fpire, and long ftraight beak; 9 inches long. India.

lancea. 127. M. narrowed; whirls of the fpire tranfverfely ribbed, and longitudinally crenated; aperture ovate; ribbed with white within, and toothed at the margin; pillar 2-plaited. Amboyna.

anguftus. 128. M. narrowed; firft whirl of the fpire longitudinally plaited, and tranfverfely ribbed; the other fmooth and round; beak tranfverfely ftriated.

verficolor. 129. M. fubcylindrical; fpire obtufe; whirls round and ftriated; lower ones moftly glabrous. India.

verrucofus 130. M. umbilicated and furrounded with belts; middle ones more raifed; whirls crowned with tubercles, which are fpotted with brown. Red fea.

ftriatulus. 131. M. thin, tranfverfely ftriated; fpire mucronate; whirls round; lip crenulated; 4 inches long.

pardalis. 132. M. rounded, white, with violet fpots, longitudinally ribbed, and tranfverfely ftriated; fpire obtufe.

gigas. 133. M. whirls of the fpire turgid, gibbous, nodulous and annulated; lip denticulated beneath; 21 inches long.

lignofus. 134. M. whitifh; fpire obtufe; whirls flightly crowned with wrinkled, unequal tubercles, beak tranfverfely ftriated; 1½ inch long.

gibbulus. 135. M. tapering, orange; fpire obtufe; whirls diftant, with longitudinal ribs, and flexuous tranfverfe ftriæ.

granularis 136. M. tapering; fpire with contiguous whirls, feparated by a flexuous line; firft ventricofe; Adriatic.

vexillum. 137. M. tapering, tranfverfely ribbed; whirls convex; aperture oval; lip denticulated.

vulpinus. 138. M. oblong, ventricofe; whirls with a ftriated margin; aperture glabrous; beak fhort, and bent outwards.

afer. 139. M. ovate, tranfverfely ftriated; fpire with flattifh whirls; crowned with a row of rounded tubercles; 1½ inch long. Senegal.

campanicus. 140. M. ventricofe; fpire obtufe, cancellated, with carinated whirls; firft ventricofe and fmooth; beak long and fmooth; three inches long. Found foffil in Campania.

arenofus. 141. M. whirls of the fpire with decuffated ribs, the firft large, three outermoft fmooth; lip toothed outwardly; very fmall. Sandy fhores of India.

maroccenfis. 142. M. narrow, tranfverfely ftriated; fpire mucronated; whirls diftant, contrary, round, and longitudinally ribbed; beak prominent; 1¼ inch long. Shores of Morocco.

lineatus. 143. M. oblong, whitifh, with tranfverfe, reddifh ftriæ; beak fhort, ftraight. New Zealand.

perron. 144. M. a little tapering; whirls carinated above, margined and flattened; beak long and ftraight. Southern ocean.

larva. 145. M. cylindrical; fpire with a crenated callous belt; upper whirls with plaited knots, lower ones flattifh; beak fhort, ftraight, emarginated.

neretoideus. 146. M. folid, thick, coarfe; fpire exferted; whirls tranfverfely ftriated; aperture femiorbicular and ftriated.

prifmaticus. 147. M. ovate, angular, iridefcent; longitudinally grooved and plaited; beak fhort; lip denticulated. India, and South feas.

columbarium. 148. M. ribs longitudinally plaited, and tranfverfely grooved; angular, fpinous, carinated; alternately varied with white and brown; whirls fuddenly diminifhing; beak fhort, ftraight. Pulo Condor.

afperrimus 149. M. ribbed, varied with brown, yellow and white; whirls oblique, with a tuberculated margin, and brown band in the middle; beak fhort, dilated, afcending; 2 inches long.

undulatus 150. M. white, undulated with bay; with grooves marked with raifed ftriæ; whirls nodulous at the margin; beak ftraight; four inches long. Red fea.

F. *Tapering, fubulate, with a very fhort beak.*

vertagus. 151. M. whirls of the fpire plaited above; pillar plaited within; beak afcending; three inches long. India.

aluco. 152. M. whirls of the fpire tuberculated, with a fpinous ftreak in the middle; pillar with a fingle plait; beak afcending; four inches long. Southern ocean, Red fea, Atlantic.

annularis. 153. M. whirls furrounded with belts longitudinally ftriated; firft whirl tranfverfely ftriated; beak afcending.

plicatulus. 154. M. ventricofe; fpire tranfverfely ftriated; whirls longitudinally plaited and knotty; aperture oval.

fordidus. 155. M. ventricofe, tranfverfely ftriated and crowned with black knots; lip dilated.

cingulatus. 156. M. fpire tranfverfely ftriated and grooved; whirls

whirls ſurrounded with three rows of granulations, the firſt a little knotty. Tranquebar.

fuſcus. 157. M. rounded, brown; firſt whirl of the ſpire gibbous; the others varicoſe; the laſt with numerous ſpines.

faſciatus. 158. M. tranſverſely ſtriated; ſpire crowned. Rivers of America.

fluviatilis. 159. M. brown; firſt whirls of the ſpire crowned with ſpines, the others with knots; aperture repand.

alatus. 160. M. reticulated; ſpire mucronate; firſt whirl grooved and tranſverſely ſtriated; lip winged.

noduloſus. 161. M. tranſverſely ſtriated, and alternately barred with brown and white; ſpire mucronate; whirls diſtant, with undulated knots.

terebella. 162. M. with a triple moniliform belt on each of the whirls; aperture oval, with curved ſtriæ within; 1 to 2½ inches long.

fuſcatus. 163. M. whirls crenulated; the upper ſtria denticulated. Mediterranean.

toruloſus. 164. M. whirls of the ſpire with a ſlightly knotty zone above; beak ſhort.

radula. 165. M. whirls of the ſpire tuberculated, with a double row of punctured ſtriæ. Africa.

aſper. 166. M. whirls of the ſpire grooved, tranſverſely ſtriated and muricated. Guinea.

granulatus 167. M. rough, with decuſſated tubercles; beak acute, aſcending; 2 inches long; white. India.

decollatus. * 168. M. whirls of the ſpire with longitudinal plaited grooves, with the tip ſeemingly broken off. European ſeas. Britain.

moluccanus. 169. M. ſtriated; whirls of the ſpire tranſverſely grooved with undulated, longitudinal plaits; lip dilated, crenulated. Marſhes of Molucca iſlands.

minimus. 170. M. with tranſverſe, undulated ſtriæ, croſſed by longitudinal lines; aperture orbicular.

ſtrigilatus. 171. M. longitudinally ſtriated; whirls undivided, with a ſnowy belt at the ſuture, marked with reddiſh ſpots.

tuberculatus. 172. M. tranſverſely ſtriated, and ſurrounded with glabrous knots; lip thickened.

gibboſus. 173. M. whirls of the ſpire margined; belly gibbous; lip cleft, denticulated; beak ſhort.

atratus. 174. M. black; whirls tranſverſely ſtriated and tuberculated; pillar with one plait.

contrarius. 175. M. four contrary whirls marked with double ſtriæ; beak dilated. European and North ſeas.

eburnea. 176. M. contrary, hyaline, with 6 finely crenulated whirls.

conditus. 177. M. tapering, rough with granulations; lip doubled, emarginated on each ſide, and toothed within; aperture oval and ſtriated.

clava. 178. M. tranſverſely ſtriated and ſpotted; whirls with plaited knots; lip double, dilated. Pulo Condor.

hexagonus. 179. M. yellowiſh, hexagonal, with tranſverſe, granulated ſtriæ; firſt whirl tuberculated. South ſea; and is often found foſſil.

minutiſſimus. * 180. M. with five whirls, ſpirally ſtriated, and remote ribs; pellucid; a very minute and elegant ſhell. Coaſts of Wales.

55 Trochus.

Gen. 27. Trochus.

Gen. Char.—The animal a limax; ſhell univalve, ſpiral, more or leſs conic; aperture ſomewhat angular or rounded; the upper ſide tranſverſe and contracted; pillar placed obliquely.

Species.

A. Erect, with the pillar perforated.

niloticus. 1. T. conic, ſmooth, ſomewhat umbilicated; a large ponderous ſhell, with oblique, red, perpendicular ſtriæ. Indian ocean.

maculatus. 2. T. conic, tuberculated, with an oblique perforation; inner lip two-lobed. Aſia, South America.

perſpectivus. 3. T. convex, obtuſe, margined; the umbilicus pervious and crenulated, 2¼ inches long. Aſia, Africa. This is a very beautiful ſhell.

hybridus. 4. T. convex; pillar 2-toothed; perforation crenulated. Mediterranean.

cruciatus. 5. T. convex, with callo-punctured ſtriæ; pillar 1-toothed. Mediterranean.

pharaonis. 6. T. obovate, ſtriated; marked with concatenated, globular dots; aperture and pillar toothed; umbilicus crenated. European and Aſiatic ſeas.

magus. * 7. T. convex, obliquely umbilicated; ridges of the whirls riſing into obtuſe tubercles. European and African coaſts, Britain.

modulus. 8. T. ſtriated, plaited above, and more convex beneath; aperture ovate and 1-toothed. Red ſea.

ſcaber. 9. T. ſubovate; grooves moniliform and alternately larger; ſhell black; aperture yellowiſh.

varius. 10. T. obliquely umbilicated; convex; whirls ſlightly margined. Mediterranean.

cinerarius. * 11. T. ovate, obliquely umbilicated; whirls rounded; ſize of a pea. Shores of Europe. Britain.

divaricatus. 12. T. ovate, ſubumbilicated; perforation nearly ſhut up; loweſt whirl more remote. Mediterranean and Greenland ſeas.

umbilicaris. 13. T. conico-convex; perforation pervious, exactly cylindrical; whirl ſlightly emarginated. Shores of Europe.

ſolaris. 14. T. convex, conic; whirls ſpinous and margined; aperture ſemi-heart-ſhaped; 2 inches diameter. India and America.

tectum. 15. T. depreſſed, oblique; white with brown lines; ſpire tranſverſely ſtriated, and longitudinally ribbed; firſt whirl ventricoſe; aperture orbicular; firſt whirl large; pillar brown.

conus. 16. T. conic, white ſpotted with red; whirls round, with moniliform belts; firſt whirl only perforated. India.

ſpinoſus. 17. T. ſubequal, mucronate; whirls 9, ſpinous beneath; on each ſide a linear band of white and black, with a triple row of knots.

jujubinus. 18. T. lateritious, ſpotted with white; the baſe flat, with concentric lines of concatenated dots; whirls channelled, teſſelated at the lower margin with white and cheſnut. South America.

alveare. 19. T. plaited with knots, tranſverſely ſtriated, with belts of concatenated dots; perforation funnel-ſhaped; pillar crenulated. India.

concavus. 20. T. baſe and continued perforation funnel-ſhaped; whirls contiguous, undulated and plaited; aperture denticulated at the margin; 2 inches broad. India.

vernus. 21. T. ſurrounded with granulations and knots, green, and whitiſh towards the tip; the tip varied with black dots. India.

conſperſus. 22. T. covered with white, greeniſh, and buff-coloured ſpots; tip with red and black ones; baſe white, ſpotted.

ſpotted with red; within pearly; whirls with many rows of knots; lower margins glabrous. India.

ntorium. 23. T. wrinkled and plaited; whirls knotty beneath, with concatenated dots in the middle; whirls diſtant; perforation funnel-ſhaped. India.

hroleu-ſ. 24. T. wrinkled and plaited, obliquely crenated and tranſverſely ſtriated; baſe flat; white with red dots. India.

llatus. 25. T. plaited and wrinkled, ſea-green; whirls with concatenated dots; upper ones with a radiated ſpinous margin. India.

engleri. 26. T. ſurrounded with rows of ochraceous knots and granulations, waved with red; one part of the baſe ſmooth.

ſlatus. 27. T. dots elevated, concatenated; whirls with oblong white knots beneath, and intermediate purple grooves.

æqualis. 28. T. rough, with unequal knots and granulations; many rows of knots on the whirls; tubercles larger on the marginal row.

egius. 29. T. white, with a roſy ſhade; tranſverſely ſtriated, with many rows of knots; margin of the whirls prominent; perforation funnel-ſhaped.

errucoſus 30. T. white, radiated with purple; conic; margin of the whirls knotty; perforation funnel-ſhaped.

ylindricus 31. T. browniſh, cylindrical; whirls convex, marked with tranſverſe ſtriæ; perforation crenated. Very rare.

adiatus. 32. T. radiated with red; pyramidal; whirls with concatenated dots; perforation funnel-ſhaped. South America.

iridis. 33. T. green; firſt whirl with 5 rows of knots, ſecond with 4, the reſt glabrous.

uſticus. 34. T. black-brown; obtuſely pyramidal. China.

igerri-nus. 35. T. deep black; whirls flattiſh; ſpire tranſverſely ſtriated; pillar 1-toothed. China.

anulum. 36. T. whirls of the ſpire ochraceous, with ſpotted tubercles; and with an intermediate, ſpotted, wrinkled groove.

rigoſus. 37. T. ochraceous, varied with black at the tip; pyramidal and tranſverſely ſtriated; whirls of the ſpire flattiſh; margin tumid and ſpotted with red; very ſmall. Shores of Morocco.

yramis. 38. T. pyramidal, with cheſnut ſpots and clouds; margin of the whirls vaulted and nodulous; $\frac{1}{2}$ to 2 inches long.

apenſis. 39. T. depreſſed, varied with white and cheſnut; baſe convex, with a ſcarlet ring marked with deeper ſpots. Cape.

ægyptius. 40. T. depreſſed, white ſpotted with red; whirls tranſverſely ſtriated and plaited, diſtant; pillar 1-toothed; $\frac{1}{2}$ inch long. Red ſea.

depreſſus. 41. T. whitiſh, radiated with red, and red at the tip; depreſſed; whirls ſurrounded with a belt of moniliform dots.

lævigatus. 42. T. pale brown; baſe ſub-convex; whirls ſmooth, obſoletely ſtriated tranſverſely; perforation white, funnel-ſhaped.

grœnlandicus. 43. T. pellucid, fleſh colour; baſe convex; whirls 6; convex and finely ſtriated tranſverſely.

roſeus. 44. T. convex, roſy, grooved; perforation very minute; ſhell ſmall. Cape of Good Hope.

petholatus. 45. T. depreſſed, brown, with whitiſh ſpots; very minute.

viridulus. 46. T. greeniſh, obliquely radiated with white; whirls convex, with a belt of moniliform granulations; pillar toothed.

urbanus. 47. T. convex, with numerous rows of granulations; perforation denticulated; aperture crenulated.

guineenſis. 48. T. clouded with brown and gray; rows of granulations numerous, with knots; aperture crenated; perforation toothed; 6 lines long. Guinea.

nodulus. 49. T. cinereous, with moniliform belts of granulations; perforation white, toothed; aperture crenated.

carneus. 50. T. depreſſed, pale fleſh colour, with crowded moniliform belts of granulations; perforation large; 1-toothed.

teſſelatus. 51. T. tranſverſely ſtriated; whirls diſtant; numerous ſquare ſpots on the ſpire. European ſeas.

croceus. 52. T. convex, cheſnut; whirls of the ſpire convex, the outer ones ſaffron-coloured. Africa.

obliquatus. 53. T. depreſſed, convex, with oblique violet rays; whirls convex. Mediterranean.

vittatus. 54. T. convex, cheſnut; whirls with a fillet, varied with red and white at the upper margin.

ſchrœteri. 55. T. depreſſed, pyramidal; baſe concave; whirls tranſverſely ſtriated and obliquely ribbed, the firſt with a keeled margin; perforation funnel-ſhaped. Found foſſil in Campania.

indicus. 56. T. conic-convex; whirls unarmed; aperture ſemi-heart-ſhaped; perforation ſpiral; ſcarcely 1 inch high. India.

infundibuliformis. 57. T. depreſſed, cheſnut; whirls tranſverſely ſtriated and crenated, with rows of granulations; perforation pervious, crenulated.

ſtramineus 58. T. ſtraw colour; whirls convex, with decuſſated ſtriæ ſeparated by a groove; perforation pervious. Tranquebar.

variegatus. 59. T. white, marked with browniſh rays and crenated ſtriæ; perforation crenated, pervious.

areola. 60. T. convex, tranſverſely ſtriated; white, with ſquare reddiſh ſpots; perforation crenulated, whirls of the ſpire ſeparated by a white ſtreak.

inermis. 61. T. greeniſh yellow, with longitudinal plaited ribs terminated by a ſpine; aperture compreſſed; perforation wrinkled.

imperialis. 62. T. conic, olive, covered with rows of raiſed violet ſcales; whirls inflated, with a ſpinous radiate margin; ſpire with 7 whirls; large. South ſeas.

planus. 63. T. depreſſed, ſtraw colour, with darker ribs; whirls of the ſpire plaited; perforation pervious.

albidus. 64. T. conic; white, with oblique brown bands; whirls chanelled near the ſuture.

fuſcatus. 65. T. conic; baſe greeniſh gray, ſpotted with brown; whirls round, flattiſh at the ſuture.

corallinus. 66. T. conic; red, dotted with white; ſlightly perforated; whirls round, the firſt with 15, the next with 6 rows of tubercles; 6 whirls in the ſpire; 4 lines long. Senegal.

griſeus. 67. T. gray, with whitiſh ſpots; whirls flattiſh, and tranſverſely grooved. Senegal.

ferrugineus. 68. T. convex; the whirls reverſed. Found near Scaphuſia, converted into iron ore.

novus. 69. T. pyramidal, with contrary round whirls; 3 of them with a quadruple trifarious row of tubercles, the fourth very diſtant.

fragilis. 70. T. very thin, and of a wax colour; firſt whirl large, with a brown band in the middle.

calloſus. 71. T. obtuſely pyramidal; 4 elevated contiguous whirls, tumid at the margin, in the ſpire.

afer. 72. T. convex, gray with whitiſh ſpots; whirls flattiſh; 6 lines long. Senegal.

neritoideus 73. T. ſub-ovate, convex, depreſſed; ſmooth, reddiſh, glabrous; 2 lines long. Greenland.

perlatus. 74. T. reddiſh, with elevated dots; unequally ribbed; ſpire depreſſed; whirls convex.

terreſtris. * 75. T. conic; livid; minute. Mountains of Cumberland.

fuſcus. * 76. T. opaque, brown, margined; aperture roundiſh; ſpires 5. Sandwich.

B. *Imperforated, erect; umbilicus cloſed.*

veſtiarius. 77. T. conic, convex, with a gibbous callous baſe; aperture ſomewhat heart-ſhaped; very ſmall. Mediterranean and Aſia.

labio. 78. T. ovate, ſub-ſtriated; pillar 1-toothed. Aſia, Africa, New Zealand.

tuber. 79. T. depreſſed; whirls ſomewhat keeled, and knotted at the upper and lower margin; 2 inches diameter. Mediterranean and South America.

ſtriatus. * 80. T. conic; aperture obovate; laſt whirl angular; minute. Mediterranean; Falmouth.

conulus. * 81. T. conic, ſmooth; whirls ſeparated by a prominent line. European ſea; Britain.

ziziphinus. * 82. T. conic, livid, ſmooth, tranſverſely ſtriated; whirls margined. European and African coaſts, ſhores of Britain.

obeliſcus. 83. T. conic; ſurrounded with numerous rows of white or green moniliform granulations; pillar 1-toothed; 2 inches high. India.

diſtortus. 84. T. ſolid, white, poliſhed; ſtriated, diſtorted, and obtuſe at the tip; firſt whirl gibbous; aperture compreſſed, ovate.

virgatus. 85. T. pyramidal, with roſy and white ſtripes, and numerous rows of knots; baſe with concentric white and red circles. India.

foveolatus. 86. T. cinereous, variegated with greeniſh, whitiſh, and reddiſh; whirls of the ſpire tuberculated at the lower margin. Red ſea.

diaphanus. 87. T. thin, pellucid, with alternate cheſnut and white moniliform belts of granulations; 1½ inch high. New Zealand.

iris. 88. T. covered with a ſmooth coat, under which it is bluiſh and reddiſh, ſhining with irideſcent. Southern ocean.

roſtratus. 89. T. pyramidal, tranſverſely ſtriated; varied with white and red; tip green, pellucid; 1 inch high. South ſea.

notatus. 90. T. ſtriæ decuſſated; grooved within; tip deep red.

elegans. 91. T. pyramidal, ſtriated, browniſh purple. South ſea.

melanoſtoma. 92. T. obtuſely pyramidal; ſpotted with greeniſh. South ſea.

erythroleucus. 93. T. pyramidal; ſtriated with white and red. Morocco.

punctulatus. 94. T. red, punctulated; very minute. Morocco.

imbricatus. 95. T. pyramidal, obliquely grooved, plaited and ribbed; whirls a little prominent at the margin. South American ſeas.

americanus. 96. T. ochraceous; longitudinally grooved; whirls tranſverſely ſtriated; lip denticulated. South America.

cælatus. 97. T. ſea-green, with protuberances and oblique ſcaly plaits; whirls of the ſpire tranſverſely ſtriated and grooved in the middle, concave ſpines on the lower margin of the firſt whirl.

purpure[us]. 98. T. purple, with plaited tuberculated whirls.

cookii. 99. T. ſea-green, with numerous rows of tubercles and oblique undulated plaits; 4 inches long, as broad, and covered with a horny lid. Cooke's bay.

noduloſu[s]. 100. T. browniſh, with a convex baſe; whirls with a ſingle row of tubercles, firſt with 2. South ſea.

mauritianus. 101. T. pyramidal; white, varied with reddiſh and green; whirls ſpinous; pillar emarginated, plaited. Bourbon and Mauritius iſlands.

feneſtra[tus]. 102. T. pyramidal; white; whirls of the ſpire longitudinally ribbed, with tranſverſe moniliform belts of green granulations: 1½ inch wide. Indian and South ſeas.

helicinu[s]. 103. T. convex on each ſide, ſolid; ſpire ſmooth; 2 firſt whirls obliquely ribbed. South ſeas.

argyroſtomus. 104. T. ovate, with undulated ribs and tranſverſe ſtriæ; whirls ventricoſe; 2 inches broad and high. South ſea.

ſinenſis. 105. T. obtuſely pyramidal; black, with a purple band at the baſe; pillar white. China.

lugubris. 106. T. black, with a ſub-convex granulate baſe; minute, with 5 whirls. South ſeas.

aſper. 107. T. obtuſe; whirls round, with many rows of tubercles, grooved and tranſverſely ſtriated; pillar toothed.

teſſelatus. 108. T. conic, convex, tranſverſely ſtriated, with oblong ſquare ſpots diſpoſed in rows; pillar lip ſpotted with black. Mediterranean, Africa.

citrinus. 109. T. conic, convex; citron, with angular black lines. Aſia.

granatu[m]. 110. T. pyramidal, white, variegated with ſcarlet; 2 firſt whirls very large; 2 inches high. South ſeas.

crocatus. 111. T. ſmooth, conic, white with a ſaffron tip.

conchyliophorus. 112. T. whirls round, and obſoletely plaited; aperture compreſſed, browniſh; 2 inches high. South America.

pantherinus. 113. T. convex; white, with green, brown, and fulvous ſpots; 2 rows of tubercles on the whirls; 8 lines long. Senegal.

grandinatus. 114. T. rough, with concatenated globules; baſe convex, with concentric, granulated ſtriæ; lip double-toothed. Palmerſton iſland.

inæquali[s]. 115. T. depreſſed, with belts dotted with white beneath; whirls crowned with ſpines. Friendly iſlands.

tigris. 116. T. gray, with red ſtripes, and tranſverſely ſtriated with white. New Zealand.

pulligo. 117. T. conic, brown, obliquely ſtriated with black. George's bay.

parvus. * 118. T. conic, white; whirls 4, tuberculated. Pembrokeſhire coaſt.

C. *Tapering, with an exſerted pillar, and falling on the ſide when placed upon the baſe.*

teleſcopium. 119. T. imperforated, ſtriated; pillars ſpiral: 4 inches long. Indian ocean.

dolabrat[us]. 120. T. umbilicated, glabrous; pillar with recurved twiſted plaits. South America.

perverſus. 121. T. glabrous, imperforated; whirls reverſed; ſmall. Mediterranean.

puſillus. 122. T. flat at the baſe; finely ſtriated tranſverſely; whirls reverſed; ¼ inch long. Indian ſeas.

undulatu[s]. 123. T. flat at the baſe; longitudinally ribbed; whirls reverſed. Indian ſhores.

124. T.

ntrico- 124. T. cancellated, glabrous at the baſe; whirls reverſed; upper ones ventricoſe; very ſmall. Indian ſands.

ulatus. 125. T. aperture nearly ſquare; whirls reverſed, and ribbed on each ſide; ſmall. Indian ſands.

nineus. 126. T. ſub-pyramidal, umbilicated, ſmooth; white, with a reddiſh tip; whirls ſeparated by a groove.

ictatus. 127. T. whirls with a triple row of prominent dots; imperforated; ſize of a barleycorn. Southern Europe, Africa.

iatulus. 128. T. imperforated; longitudinally and obliquely ſtriated; ſmall. Mediterranean.

-zag. 129. T. ſubſtriated, and marked with darker angular lines; whirls 5 or 6.

aris. 130. T. whirls 5, reverſed; convex, ſmooth, umbilicated.

rtenſis. 131. T. white, with a reddiſh band; pyramidal, nearly imperforated. In gardens in warmer climates.

56 rbo.

Gen. 28. Turbo, *the Wreath.*

Gen. Char.—The animal a limax; the ſhell univalve, ſpiral, ſolid; aperture contracted, orbicular, entire.

Species.

A. *Pillar margin of the aperture dilated and imperforated.*

tuſatus. 1. T. roundiſh, ſmooth, very obtuſe; above ventricoſe. North ſeas.

ritoides. 2. T. ovate, glabrous, obtuſe; minute. Mediterranean, America.

toreus. * 3. T. *periwinkle*; ſubovate, acute, ſtriated; $1\frac{1}{4}$ inch high; finely ſtriated tranſverſely. Shores of Europe; Britain. The animal of this ſpecies is frequently eaten.

midus. * 4. T. pale red; 5 diſtinct, tumid, ſtriated whirls; firſt ventricoſe. England, in woods; very rare.

dix. * 5. T. ſmooth; whirls 5, diſtinct, tumid. Weſtern ſhores of England.

eatus. 6. T. ſomewhat conic, cinereous; variegated with fine zig-zag black ſtreaks. Weſtern coaſts of England.

uricatus. 7. T. umbilicated, ſubovate, acute; ſurrounded with ſtriæ of raiſed dots; pillar margin a little obtuſe; an inch high. Europe, America.

uus. 8. T. ſubovate, ſmooth; aperture lateral, margined; umbilicus covered. Pulo Condor.

nctula-s. 9. T. ſubovate, ſmooth, brown, with paler, flat, dotted belts.

B. *Solid, imperforated.*

nex. * 10. T. oblong ovate; ſtria decuſſated and raiſed with dots; very minute. Shores of Europe, Britain.

llus. * 11. T. ovate, ſmooth; variegated with red and white; minute, tranſparent, gloſſy. European ſeas, ſhores of Britain.

ſciatus. * 12. T. oblong, white, marbled, or banded with black; 6 tumid whirls in the ſpire; $\frac{1}{2}$ inch long. Coaſts of Wales.

rſonatus. 13. T. convex, ſmooth; aperture ſomewhat angular. India.

tholatus. 14. T. ovate, ſmooth, gloſſy; whirls ſomewhat angular on the upper part. India, South America.

chlus. 15. T. ovate, ſtriated, with one ſtria thicker on the back. India.

ryſoſto-us. 16. T. ſubovate, wrinkled; whirls ſurrounded with two rows of vaulted ſpines; yellowiſh, radiated with brown. India.

echinatus. 17. T. ſubovate, wrinkled, with obtuſe vaulted ſpines and whirls; pillar lip expanded, crenated. South ſea, and Friendly iſlands.

tectum perſicum. 18. T. ovate; ſpines obtuſe, depreſſed; beneath papillous. India.

pagodus. 19. T. conic; ſpines obtuſe, concatenated; ſtriæ papillous beneath; 3 inches high. India.

ſulcatus. 20. T. ſubconic; variegated with black and gray, and covered with hollow ſcales. Friendly iſlands.

calcar. 21. T. nearly imperforated, depreſſed; whirls rough; with compreſſed hollow ſpines above. India.

rugoſus. 22. T. ſubovate, ſtriated; whirls rugged above. Mediterranean, New Zealand.

marmoratus. 23. T. ſubovate, ſmooth; 3 rows of protuberances in the whirls; beak dilated behind. South America.

ſarmaticus 24. T. convex, obtuſe; whirls knotty above, and ſeparated by a canal. Aſiatic and African ſeas.

olearius. 25. T. convex, obtuſe, ſmooth, angular. India.

cornutus. 26. T. whirls and ſpire round, with decuſſated ſtriæ; the firſt with 3 rows of imbricated ſpines; a large ſhell. China.

radiatus. 27. T. rugged; whirls round, diſtant, tranſverſely ſtriated, and armed with ſmall imbricated ſpines. Red ſea.

imperialis. 28. T. glabrous, gloſſy green; within ſnowy; aperture ſilvery; pillar lip callous above; whirls of the ſpire very convex.

coronatus. 29. T. wrinkled; white, with greeniſh clouds; tip orange; whirls crowned with ſpines and knots; pillar produced into a beak. Seas of Malacca. Very rare.

canaliculatus. 30. T. grooved and tranſverſely ſtriated; whirls 6, very convex. India.

ſetoſus. 31. T. whirls of the ſpire cylindrical; grooved and tranſverſely ſtriated. India.

ſparverius. 32. T. oblong, with broad, ſmooth ſtriæ; yellowiſh ſpotted with brown. India.

ſpinoſus. 33. T. oblong, tranſverſely ſtriated; ſtriæ ſpinous; aperture ſilvery. India.

moltkianus 34. T. ſilvery gray, with tranſverſe orange and yellow bands; whirls of moniliform belts of granulations.

ſpengleri-anus. 35. T. variegated white and yellowiſh; whirls round, tranſverſely ſtriated, and ſeparated by a canal. Indian ocean. Very rare.

caſtanea. 36. T. tranſverſely ſtriated; cheſnut brown, ſpotted with white; whirls 5, ſurrounded with rows of knots. South America.

crenulatus. 37. T. ſilvery gray, ſurrounded with many rows of knots; aperture milk-white within.

ſmaragdus. 38. T. ponderous, ſlightly depreſſed; ſmoothiſh and obliquely wrinkled; 4 whirls in the ſpire; firſt round and larger; 2 inches broad and high. New Zealand.

papyraceus. 39. T. pellucid, thin and finely annulated; firſt whirl large, the next with a band varied with red and white.

æthiops. 40. T. tranſverſely grooved; firſt whirl black, finely ſtriated; the reſt ſilvery; lips bordered with brown.

nicobaricus. 41. T. browniſh, reticulated; whirls ſurrounded with belts; throat golden. Nicobar iſlands.

cidaris. 42. T. ſmooth, with compreſſed roundiſh whirls; the firſt round and very large; aperture compreſſed, ſilvery; pillar a little prominent. India, China.

43. T.

nigerrimus 43. T. ſmooth, deep black; whirls diſtant, with a hollowed margin. Southern ocean.

helicinus. 44. T. ſmooth, nearly imperforated; roundiſh, with contiguous convex whirls; pillar thickened.

punctatus. 45. T. ovate, thick, with a mucronate ſpire; whirls ſmooth, flattiſh; the two firſt very large; 6 lines long. Senegal.

hæmaſtomus. 46. T. ovate, ſolid, glabrous; whirls 6, ſtriated; aperture margined, oval.

torquatus. 47. T. ovate, with convex tranſverſe grooves, and rugged ſtriæ; whirls with a knotty belt. New Zealand.

undulatus. 48. T. ovate, convex, with longitudinal undulated ſtreaks; ſpire obtuſe; mouth ſilvery. New Zealand.

niveus. 49. T. ſpiral, ſnowy, diaphanous, tranſverſely ſtriated; whirls often diſtorted. Nicobar iſlands.

helicoides. 50. T. horny, ſubdiaphanous, ſmoothiſh; ribs 3; whirls diſtant; aperture triangular. Indian ocean.

nitidus. * 51. T. ſmooth, obtuſe; whirls 4; aperture oval. Pembrokeſhire coaſt.

ſcriptus. * 52. T. ſmooth, opaque; whirls 3, with brown lines reſembling characters; aperture roundiſh; minute. Pembrokeſhire coaſt.

coſtatus. * 53. T. opaque; 4 whirls deeply ribbed longitudinally, and finely ſtriated tranſverſely. Devonſhire.

ſubluteus. * 54. T. opaque; 5 longitudinally ribbed whirls; aperture rounded, margined; minute. Pembrokeſhire coaſt.

albulus. * 55. T. opaque; whirls 5, longitudinally ribbed; aperture roundiſh; not margined. Pembrokeſhire coaſt.

reticulatus * 56. T. white, opaque; whirls 4, reticulated. Pembrokeſhire coaſt.

ruber. * 57. T. opaque, ſmooth, with 5 whirls. Cornwall.

interſtinctus. * 58. T. pellucid, ſmooth; whirls 5, finely ribbed. Devonſhire.

ſtriatus. * 59. T. pellucid, white; whirls 5, ſeparated by a fine rib. Plymouth.

ſubarcuatus. * 60. T. pellucid, white, curved towards the tip; whirls 10, longitudinally ribbed. Pembrokeſhire coaſt.

æreus. * 61. T. pellucid; whirls longitudinally ribbed; braſſy between the ribs. Pembrokeſhire coaſt.

elegans. * 62. T. pellucid; whirls 6, ſpirally ſtriated; ribs remote. Pembrokeſhire coaſt.

pellucidus. * 63. T. pellucid, white, with 5 reticulated whirls. Pembrokeſhire coaſt.

canaliculatus. * 64. T. pellucid, whitiſh; whirls 5, longitudinally grooved. Pembrokeſhire coaſt.

diviſus. * 65. T. pellucid, white; whirls 4, each divided into 2 parts; upper one ſmooth; the lower one ſpirally ſtriated. Pembrokeſhire ſands.

C. *Solid, perforated.*

pica. 66. T. conic, rounded, ſmooth; a ſmall tooth near the umbilicus; $3\frac{1}{2}$ inches broad. In moſt ſeas.

ſanguineus. 67. T. umbilicated, conic, convex, ſtriated and ſmooth; whirls ſlightly grooved; ſize of a pea. Africa.

argyroſtomus. 68. T. ſubovate, with tranſverſely ſtriated lines on the back. India.

margaritaceus. 69. T. ſubovate, with ſmooth, elevated, dorſal lines. Indian ocean.

verſicolor. 70. T. glabrous; finely ſtriated tranſverſely, and varied with green and white. South ſea.

71. T. umbilicus rough; whirls, with branched ſpines. India. *delphin*

72. T. depreſſed, knotty; an unequally tuberculated ridge on the back of the firſt whirl. *nodulo*

73. T. ſubmucronate; covered with ſmooth ſpines. *diſtortu*

74. T. baſe convex; whirls radiated with ſpines; 12 larger ones on the firſt; ſmall. South ſea. *ſtellari*

75. T. whirls crowned with lacinated ſpines; the firſt with 9 large ones. Nicobar iſlands. *aculeat*

76. T. baſe flattened; whirls ſpinulous at the lower margin. *ſtellatu*

77. T. whirls convex, and ſeparated by a band, teſſelated with brown and white; colour of a medlar. South ſea. *meſpilu*

78. T. ſurrounded with knotty rings; dirty green, with a reddiſh tip. Indian and South ſeas. *granula*

79. T. ſpire annulated; firſt whirl very large; perforation ſpoon-ſhaped. South ſea. *ludus.*

80. T. black, with double, alternate, black, and cinereous moniliform belts of granulations; pillar 1-toothed; ſize of a nut. Nicobar iſlands. *atratus*

81. T. depreſſed, orbicular; white, varied with brown; lower margin of the pillar denticulated. *dentatu*

82. T. dirty green, varied with brown; whirls 4, firſt large. New Zealand. A large ſhell. *diadem*

83. T. ſmooth, roundiſh, cinereous; whirls ſubſtriated, ventricoſe, flattened at the ſuture. *cinereu*

84. T. thin, diaphanous, white, round; 6 keel-ſhaped whirls in the ſpire; perforations ſpiral. *carinat*

85. T. thin, ſmooth; whirls flattened; 2 lines long. Senegal. *afer.*

86. T. depreſſed, ſmooth, opaque, brown; whirls 4; $1\frac{1}{2}$ line in diameter. *planorb*

87. T. hyaline, ſmooth, ſubcarinated; whirls 6, rounded; lip fringed, reflected. *marginlus.*

88. T. whirls rounded; perforation deep, wide, and funnel-ſhaped. *helicoid*

89. T. pyramidal, with foliaceous wrinkles; perforation large. *foliaceu*

90. T. tranſverſely ſtriated; within margaritaceous. *anguis.*

91. T. granulated, ſlightly umbilicated; within margaritaceous. New Caledonia. *porphyrtes.*

92. T. white, glabrous, ſtriated green. New Zealand. *ſmarag*

D. *Cancellated.*

93. T. navel flattiſh, ſpreading; whirls round, with crenated ſtriæ. *crinellu*

94. T. umbilicated, ſomewhat oblong and obtuſe; whirls round, ſmooth; 4 whirls. Minute. Freſh water near the baths in Tuſcany. *therma*

95. T. *wentle-trap*; conic; whirls diſtant, longitudinally ribbed. Var. 1. perforated with 8 whirls. 2. Imperforated with 10 whirls; 2 inches long. Barbary, Coromandel.—The wentle-trap is a very rare ſhell, and therefore greatly eſteemed among collectors. As a proof of this, in the year 1753, four ſpecimens which were diſpoſed of at the ſale of Commodore Liſle's ſhells in London, brought 75l. 12s. Two were ſold at 16 guineas each; one at 18 guineas, and the fourth at 23l. 2s. *ſcalaris*

* 96. T. *falſe wentle-trap*; taper, not umbilicated; ſpire with longitudinal ribs; whirls ſmooth, ventricoſe, and ſeparated by a deep canal; from 1 to 3 inches long. *clathru*

long. Indian and European seas, Britain, Falmouth, South Devon.

rcula- * 97. T. dusky, with 12 finely tuberculated whirls. Northumberland coast.

iguus. 98. T. tapering, perforated; whirls contiguous; smooth, ribbed. Mediterranean.

atus. 99. T. taper, subcancellated; whirls 8-ribbed, contiguous; crenated above.

eus. 100. T. taper; striæ crowded, longitudinal, raised; size of a barley-corn. Mediterranean.

ulus. 101. T. subcancellated, taper; whirls contiguous; belts interrupted, varicose; size of a barley-corn. Mediterranean.

102. T. ovate, obtuse; whirls contiguous, imbricated, and longitudinally striated, 1½ inch long. South America.

ieus. 103. T. umbilicated, rounded, rather acute; whirls round, with decussated striæ; aperture reflected.

ina. 104. T. oblong, obtuse, with wrinkled striæ; aperture with a dilated, flat, crenated border; 8 lines long. Jamaica.

latus. 105. T. white, cylindrical, reticulated; aperture remote.

o. 106. T. oblong, umbilicated, brown, striated with convex dots; lip white, dilated; 15 lines long. Jamaica.

itus. * 107. T. ovate, imperforated, ventricose; finely striated spirally; 6 lines long. Woods of Europe, Britain.

exus. 108. T. umbilicated, convex, a little prominent; whirls round, substriated; aperture reflected. Southern Europe.

ius. 109. T. umbilicated, oblong; whirls equal; striæ decussated; aperture dilated.

batus. 110. T. subovate, wrinkled, perforated. Coromandel.

E. *Tapering.*

ricatus 111. T. whirls of the spire imbricated downwards; 4 inches long. American islands.

licatus. 112. T. smooth; whirls imbricated upwards; 3 inches long. Tranquebar.

tangu- 113. T. with a single prominent, acute, transverse rib; 4 inches long. Tranquebar.

licatus. * 114. T. whirls with two prominent, acute, transverse ribs; 5 inches long. Coromandel, shores of Britain.

etus. * 115. T. whirls with 2 prominent, obtuse, distant, transverse ribs; 2 inches long. Europe, Guinea, shores of Britain.

bra. * 116. T. whirls 6, prominent, acutely striated; from 2 to 6 inches long. Shores of Europe, Africa and China; Britain.

is. * 117. T. with 8 smooth whirls nearly obsolete. Minute. Shores of Anglesea.

us. 118. T. white, with 8 whirls transversely striated.

iegatus 119. T. whirls of the spire flattish, with 7 obtuse striæ; 2 to 3 inches long. South America, Barbary.

ulinus. 120. T. whirls of the spire with 10 obsolete striæ; 2 to 4½ inches long. European, Mediterranean seas.

ystalli- 121. T. whirls of the spire ribbed; aperture ovate. Denmark.

ulus. 122. T. imperforated, glabrous: whirls rounded, striated. Depths of the Greenland seas.

ulatus. 123. T. whirls with a prominent, margined suture; 1¼ inch long.

* 124. T. pellucid; whirls contrary; sutures subcrenated; aperture 2-toothed behind; 1½ inch long. Europe; roots of trees, Britain. *bidens.*

* 125. T. pellucid; whirls reversed, not crenated; aperture 3-toothed, ¼ inch long. Europe, Britain, among moss, and in old walls. *perversus.*

126. T. obtuse; grooves curved; whirls 11; 7½ lines long. *fusulus.*

127. T. obtuse; groove straight; whirls 9; aperture toothed. *fusus.*

128. T. obtuse, white; grooves oblique; aperture nearly square; whirls 8; 12 lines long. *sulcatus.*

129. T. whirls 9, recurved; aperture 4-toothed; 5 lines long. Bombay, Italy. *quadridens.*

130. T. whitish; whirls 7; aperture 3-toothed; 5 lines long. Italy. *tridens.*

* 131. T. ovate, obtuse, pellucid; 4 to 6 whirls; aperture toothless, oval; 1 line long. Among moss, Britain. *muscorum.*

* 132. T. deep brown, spires 4; first ventricose; aperture oval; size of a grain of wheat. Britain. *ulvæ.*

* 133. T. imperforated, smooth; whirls 5, nearly obsolete; transversely barred. Minute. Pembrokeshire coast. *trifasciatus.*

* 134. T. smooth; whirls 5, obliquely barred; aperture suboval. Minute. Pembrokeshire coast. *membranaceus.*

* 135. T. whirls 5, subobtuse, roundish; minute. Pembrokeshire coast. *interruptus.*

* 136. T. smooth; whirls 5, somewhat angular above. Pembrokeshire coast. *subrufus.*

* 137. T. whirls 3; the first with 3 transverse ridges; minute. Seasalter, England. *strigatus.*

* 138. T. whirls 7, ridged; aperture oval. Seasalter. Rare. *albidus.*

* 139. T. carinated; whirls 7; aperture contracted, margined. Sandwich. Rare. *carinatulus.*

* 140. T. whirls 6; aperture oval, margined; minute. Sandwich. Very rare. *clathratulus.*

* 141. T. thick, barred; whirls 5; aperture round, margined; minute. Sandwich. Rare. *crassus.*

* 142. T. nine whirls, dotted, reversed; aperture contracted; minute. Sandwich. *punctatus.*

* 143. T. whirls 6, reticulated; aperture oval, submargined; minute. Sheppey island. *sheppeianus.*

* 144. T. whirls 3, elegantly reticulated; aperture oval, toothed; minute. Sandwich. *sandvicensis.*

145. T. whirls 5, distinct, transversely striated, barred with white. *obtusus.*

146. T. white, smooth; aperture with a flattish, concave, obtuse, reflected lip. Mediterranean. *auriscalpium.*

147. T. imperforated, glabrous; aperture oval; size of a barley-corn. Mediterranean. *politus.*

148. T. flattish; whirls annulated, and erected on the back; minute. In stagnate waters in Europe. *dactylius.*

149. T. two obtuse, approximate ridges on the whirls of the spire. *obsoletus.*

150. T. subumbilicated, whitish; whirls 12; aperture 5-toothed. *quinquedentatus.*

151. T. pyramidal, ventricose, horny, pellucid; aperture compressed; above one-fourth of an inch long. Germany. *pyramidalis.*

* 152. T. conic, smooth, glossy; whirls 5 or 6; aperture suboval; pillar furnished near the middle with 1 tooth; two-tenths of an inch long. Salcomb bay. *unidentatus.*

Gen.

Helix.[57]

Gen. 29. Helix, *Snail.*

Gen. Char.—The animal a limax; ſhell univalve, ſpiral, ſubdiaphanous, brittle; aperture contracted, ſemilunar, or roundiſh.

SPECIES.

A. Whirls with a keel-ſhaped acute margin.

ſcarabæus. 1. H. ovate, both edges keel-ſhaped; aperture toothed. Mountains of Aſia, and the Friendly iſlands.

lapicida. * 2. H. umbilicated; convex on each ſide; aperture tranſverſe, margined, ovate; $\frac{1}{2}$ inch in diameter. Rocks, woods, and hedges in Europe, Britain.

marginata. 3. H. ſubumbilicated, a little depreſſed; obliquely ſtriated; aperture tranſverſe; 9 lines in diameter.

cicatricoſa. 4. H. umbilicated, depreſſed and wrinked; whirls reverſed.

ægophthalmos. 5. H. umbilicated, depreſſed, greeniſh, immaculate; whirls 7; an inch acroſs. India, South America.

oculus capri. 6. H. ſubcarinated, umbilicated, convex; aperture margined. Trees in Aſia.

albula. * 7. H. umbilicated, flattiſh; gibbous beneath; aperture ſomewhat heart-ſhaped. Europe, Britain, rocks and dry banks.

maculata. 8. H. perforated, flattiſh, ſubcarinated; white, dotted with brown; gibbous beneath, with linear bands; 5 lines acroſs.

albina. 9. H. perforated, flattiſh, white, gibbous beneath; aperture quadrangular.

ſtriatula. 10. H. ſubcarinated, umbilicated, convex, ſtriated; more gibbous beneath; aperture roundiſh, lunated; minute. Water-falls of Lombardy.

algira. 11. H. ſubangular, umbilicated, convex, whirls 6; navel pervious.

leucas. 12. H. ſubcarinated, umbilicated, convex, ſmooth; beneath gibbous; navel very minute; aperture roundiſh, lunate.

lævipes. 13. H. perforated, ſubcarinated, contrary, convex, pale with a rufous band, united to a white one; $\frac{1}{4}$ inch in diameter.

exilis. 14. H. perforated, depreſſed, ſubcarinated; pale with a rufous band joined to a white one; whirls ſtriated; 10 lines acroſs. Tranquebar.

vermiculata. 15. H. ſubglobular, depreſſed, rough, imperforated; dotted with white; lip reflected, white. Italy and Portugal.

candida. 16. H. umbilicated, convex on each ſide; aperture not margined.

ſpadicea. 17. H. perforated, umbilicated, cheſnut; whirls 5; 7 lines high.

incarnata. 18. H. perforated, ſubglobular, ſubcarinated; whirls 6; lip fleſh-coloured; 6 lines broad. Woods of Denmark and Germany.

ſericea. 19. H. perforated, ſubglobular, convex on each ſide; tomentoſe. Denmark, in gardens.

coronulata. 20. H. perforated, globular, ſubcarinated and ſtriated; white, with a brown band; $3\frac{1}{2}$ lines wide. Lyons.

planorbis. * 21. H. ſubcarinated, umbilicated, flat; above concave; aperture oblique; ovate and acute on each ſide. Ponds and rivers of Europe and Barbary, Britain.

complanata. 22. H. carinated downwards, umbilicated, convex; flat beneath; aperture ſemi-heart-ſhaped. Ponds and rivers of Europe.

ringens. 23. H. ſubcarinated, imperforated, convex, with an inverted, ringent aperture; lip 4-plaited behind; $1\frac{1}{2}$ inch wide. India.

ſinuata. 24. H. imperforated, ſubcarinated, reddiſh brown, with a white ridge; aperture tranſverſe; toothed and 3-plaited behind; 9 lines in diameter. America.

lucerna. 25. H. imperforated, white; flattiſh above; beneath gibbous; aperture tranſverſe, 2-toothed; 13 lines broad.

lampas. 26. H. imperforated, flattiſh above, beneath gibbous; whirls ſcared. A rare ſhell.

carocol[...] 27. H. imperforated, a little convex on each ſide, with a white tranſverſe lip. India.

lychnuc[...] 28. H. imperforated, top-ſhaped, white, with fulvous bands; aperture tranſverſe, 2-toothed.

cepa. 29. H. ſubglobular, umbilicated, ſubcarinated; yellowiſh, with a whitiſh band; aperture tranſverſe, 2-toothed, and ſinuated behind.

cornu-m[...] tare. 30. H. ſubcarinated, imperforated, convex; aperture with a white margin. India.

pellis-ſe[...] pentis. 31. H. ſubcarinated, with flame-coloured, red, and white bands; beneath ſurrounded with 4 rows of dots; aperture fringed. Warm parts of America.

vortex. * 32. H. flat, thin, concave above; aperture oval, flat; 3 lines wide. Ponds and rivers of Europe, Britain.

ſcabra. 33. H. ſubcarinated, imperforated, ovate, pointed, and ſtriated.

gothica. 34. H. convex on each ſide; horny, with ſubferruginous bands. Woods of Sweden.

gualteri[...] ana. 35. H. imperforated, depreſſed, with decuſſated ſtriæ; aperture acute on each ſide. India. A land ſpecies, very rare.

tricarinata. 36. H. top-ſhaped, acuminated, with convex ſpiral ſtriæ, and triple ridge; aperture dilated; 11 lines wide.

iſogono-moſtom[...] 37. H. browniſh, depreſſed; firſt whirl round; aperture contracted; nearly triangular; 3-toothed and margined. Virginia and Alſace.

oculusc[...] munis. 38. H. depreſſed, umbilicated; whirls contiguous; the firſt large; aperture oblong, ovate.

affinis. 39. H. umbilicated, convex on each ſide; variegated with white and cheſnut; aperture winged and ſlightly margined.

margin[...] 40. H. umbilicated, obliquely ſtriated; convex above; beneath a little depreſſed; firſt whirl carinated; $1\frac{1}{2}$ inch broad.

ſinuoſa. 41. H. ſubcarinated, imperforated; convex on each ſide, with hollow dots; aperture tranſverſe; 7-toothed; whirls 6.

maculo[...] 42. H. umbilicated, ſubcarinated, obliquely ſtriated and a little depreſſed; aperture lunated, with a margined lip.

punctat[...] 43. H. ſubumbilicated, ſubcarinated, aperture tranſverſe, oblong; lip margined, 3-toothed.

vitrea. 44. H. ovate, glabrous; whirls 5; the firſt gibbous, the reſt carinated; aperture oblong-ovate; 2 inches high.

annula[...] 45. H. umbilicated, depreſſed, white; whirls 4, the firſt gibbous and doubly carinated; aperture ovate; 2 lines in diameter.

rhenan[...] 46. H. umbilicated, white, depreſſed above; whirls carinated

carinated and irregularly ſtriated, the laſt brown. Rhine.

via. 47. H. depreſſed, umbilicated; white, with longitudinal black ſpots above, and 5 bands beneath. Santa Cruz.

rugata. 48. H. umbilicated, wrinkled, and obliquely ſtriated; aperture lunated. Jamaica.

a. 49. H. imperforated, ſmooth, ſaffron, with brown margin, and baſe of the whirls; aperture blue. Otaheite.

nata. 50. H. rounded, brown; whirls carinated; aperture ſinuous. New Zealand.

inata. * 51. H. ſtriated, carinated; whirls 3; aperture ſuboval; minute. Freſh water near Feverſham, England.

B. *Umbilicated; whirls rounded.*

nea. * 52. H. above umbilicated, flat, blackiſh; whirls 4. Freſh waters, Europe, Coromandel, Britain.

orbis. 53. H. concave on each ſide, flat, whitiſh; whirls 5, rounded; 1½ line diameter. Stagnant waters, France, Germany.

ygyra. 54. H. flattiſh, orbicular; aperture oval; lip fringed.

torta. 55. H. ſubumbilicated, flat on each ſide, equal; aperture linear, arched; 1 to 2 lines wide. Stagnant waters of Europe.

da. 56. H. poliſhed, yellowiſh, above convex, umbilicated; flat beneath, perforated; 1 to 3 lines in diameter. Ditches of Denmark.

2 57. H. white, umbilicated on each ſide; aperture dilated; 1 to 2 lines wide. Denmark, aquatic plants.

ilis. 58. H. pellucid, umbilicated above; ſtriated with dots. Ditches in Denmark and Berlin.

nu-etis. 59. H. umbilicated, flattiſh; aperture oval; 12 to 16 lines in diameter. China.

ida. * 60. H. umbilicated, convex, hiſpid, diaphanous; whirls 5; aperture roundiſh, lunated. Woods of Europe. Britain.

bulla- 61. H. ſubumbilicated, ſubglobular, glabrous; whirls above more ventricoſe; aperture large, ovate, oblong; 1 to 5 inches wide. Aſia and America.

inalis. 62. H. globular, perforated; reddiſh brown; whirls four. Fiſh ponds of Denmark.

lla. 63. H. globular, perforated; aperture rolled ſpirally inwards. Lakes of Germany.

rica. 64. H. globular, horny, with an obtuſe crown; 1 to 2 lines wide. Seas of Denmark.

atia. * 65. H. ſubumbilicated, ſubovate, obtuſe; aperture roundiſh, ſemilunar; reddiſh brown, with obſolete, paler bands. Woods of Europe, Britain.—This ſpecies was a favourite diſh among the Romans. It is ſtill uſed as an article of food in many parts of Europe, during the ſeaſon of Lent. It was introduced into England by Sir Kenelm Digby, as a cure for conſumption.

uca. 66. H. umbilicated, roundiſh, pointed; lip margined; aperture oval.

ina. 67. H. ſubumbilicated, convex, obtuſe; yellowiſh, with a brown band; from 12 to 18 lines wide. Woods of Jamaica and China.

anea. 68. H. perforated, ſubglobular, dull cheſnut, with a rufous band united to a white one; whirls 7, ſtriated.

69. H. perforated, ſubglobular, with hollow dots *rapa.* and a red band; firſt whirl larger; 8 lines wide.

70. H. globular, ſubumbilicated, white; lip reflect- *globulus.* ed; whirls 5.

71. H. imperforated, depreſſed; gray, with white *lactea.* dots; aperture red brown. Jamaica and Portugal.

72. H. depreſſed, umbilicated, white, with a cut *inciſa.* margin.

* 73. H. umbilicated, convex, pointed; aperture ſub- *arbuſtorum.* orbicular, a little reflected at the rim, brown, with a ſingle black ſpiral band; 9½ lines wide. Shrubberies and hedges, Britain.

74. H. nearly imperforated, globular, pellucid; *fulva.* fulvous, with a white lip; 1 to 3 lines wide. Woods of Denmark.

75. H. ſubimperforated, ſubglobular, ſtriated; whirls *epiſtylum.* 7; 12 lines in diameter.

76. H. ſubimperforated; white, with rufous lip and *cincta.* bands; whirls 5; 18 lines wide.

77. H. ſubimperforated, ſubglobular; white, with *ligata.* rufous bands; whirls 4; 14 lines wide. Italy.

78. H. ſubimperforated, ſubglobular; pale yellow, *aſperſa.* with 4 rufous bands, interrupted with white ſpots; whirls 4; 12 to 18 lines in diameter. Italy.

79. H. ſubimperforated, ſubglobular; pale, imma- *extenſa.* culate; aperture large; whirls 4, diſtant.

80. H. perforated, globular; white, with ſubinter- *piſana.* rupted red bands; lip roſy; 5 to 7½ lines wide. Barbary, Italy.

81. H. perforated, with a depreſſed crown; white, *ſtrigata.* with rufous bands, and numerous lines; lip white on each ſide; 10 lines wide.

82. H. perforated, globular, poliſhed; white, with *nemorenſis.* brown bands; 15 lines wide. India.

* 83. H. umbilicated, convex, ſlightly depreſſed; a- *zonaria.* perture rather oblong and margined; whirls 5; firſt ventricoſe; 11 to 13 lines in diameter. Barbary, Europe, Britain.

84. H. umbilicated; ſubdepreſſed, ſtriated, white; *ſtriata.* 6 lines wide. Italy.

* 85. H. umbilicated, depreſſed, yellowiſh, with a *ericetorum.* brown band or bands; 4 to 11 lines wide. Europe, Britain.

* 86. H. umbilicated, ſubdepreſſed, fulvous, horny, *nitens.* or yellowiſh green; ſubſtriated; aperture large; whirls 4 or 5; 1 to 4 lines wide. Wet woods of Europe, Britain.

87. H. umbilicated, cinereous; whirls 4; rib tranſ- *coſtata.* verſely plaited; aperture circular; 1 line wide. Highlands of Denmark.

88. H. umbilicated, ſubdepreſſed; aperture circi- *pulchella.* nate; lip white, reflected; whirls 4; 1 line wide. Moiſt woods of Denmark.

89. H. umbilicated, ſubdepreſſed, with elevated, *rotundata.* tranſverſe lines, and ferruginous ſpots; 2½ lines wide. Moiſt places, and rotten wood, in France, Germany, and Denmark. Common.

90. H. umbilicated, depreſſed; yellowiſh, poliſhed; *cellaria.* white beneath; aperture large; whirls 5; 3½ lines wide. Cellars in Germany.

91. H. umbilicated, depreſſed on both ſides; whirls *obvoluta.* obvoluted. Var. 1. Whitiſh, glabrous, with a triangular aperture. 2. Brown, hiſpid, with a linear aperture; 4 to 5 lines wide. Italy.

strigosula. 92. H. perforated, subdepressed, striated; white, with a rufous band; 5 lines wide. France.

radiata. 93. H. perforated, striated; convex beneath; radiated. France and Virginia.

crystallina 94. H. perforated, depressed, glossy white, diaphanous; 4 to 5 whirls; 1 line wide. Denmark, among moss.

ungulina. 95. H. umbilicated, convex; aperture margined, suborbicular, and elongated above; of the shape of an apple; 16 lines wide. India.

varica. 96. H. globular, umbilicated, whitish yellow; whirls 5, reversed; the outermost divaricated; 19 lines wide.

fruticum. 97. H. umbilicated, globular; aperture without pillar lip; 7½ lines wide. Hedges of Denmark.

lucena. 98. H. subglobular, umbilicated; gibbous beneath; lip reflected, white; whirls 5, the first very convex.

vittata. 99. H. Subglobular, subumbilicated; white, with crowded chesnut bands and blue crown; lip reflected, white; 9 lines in diameter. Coromandel.

rosacea. 100. H. subglobular, subumbilicated; flesh colour, and transversely striated; whirls 5; 19 lines wide.

itala. 101. H. umbilicated, convex, obtuse; whirls 5, round; navel wide; size of a nut. Southern Europe. A land species.

lusitanica. 102. H. umbilicated, perforated, convex, obtuse; whirls 5, round, and yellowish white; umbilicus spreading; size of a small apple. Southern Europe. A land species.

mammelaris. 103. H. umbilicated ovate; whirls 3; striated; aperture large, ovate, and united to the tip. Rivers of Africa.

hispana. 104. H. umbilicated, convex; whirls 5, round; umbilicus thin, perforated; aperture suborbicular. Southern Europe.

lutaria. 105. H. umbilicated, ovate, oblong; finely striated; aperture white within.

ovalis. 106. H. perforated, ovate, ventricose, and streaked; tip ribbed and rosy; lip of the same colour; pillar white; whirls 6; 4 inches long.

oblonga. 107. H. perforated, ovate, oblong, striated; lip and pillar rosy; whirls 6; aperture oval; 3 inches long. South America and India.

flammea. 108. H. perforated, oblong; white, with longitudinal, rufous bands; pillar reflected; straight; 18 to 20 lines long. Guinea.

pileus. 109. H. top-shaped, white with rufous bands; whirls 6; aperture transverse, large; 15 lines long.

nucleata. 110. H. top-shaped, umbilicated; convex on both sides; brown, with prickly ribs; lips whitish; ¼ line wide. Woods of Denmark.

volvulus. 111. H. top-shaped, umbilicated, acuminated; aperture circinated; 11 to 22 lines wide.

involvulus. 112. H. top-shaped, umbilicated, pointed; white, with spiral, convex striæ; aperture circinate; 13 lines wide.

neritina. 113. H. glabrous, hardish, umbilicated; chesnut, with white bands; whirls flat beneath; aperture ovate, oblong; 1 inch long.

turturum. * 114. H. umbilicated, rounded, thin; aperture semilunar. Woods of Europe; Britain.

olivetorum. 115. H. umbilicated, a little depressed, yellow; aperture compressed; first whirl flattish, round. Olive groves, Florence.

badia. 116. H. umbilicated, subglobular, smooth; aperture linear; 1 inch high.

cretac 117. H. subumbilicated, smooth; whirls convex; aperture lunated; 10 lines high.

pileat 118. H. subumbilicated, conic, white, with chesnut bands; aperture semilunar; tip obtuse.

fuscesc 119. H. rounded, subumbilicated, thin; aperture semilunar. Thuringia.

terrest 120. H. umbilicated, with an obtusely mucronate spire; first whirl very large, the rest gradually decreasing; aperture margined, semilunar; whirls 6.

nivea. 121. H. rounded, umbilicated, thin, glossy white; aperture semilunar.

media 122. H. flat on both sides, umbilicated; whirls 6, the first round; aperture suborbicular. Germany.

tenell 123. H. umbilicated, very thin, flat, polished, and convex above; aperture compressed, semilunar; whirls 5, contiguous.

crepus laris. 124. H. umbilicated, depressed, white; whirls 6, round, 3d and 4th brown, the last reddish at the tip; aperture semilunar, smooth. Guinea.

hyalin 125. H. umbilicated, pellucid; beneath hemispherical, white; whirls reversed. Shores of Guinea.

avella 126. H. umbilicated, obtusely subtriangular, rough, plaited and silvery within; aperture smooth, eared; first whirl with an elevated circle; size and colour of a nut; pillar lip white. Southern ocean.

rufesc 127. H. inflated, subumbilicated, fragile; whirls 5; first very large; aperture semilunar; 6 lines wide. Rivers of Hamburgh.

pervi 128. H. umbilicated, obtusely subpyramidal; whirls 4, convex; the first with an elevated circle; the rest surrounded with a groove; aperture semilunar; minute.

lævis 129. H. umbilicated, oblong; whirls round and smooth; aperture orbicular.

fascio laris. 130. H. umbilicated, pellucid; whirls 3, divided by a groove; aperture orbicular and not margined. The animal, besides the two tentacula, is furnished with a crest. Waters of Strasburg and Paris. Very rare.

holos cea. 131. H. umbilicated depressed; first whirl villous, flat; aperture triangular, margined; whirls 6; ½ inch wide. France and Switzerland.

turgi 132. H. thin, fragile, white, umbilicated; first whirl round, inflated; whirls 6; ¾ inch wide. Waters of Hamburgh.

tenu 133. H. umbilicated, pellucid, horny, transversely striated, and convex; whirls 6, gradually decreasing; aperture semilunar; 4 or 5 lines in diameter.

corn 134. H. cartilaginous, horny, pale yellow, subpellucid, gibbous. Kurile islands.

corn nato 135. H. depressed, deeply umbilicated. Leaves and branches of trees, Senegal.

eleg 136. H. pyramidal, white, umbilicated; whirls 6, acute, flattish, and margined. Barbary and Southern Europe. A land snail.

cook 137. H. pyramidal, smooth, white, obtuse; base imperforated, convex. South sea islands.

bide 138. H. pyramidal, subcarinated, very finely striated; lip reflected, 2-toothed. Botanic garden at Strasburg.

tur 139. H. pyramidal, subimperforated, varied with yellow and rufous. Coromandel.

140. H.

ciata. 140. H. conic, ovate, white, with 3 brownish bands in the first whirl; aperture fringed; lip white, dilated. Tranquebar. A land species.

141. H. conic, ventricose, perforated, pellucid, with a black tip; first whirl with 3 yellowish bands. Bengal.

oides. 142. H. top-shaped, perforated, polished; longitudinally striated; whirls reversed, the first keel-shaped; aperture angular.

tosa. * 143. H. umbilicated; whirls 3, bristly; aperture roundish; minute. Boggy ground, Pembrokeshire.

lata. * 144. H. whirls 3, longitudinally striated; tube at the base margined; minute. Coast of Pembrokeshire.

ata. * 145. H. subumbilicated, smooth; whirls 3, first more ventricose; aperture dilated; minute. Sandwich and Tenbigh.

issima. * 146. H. umbilicated; whirls 2, transversely striated; minute. Pembrokeshire coast.

or. * 147. H. slightly umbilicated, smooth; whirls 2; minute. Pembrokeshire coast.

sa. * 148. H. subglobular, umbilicated; mouth roundish; margin thorny; minute. Near Feversham. Rare.

ulata. * 149. H. subumbilicated, reticulated; mouth rounded, margined; minute. Reculver. Very rare.

C. *Rounded and imperforated.*

ersa. 150. H. subumbilicated, ovate, oblong; whirls 5 to 8, contrary; 18 to 28 lines long. India.

ra. 151. H. conic, yellow; lip reflected, white; whirls 6 to 7; aperture ovate; 18 to 22 lines long.

a. 152. H. conic, a little pointed; whitish with a rufous band and streaks; lip reflected; whirls 7; 2½ inches long.

rsa. 153. H. conic, pointed; whirls 8, obliquely streaked, contrary; 2½ inches long. Mauritius and Bourbon islands.

rrupta. 154. H. conic, pointed, white with fulvous streaks; lip white, reflected; whirls 7; 22 lines long.

raria. 155. H. conic, pointed; whirls contrary; white, with undulated, interrupted, brown streaks; 15 lines long; very rare.

a. 156. H. subcylindrical, glabrous, contrary, barred; pillar yellow; lip slightly reflected; 12 to 16 lines long; very rare.

naria. 157. H. glossy, whitish, thin, longitudinally striated; spire contrary, hemispherical; minute. Armenian coast.

aicen- 158. H. globular, chesnut-brown, barred with white; lip fringed, white; crown obtuse. Jamaica.

dia. 159. H. subglobular, depressed; base concave; aperture lunated. Rhode island.

osa. 160. H. oblong, polished, white, diaphanous; whirls 8; aperture ovate, toothless; 11 lines long. India.

ica. 161. H. oblong, a little wrinkled, rosy; whirls 6; aperture toothless; 20 lines long.

thina. 162. H. nearly imperforated, roundish, obtuse, diaphanous and very brittle; aperture dilated behind, with an emarginated lip; 1 inch broad and high. In most seas.—The animal which inhabits this shell shines in the night, and stains the hand with a violet or purple dye.

antea. 163. H. imperforated, roundish, solid, with a depressed spire; whirls 6, contiguous.

ipara. * 164. H. imperforated, ventricose, subovate, obtuse; whirls 5 to 6, very convex; aperture nearly orbicular; 1½ inch long. Stagnant waters of Europe, Britain. This species is viviparous.

fasciata. 165. H. ovate, ventricose; white with 3 shining red bands; whirls 5; spire acute; 9 to 15 lines long. Italy.

dissimilis. 166. H. subovate, pointed, yellowish-white, with a black lip; whirls 6. Tranquebar.

nemoralis. * 167. H. perforated, roundish, thin, pellucid, and marked with variously coloured transverse bands; whirls 5, from 9 to 11 lines wide. Woods of Europe, Britain.

hortensis. * 168. H. *Garden Snail*; imperforated, globular, pale, with broad, interrupted, brown bands; lip white; 7 to 8 lines wide. Gardens and orchards, Europe, Britain.—This species is extremely destructive to the tender leaves of plants, and fruits. It is oviparous; the eggs are round, and about the size of small peas.

lucorum. 169. H. imperforated roundish, smooth; whitish, with rufous streaks and bands. Southern parts of Europe.

grisea. 170. H. imperforated, subovate, obtuse, gray with two pale bands; aperture rather oblong. Woods of Europe.

hæmastoma. 171. H. imperforated, roundish, brown, with a longitudinal white band; whirls 5, round, first large; aperture pure purple; 1½ inch broad. Ceylon.

pulla. 172. H. imperforated, subovate, brown striped; whirls 4; aperture oblique, margined, whitish; 2 inches broad.

venusta. 173. H. imperforated, subovate; sulphur with a white band margined with red; whirls 4; lip reflected, margined; 10 lines broad.

picta. 174. H. imperforated, subglobular, glabrous; whirls 4, round, first ventricose, the others depressed; aperture lunar. Italy.

variegata. 175. H. imperforated, subovate, covered with a brown cuticle, under which it is barred; aperture white within. Italy.

solida. 176. H. imperforated, solid, ovate; whirls 6, round, contiguous; pillar thickened; 1 inch long.

aperta. 177. H. imperforated, subglobular, finely striated longitudinally; whirls 3, first ventricose; aperture lunar; pillar spiral.

versicolor. 178. H. imperforated, roundish, and transversely striated; whirls round, the first ventricose; aperture ovate.

afra. 179. H. imperforated, ovate; whirls 6, flattish, contiguous; aperture unequal, 5-toothed; 3 lines long. Senegal.

nucleus. 180. H. imperforated, ovate, transversely striated with black belts; aperture sinuous. Otaheite.

coccinea. 181. H. imperforated, ovate, smooth, red; aperture pale yellow. New Zealand.

variegata. * 182. H. imperforated, subpellucid, smooth, with red lines; whirls 4, the first more ventricose; minute. Welch coast.

fulgida. * 183. H. whirls 3; aperture rounded, margined; minute. Welch coast.

striata. * 184. H. striated; aperture suboval; whirls reflected on the back; minute. Sandwich. Very rare.

D. *Tapering.*

decollata. * 185. H. imperforated, tapering; spire mutilated, truncated; whirls 4 to 7, first large; 6 to 15 lines long. Europe, Asia, and Africa; Britain.

 186. H.

scalaris. 186. H. conic, tapering, imperforated; whirls 5, ventricose, remote; spire obtuse; aperture ovate.

circinata. 187. H. hyaline, transversely ribbed, perforated, and a little tapering; whirls distant; aperture circular; 6 lines high.

subcylindrica. 188. H. imperforated, tapering, subcylindrical, obtuse; whirls 4; aperture ovate; size of a grain of rye. Fresh waters, north of Europe.

stagnorum. 189. H. subperforated, and a little tapering; whirls 5; aperture ovate; minute. Fresh waters.

octona. * 190. H. subperforated, tapering; whirls 8; aperture roundish; 4 lines long. America, Europe, Britain.

tenera. 191. H. tapering, convex, striated; pillar sinuated, inflected; whirls 7 to 8, with incumbent margins; aperture ovate, oblong; 2½ inches long.

columna. 192. H. tapering, white, with a fulvous tip; whirls 7 or 8, contrary, spotted; aperture oblong; 27½ lines long.

pella. 193. H. imperforated, ovate, pointed, transversely striated; brown, with yellow bands; band on the first whirl double, on the rest single. Iceland.

plicaria. 194. H. subulate, semipellucid, longitudinally plaited; whirls 10, round; aperture ovate.

undulata. 195. H. subulate, smooth, finely striated transversely; whirls about 12, round; aperture ovate; pillar glabrous.

fuscata. 196. H. subulate, smooth, finely striated transversely; whirls about 10, round; aperture ovate; pillar smooth.

priapus. 197. H. imperforated, tapering, glabrous; pillar somewhat depressed; pillar inflected.

folliculus. 198. H. tapering, pellucid, glabrous; whirls 5 or 6, round, equal; aperture ovate; pillar slightly plaited; size of an oat. Barbary.

sepium. 199. H. tapering, milk-white, longitudinally striated; whirls 7, contiguous; aperture ovate; ½ inch long. Mountains of Southern Europe.

splendidula. 200. H. thin, glossy, pellucid; whirls 6; aperture oblong; ¼ inch long. France.

mitra. 201. H. shell tapering; whirls 8 or 9, distant ribbed; first round, the rest flattish; aperture ovate; 1 inch long.

atra. 202. H. black, tapering, minutely striated; whirls 7, rather convex; aperture oblong, oval; 2 inches long.

cuspidata. 203. H. tapering, horny, finely striated transversely, and longitudinally plaited; lip acute. Rivers of India.

crenata. 204. H. tapering, white, transversely substriated, and surrounded with a crenulated belt near the suture. Rivers of India.

carinola. 205. H. white, tapering, somewhat umbilicated; first whirl a little keel-shaped, with a blackish band.

crocea. 206. H. cylindrical, glabrous, yellowish orange; lip obtuse.

lanschaurica. 207. H. tapering, very glabrous, chesnut-brown with darker spots; throat whitish. Fresh waters, Coromandel.

obtusata. 208. H. white, densely striated, subcylindrical; whirls a little convex; lip margined; 3 inches long.

purpurea. 209. H. ovate, oblong, purplish, tessellated with purple; within iridescent. New Zealand.

E. *Ovate, imperforated.*

pupa. 210. H. coarse, nearly imperforated, ovate, oblong; whirls 6; aperture oblong, lunated. Mauritania.

barbara. 211. H. coarse, oblong, imperforated; whirls 8; aperture roundish, lunated; size of a barley-corn. Algiers.

amarula. 212. H. oblong, imperforated; whirls toothed, spinous; 10 lines long. Rivers of India.

nævia. * 213. H. transversely grooved; white, striated with black; whirls flattish, the first large and round; spire pointed; an inch long. Southern ocean, Plymouth dock.

aspera. 214. H. pointed, cinereous, transversely striated; whirls 7 to 8, toothed, marked with red streaks, and armed with sharp spines; 5 to 8 lines long. Coromandel.

stagnalis. * 215. H. imperforated, ovate, tapering to a point; somewhat angular, by several longitudinal wrinkles; whirls 6 to 7, first ventricose; aperture oblong, oval; 2¼ inches long. Still waters of Europe, Britain.

fragilis. * 216. H. imperforated, ovate, tapering to a point; spire acute; whirls 5 to 7; aperture oblong, oval; 11 lines long. Still waters of Europe, Britain.

glabra. 217. H. cylindrical, pointed, horny; aperture ovate; whirls 8; 4 lines long. Moist meadows of Denmark.

palustris. * 218. H. oblong, pointed, brown; aperture ovate; whirls 5 to 6. Meadows of Europe, Britain.

truncatula. 219. H. ovate, oblong, whirls 5, truncated upwards; aperture ovate; 2 to 5 lines long. Greece.

peregra. * 220. H. subconic, horny, with a sharp point; aperture ovate; 2 to 8 lines long. Stagnant waters of Denmark, Britain.

glutinosa. * 221. H. ventricose, diaphanous, with an obtuse projection; 2 to 3 whirls; aperture wide; 2 to 4 lines long. Denmark, chiefly on the leaves of nymphæa lutea. Marshes at Deal.

putris. * 222. H. imperforated, obtuse, ovate, yellow; whirls 3, the first large, the others minute; aperture ovate; 1 to 8 lines long. Ponds in Europe, Britain.

acuta. 223. H. conic, pointed, white, with a red band; whirls 7; aperture ovate, toothless; 4 lines long. Italy.

papilla. 224. H. conic, perforated; striæ rugged; aperture transverse; whirls 6; 10 lines wide.

minuta. 225. H. subcylindrical; whirls 5; aperture toothless, oval. Greece. Not a line long.

detrita. * 226. H. conic, white, with transverse rufous lines; whirls 6; aperture ovate; 8½ lines long. Saxony, Britain.

ventricosa. 227. H. conic, pale, striated; whirls 7; the 4 outermost nearly of equal width; 8½ lines long. Greece.

obscura. * 228. H. conic, brown; whirls 6; aperture oval, toothless; snail white; above dusky, eyes only black. Roots of trees, Europe, Britain.

lubrica. * 229. H. conic, fulvous, polished; whirls 5 or 6; aperture toothless; 2½ lines long. Moss and wet rotten wood, Britain.

limosa. * 230. H. imperforated, somewhat oblong, pellucid; aperture ovate. Wet meadows of Europe, Sandwich, river Avon.

contortuplicata. 231. H. turbinated, cinereous, nearly imperforated; crown truncated; whirls 5; aperture circinated.

..laris. 232. H. imperforated, greenish; whirls 5, spirally angular; throat wide; 12 lines long. China.

..cu-..at * 233. H. imperforated, ovate, obtuse, clouded with brown; whirls 4 or 5; aperture subovate; 1—4 lines long. Ponds and still waters of Britain.

..u-..a.. * 234. H. imperforated, ovate, gibbous, with a depression in the middle of the lip; whirls 3—5; the first ventricose; spire acute, short; aperture much dilated; 2—15 lines long. Ponds of Europe, Britain.

..ata. * 235. H. whirls 2; first ventricose; the other minute, and placed laterally; pale red, pellucid. Europe, Devonshire.

..ica. 236. H. imperforated, ovate, pointed; whirls 4; wrinkles elevated; aperture ovate, dilated. Shores of the Baltic.

..oidea. 237. H. imperforated, convex, longitudinally striated; aperture roundish.

..icua. 238. H. imperforated, convex, ovate; without lip; aperture extending to the tip. Mediterranean.

..toidea 239. H. imperforated, depressed, with waved striæ; aperture oval; open all the way down; whirls 4, lateral. Mediterranean, Atlantic, Indian and North seas.

..alis. 240. H. imperforated, subdepressed, white; whirls 6; 6 lines wide. France.

..igo. 241. H. cylindrical, glabrous; whirls 4 or 5; round, reversed; aperture square, 6-toothed; 1 line long. In decayed wood. Denmark.

..chium. 242. H. hyaline, subconic, glabrous; whirls 5, round; aperture ovate, with three teeth within.

..igua. 243. H. subimperforated, convex; grooves remote, compressed; aperture semiorbicular. Mediterranean sea.

..eus. 244. H. imperforated, ovate, black; aperture ovate. Waters of Greece.

..m. 245. H. subcylindrical, with decussated striæ; whirls 7, reversed; 3 very large, depressed in the middle. Guinea.

..mora- 246. H. marbled with white, cinereous and blue; whirls 5, round; aperture ovate, ¾ inch long. Rivers of Strasburg.

..tina. 247. H. chesnut, pellucid, thin; whirls 4, narrow; aperture ovate.

..bris. 248. H. ovate, pointed, pellucid, transversely striated; whirls 7, first largest; aperture oblong, ovate; 9 lines long.

..ma. 249. H. ovate, conic, subimperforated; 2 last whirls in the centre of the first; aperture orbicular; 1½ line long.

..ta. 250. H. white, solid, opaque; first whirl twice as large as the rest; aperture large, margined. River Unstrut.

..cans. 251. H. white, opaque, pointed; aperture oval. Waters of Hamburg.

..nda. 252. H. ovate, pointed, subimperforated; first whirl ventricose, large; aperture semicircular; 6 or 7 lines long. Stagnant waters.

..a. 253. H. ovate, pointed; whirls 5; first large, aperture ovate, oblong. Aquatic.

..ida. 254. H. obtuse; whirls 4, distant, inflated in the middle; aperture orbicular, margined; 2 lines long.

..ulef- 255. H. bluish, ovate, pointed; whirls 4, a little ventricose; aperture oblong, rounded; 2 lines long.

256. H. inflated; whirls 4, short; two lower ones distant; aperture orbicular, not margined; 2 lines long. Alsace. *cinerea.*

257. H. imperforated, oblong, white with longitudinal red undulations; whirls 6—7, first thrice as large as the next; 1¼ inch long. *undata.*

258. H. imperforated, oblong, thin, brown; whirls 4; first ovate, and thrice as large as the next; aperture ovate. *teres.*

259. H. subimperforated, oblong, finely striated with white; whirls 5; first twice as large as the next; aperture oval, margined; ½ inch long. *substriata.*

260. H. smooth, brown; aperture triangular, margined; minute. *trigonostoma.*

261. H. ventricose, pointed, cinereous; first whirl large; aperture oval, large; margined on one side; 1½ inch long. *tumida.*

262. H. oblong, pointed, longitudinally ribbed, and transversely striated; whirls 10, equally decreasing; aperture oval; ½ inch long. Coromandel. *acicula.*

263. H. ovate, imperforated; whirls 8—9, round, distant, and equally decreasing; aperture oval; ½ inch long. American islands. *peregrina.*

264. H. oblong, imperforated; whirls distant, ventricose; aperture orbicular; 2½ inches long. Danube. *danubialis.*

265. H. oblong, imperforated, smooth, pointed; whirls inflated; the first larger, the rest gradually decreasing; aperture suboval, margined; 3½ inches long. Danube. *turbinata.*

266. H. oblong, curved, subimperforated; aperture oval, margined; 2½ inches in diameter. Danube. *curvata.*

267. H. thin, smooth, white, with chesnut bands; spire obtuse; whirls flattish; 8 lines to one inch long. *exilis.*

Gen. 30. Nerita, *Nerite.*

58 Nerita.

Gen. Char.—The animal is a limax; the shell univalve spiral, gibbous, flattish at bottom; aperture semiorbicular, or semilunar; pillar lip transversely truncated, flattish.

Species.

A. *Umbilicated.*

1. N. smooth; spire slightly pointed; umbilicus gibbous, and bifid. India, Africa, America. *canrena.*

2. N. with decussated striæ, and impressed dots; spire subclavate; umbilicus gibbous, bifid. American islands. *cancellata.*

* 3. N. smooth, glossy, faintly wrinkled; spire rather obtuse; umbilicus rather closed by the pillar lip, which is gibbous and two-coloured; 2 inches long. Barbary, Europe, Britain. *glaucina.*

4. N. subglobular; umbilicus perforated, equal. Indian ocean. *vitellus.*

5. N. convex; umbilicus somewhat heart-shaped, with a flattened lobe. Cape of Good Hope, Barbary, Indian islands. Extremely rare. *albumen.*

6. N. ovate, glabrous; umbilicus partly covered; whirls 4 or five; aperture ovate. *mammilla.*

7. N. subglobular, solid, bay with white bands; spire somewhat depressed; whirls 4 or 5; an inch long. *leucozonias.*

8. N.

ſpadicea. 8. M. ſubglobular, ſolid; tip bluiſh; lateritious bands in the throat, and a white one on the beak. Mauritius iſland. Rather large.

rufa. 9. N. thin, rufous; umbilicus darker, with a white border; throat with a reddiſh band. Mauritius iſland.

fulminea. 10. N. ſubglobular, with angular, tawney lines, and flattened lobe; white or yellowiſh. Africa. Rare.

ſtercus-muſcarum. 11. N. ſmooth, ſnowy, with rufous ſpots and ſpecks; umbilicus gibbous, bifid. Mediterranean, American ſeas.

orientalis. 12. N. ſubglobular, poliſhed very ſmooth; baſe of the ſpire a little wrinkled; pillar ſnowy. Eaſtern ſeas.

cruentata. 13. N. ſubglobular, white, with red ſpots; lip obtuſe and bluiſh; umbilicus ſpiral.

rugoſa. 14. N. wrinkled; within glabrous; umbilicus bordered with white. American iſlands.

marochi-enſis. 15. N. ſubglobular, ſmooth, light green, browniſh within; livid at the tip; wrinkled at the angle of the whirls. Africa.

ſulcata. 16. N. ſubglobular, obliquely plaited; ſpire with 4 whirls, mucronate; umbilicus bifid.

arachnoi-dea. 17. N. white, reticulated with reddiſh lines, and blackiſh at the tip; umbilicus nearly covered; whirls convex.

vittata. 18. N. ſubglobular, brown, with a double white fillet in the middle; reticulated and denticulated on each ſide. Africa.

melano-ſtoma. 19. N. thin, pellucid, ſmooth, oblong; firſt whirl ventricoſe, flat and large; umbilicus half cloſed; 2 inches long. Indian ſea.

pallidula. * 20. N. ſemitranſparent, horn-colour; whirls prominent; aperture ſemilunar, and patulous; umbilicus large; a ſmall ſhell. Coaſts of Kent and Dorſet.

papilla. 21. N. pellucid, thin, oblong, with decuſſated ſtriæ; dirty yellow; whirls 4; aperture ſuboval; pillar white; umbilicus half cloſed. Tranquebar.

clathrata. 22. N. depreſſed, ovate, tranſverſely undulated and longitudinally ribbed; ribs flat, oblique, and ſemilunar; ſpire papillary. Foſſil in Campania.

valvata. 23. N. flattiſh, with a circinated aperture. N. ſeas.

icelandica. 24. N. globular, ſubacute, thick; whirls 4, ſeparated by deep grooves. North ſeas.

affinis. 25. N. globular, thick; ſpire ſubmucronated; whirls 3. New Zealand.

B. *Imperforated; lip toothleſs.*

corona. 26. N. whirls of the ſpire crowned with ſpines; minute. India, America.

radula. 27. N. grooved, with equal, tuberculated ribs; ſize of a walnut. Indian iſlands.

cornea. 28. N. obſoletely ſtriated; white or pale violent. Red ſea.

fluviatilis. * 29. N. rugged, ſpotted, ſtreaked, or mottled with white and purpliſh brown or pink; mouth cloſed with a teſtaceous operculum; 4 lines long. In ſlow rivers of Barbary and Europe, Britain.

littoralis. * 30. N. ſmooth, with a carious crown; whirls 4 or 5, firſt large; ſize of a horſe bean. Europe, ſhores of Britain. Common.

lacuſtris. 31. N. ſmoothiſh, horny, or blackiſh, ending in a very fine point. Still waters and warm ſprings of Europe; ſuppoſed to be only a variety of N. *fluviatilis.*

magdalenæ 32. N. grooves wide and black; within white; whirls 3; lip ſmooth, 2-toothed; 6 lines long. Magdalene iſlands.

margina-ta. 33. N. thin, with decuſſated ſtriæ; tuberculated; black, with ochraceous ſpots; ſubglobular; aperture margined outwardly.

dubia. 34. N. thin, pellucid, ovate, poliſhed; dull yellow varied with black; outer lip acute; inner glabrous; crown prominent; very rare.

pellucida. 35. N. ſmooth, pellucid; whirls 3; very minute. Pembrokeſhire coaſt.

alba. * 36. N. ſmooth, ſomewhat pellucid; whirls 2; very minute. Pembrokeſhire coaſt.

C. *Imperforated; lips toothed.*

pulligera. 37. N. ſmooth, coarſe, with an excavated eye-like ſmall ſpire: inner lip ſmooth, crenulated; whirls 2, one large, terminating in an acute tooth; 14—16 lines long. Rivers of India.

undulata. 38. N. thin, ſmooth, undulated, with an obtuſe crown; outer lip ſubſtriated, and toothleſs; inner one a little denticulated. India.

aterrima. 39. N. thick, opaque, globular; deep black with coloured lines; outer lip glabrous; inner lip tuberculated, wrinkled.

larva. 40. N. ſmooth, ſubglobular; white, with yellowiſh brown bands; crown obtuſe, lip ſlightly denticulated; middle ſized. Amboyna. Rare.

pupa. 41. N. ſmooth, roundiſh, milk-white; whirls with tranſverſe, parallel, black ſtriæ; lip flat; teeth ſcarcely viſible.

bidens. 42. N. ſmooth; inner lip 2-toothed: ſize of a pea.

viridis. 43. N. ſmooth, green; inner lip crenulated in the middle. Minorca and Jamaica.

virginea. 44. N. ſmooth, ovate, inner lip denticulated; 2 to 10 lines long. India, South America.

polita. 45. N. ſmooth; crown obliterated; lip toothed on each ſide; brown. India, South ſeas.

peloronta. 46. N. ſtriated; lips toothed; inner one flattiſh and wrinkled. American iſlands.

albicilla. 47. N. ſtriated; lips ſlightly toothed; inner one tuberculated. Cape of Good Hope. Indian ocean.

hiſtrio. 48. N. grooved, tranſverſely ſtriated; inner lip toothed; ribs 30, unequal.

plicata. 49. N. grooved; 17 to 20 tranſverſe ribs; outer lip 5 or 6 teethed within; inner convex, wrinkled, with three long, ſtrong teeth, beſide leſſer ones. India.

groſſa. 50. N. grooved, lips toothed; inner lip with a yellow ſpot, and 3 or 4 teeth; convex and wrinkled. Molucca iſlands.

chamæ-leon. 51. N. with 20 grooves, varied with undulated alternate black and white rays; lips toothed; inner one wrinkled and tuberculated. Indian ocean.

undata. 52. N. grooves 30; ribs about 30, flattened; lips toothed; inner one wrinkled and tuberculated. Indian ſeas.

exuvia. 53. N. grooved, with 15 to 19 ribs; lips toothed; inner one tuberculated. India.

maxima. 54. N. ſolid, thick, glabrous; undulated with black and yellowiſh rays; outer lip toothleſs; inner one concave, 4-toothed; a very large ſhell.

textilis. 55. N. angular black lines; with 16 crenated ribs and grooves; outer lip crenated without, and toothed within; inner lip wrinkled above, and tuberculated beneath.

atrata. 56. N. deep black, glabrous, and thinly ſtriated above;

above; both lips white; outer one finely grooved, and ſlightly toothed within. Atlantic and South ſeas.

enſionis. 57. N. with 16 white grooves; ribs ſpotted with white; crown a little prominent; outer lip glabrous on each ſide; inner one concave, yellowiſh and toothed. Aſcenſion iſland; a large ſhell.

cata. 58. N. mouth and lips white; whirls round, ſurrounded with black, parallel ſtriæ; outer lip ſtriated within. Malacca ſeas.

rſicolor. 59. N. with blackiſh bluiſh, red and white ſquare ſpots, and bands, ſpotted with red and white; inner lip ſtriated within, and toothed on each ſide. Antilles iſlands.

a. 60. N. white, radiated with black without; ſtriæ tranſverſe, rounded, ſmooth; inner lip wrinkled and 4-toothed. Indian ſeas.

lata. 61. N. yellowiſh within, ſubglobular, ſurrounded with thicker ſtriæ; interſtices ſnowy; lips white, toothed; outer one crenated without. Nicobar iſlands.

adri-lor. 62. N. ſubviolet with a yellowiſh tip; white within, with elevated black ſtriæ; lips toothed; outer one grooved within; inner one wrinkled. Red ſea.

alaccen-. 63. N. grooved, yellowiſh within; crown a little prominent; outer lip unarmed and crenulated outwardly; inner lip yellowiſh, ſmooth. Malacca.

tilla-m. 64. N. ſubglobular, black; white within; grooved and ſtriated; lips wrinkled and denticulated. Antilles iſlands.

ummea. 65. N. ſubglobular, with crowded tranſverſe ſtriæ; white, with purpliſh undulated rays; outer lip grooved within; inner lip wrinkled above.

lgorans. 66. N. ſubglobular, with crowded tranſverſe ſtriæ; deep black with ochraceous rays; lip ſlightly denticulated; inner one tuberculated in the middle. American iſlands.

ſſelata. 67. N. obtuſe, tranſverſely ſtriated; the ſtriæ marked with nearly ſquare black and white ſpots; both lips denticulated; outer lip ſlightly ſtriated within, inner lip with one or two teeth; concave, glabrous, and denticulated beneath. Iſlands between Africa and America.

faſciata. 68. N. blackiſh with 2 gray bands; crown white. India.

terata. 69. N. ſubglobular, white, with various characters; inner lip crenulated, toothed. India.

olacea. 70. N. ovate, ſolid, ſmooth, violet dotted with white; inner lip denticulated beneath.

nega-nſis. 71. N. ovate, obtuſe, deep black; whirls 3, the firſt turgid, with 25—30 grooves; the two others very minute; 1 inch broad. Senegal.

omon-rii. 72. N. black, ovate, pointed; whirls 3, with 30 grooves; left lip wrinkled. Africa.

icolor. 73. N. variegated with red, black, and white; right lip with 10 teeth; left lip glabrous, with three large emarginated teeth; 9 lines long.

rverſa. 74. N. ſurrounded with belts; ſpire reverſed; aperture 8-toothed. Found only in a foſſil ſtate.

rrita. 75. N. bands alternately white and black; within white; crown much elevated; outer lip acute; whirls 4. Freſh waters in Antilles iſlands.

ulcata. 76. N. blackiſh, tranſverſely ſtriated; the ſtriæ ſpinous; inner lip flattiſh, ſmooth, and ſlightly toothed. India.

59 Haliotis.

Gen. 31. Haliotis, *Sea-ear*.

Gen. Char.—The animal is a limax; the ſhell is univalve, dilated, ear-ſhaped, with a longitudinal row of orifices along the ſurface; ſpire lateral and nearly concealed.

Species.

1. H. *Midas' ear;* roundiſh, both ſides poliſhed; orifices from 8 to 10; 7 to 9 inches long. Indian ocean, Cape of Good Hope. *midæ.*

2. H. ſubovate; outſide tranſverſely grooved, rugged and tuberculated; wrinkles on the outſide undulated. The inner margin of the ſhell has a ridge the whole length, which terminates in one ſpiral turn at the end. This ridge is beſet with tubercles, the laſt 6 of which, or from 6 to 9, are open. The inſide is open, concave, and of a beautiful mother-of-pearl: the length is from 3 to 4 inches; breadth from 2 to 3. It is found on the ſhores in the ſouth of England, after violent ſtorms. It is common in the iſland of Guernſey, adhering to the rocks at the loweſt ebb. The fiſh is eaten by the inhabitants, and the common people adorn their houſes, with the ſhells, by ſticking them on the outſide with plaſter. *tubercu-lata.*

3. H. ovate, ferruginous, tranſverſely wrinkled, and longitudinally ſtriated; 4 or 5 orifices open. Aſia, Barbary. *ſtriata.*

4. H. ovate, longitudinally ſtriated; larger ſtriæ tuberculated; orifices 20 to 30; 4 or 5 open. India. *varia.*

5. H. oval, longitudinally ſtriated, with obſolete tranſverſe ones; orifices about 30, 4 or 5 open; 2 to 4 inches long. Africa, India. *marmo-rata.*

6. H. *aſſes ear;* ſmoothiſh, oblong; margin ſomewhat falcated; nerves on the outſide elevated; orifices about 30, 5 to 7 open; 3 inches long. India. *aſinum.*

7. H. ovate, red, with an elevated angle on the belly; orifices 30, 4 or 5 open. Africa, India. *parva.*

8. H. ovate, greeniſh, ſpotted with brown; ſtriæ elevated, double, tranſverſe; 6 orifices open. Africa. *biſtriata.*

9. H. varied with gray, bluiſh, and red; ovate; ſpire prominent, inflated; 7 to 9 orifices open; 3 inches long. New Zealand. *auſtralis.*

10. H. ovate, ſomewhat convex, ſolid, with decuſſated ſtriæ; orifices flattened; 6 open; 2½ inches long. Guinea. *guineenſis.*

11. H. ovate, imperforated, with prickly ribs; ſpire exſerted; 1 inch long. India. Extremely rare. *imperfo-rata.*

12. H. ovate, imperforated; margin oblique above, and tuberculated within; ſpire reverſed; ¼ inch long. Foſſil. *perverſa.*

13. H. tranſverſely plaited on the outſide; margin broad, thick, and finely ſtriated longitudinally; ¼ inch long. Foſſil near Hildeſia. *plicata.*

14. H. ovate, ſmoothiſh, ſolid; varied with white and green; 6 orifices open; 2½ inches long. *glabra.*

15. H. roundiſh, varied with roſy and white; outer lip crenated; orifices 30, 6 pervious; 7 lines long. South ſea iſlands. *pulcher-rima.*

16. H. ovate, with decuſſated undulated ſtriæ; under ſide irideſcent; 6 orifices open; 1½ inch long. New Zealand. *virginea.*

17. H. ſuborbicular, depreſſed, wrinkled; varied with white, cheſnut, and yellowiſh; orifices in the middle pervious. *ovina.*

18. H. oval, rugged, varied with white and red; ſpotted; inner lip with a very broad margin; 3 to 7 orifices open. *gigantea.*

19. H.

iris. 19. H. ear ventricose, fulvid brown, with transverse wrinkles, and longitudinal, tuberous plaits; under side iridescent; 4½ inches long. New Zealand. Extremely rare.

60 Patella.

Gen. 32. PATELLA, *Limpet.*

Gen. Char.—The animal is a limax; the shell univalve, subconic, shaped like a bason, without spire.

SPECIES.

A. *Having an internal lip; shell entire.*

equestris. 1. P. orbicular, perfoliated outwardly; lip vaulted, perpendicular; 1 inch wide. Indian and American seas.

neritoidea. 2. P. ovate; tip subspiral; lip lateral; size of a cherry; inhabitant red.

sinensis. * 3. P. subconic, smooth; lip somewhat lateral. Mediterranean and Indian seas. On oysters in Salcomb-bay, Devonshire.

porcellana. 4. P. oval; tip recurved; lip placed behind and flattened. India and Goree.

fornicata. 5. P. oval, obliquely recurved behind; lip placed behind, and concave. Barbadoes, Mediterranean.

aculeata. 6. P. oval, brown, with prickly striæ; crown recurved. American islands.

trochiformis. 7. P. conic, longitudinally plaited; internal lip lateral. Tranquebar and Falkland islands.

auricula. 8. P. roundish, with radiated grooves, and striated; crown recurved; internal cavity ear-shaped. Borneo, Santa Cruz.

rugosa. 9. P. ovate, thin, obsoletely wrinkled transversely; margin unequal; lip unequally repand; above 1 inch long. China. It is generally found on the *buccinum spiratum.*

goreensis. 10. P. oval, flat, thin, white, glossy, lamellated on the outside; 5 to 6 lines in diameter. Rocks at Goree.

contorta. 11. P. granulated with white, and fine perpendicular, oblique ribs; lip thin, oblique, and covering half the cavity. Rare.

explanata. 12. P. white, finely striated; crown inclining downwards and dilated, behind which the shell is depressed.

plicata. 13. P. conic, ochraceous, with ferruginous rays within; with longitudinal, transversely striated plaits.

striata. 14. P. white, conic, striated; grooves undulated; crown a little lateral.

solea. 15. P. twisted, pellucid, with ferruginous spots; thinly plaited and transversely grooved above; lip undulated, repand; ½ inch long.

echinata. 16. P. conic, prickly; within glabrous. Found fossil near Crignon.

B. *Margin angular, or irregularly toothed.*

crepidula. 17. P. oval, flattish, smooth; lip semilunar, flat behind. Mediterranean.

laciniosa. 18. P. rays unequal, elevated; thicker and obtuse, on the outside. India.

saccharina. 19. P. angular, with 7 keel-shaped, obtuse ribs. Java and Barbadoes.

barbara. 20. P. toothed, with 19 elevated, vaulted, and muricated rays. Falkland islands.

granularis 21. P. toothed, with elevated, angular, imbricated striæ; 2 inches long. Southern Europe, and Cape of Good Hope.

granat[a] 22. P. angular, with numerous muricated striæ; 1½ to 3 inches long. Jamaica, southern Europe.

vulgata * 23. P. with about 14 obsolete angles, and dilated, acute, crenated margin; crown central; 2 inches high. Marine rocks of Europe and India, Britain.

depress[a] * 24. P. oblong with about 14 angles; crown lateral. Rocks of Europe, Britain,

cerulea 25. P. crenated, subangular; striæ numerous, unequal; beneath blue; blackish, on the outside. Mediterranean.

tuberculata. 26. P. conic, tuberculated; tubercles white, in rows; slightly toothed; retuse behind,

lepas. 27. P. roundish, pectinated; rays imbricated, tuberculated, and transversely striated; crown incurved; 2½ inches long. Chili, Falkland islands.

tricosta[ta] 28. P. oval, three-ribbed; white; striated at the sides; internal margin flattish, a little jagged. Indian ocean.

mytilin[a] 29. P. carinated, rounded on the fore-part, with undulated striæ; brown and pearly within; hinder margin crenated; 1 inch long. South America.

ovata. 30. P. toothed, oval, conic, somewhat compressed; ribbed; brown between the ribs; brown within, with white grooves; 9 lines long.

stellata. 31. P. angular, ovate, depressed; rays 10, elevated, with short, intermediate ribs; 8 lines long.

island[ica] 32. P. solid, ovate, gibbous; unequally ribbed; glabrous within, with alternate, cinereous, and horny rays; margin crenated; 1½ inch long. Shores of Iceland.

cypria. 32. P. oval, subpellucid; ribs 16 to 20; tuberculated and foliaceous on the outside; 1 to 3 inches long. Shores of Cyprus.

costata. 34. P. ovate, a little gibbous, white; ribs 20 to 40; keel-shaped, crowded, unequal, tuberculated; 2 inches long.

leucopleura. 35. P. ovate, dusky; ribs smooth, unequal, white, crowded; crown usually brown; 1 inch long.

striatul[a] 36. P. a little rugged, white, with brown, flexuous striæ, branching outwards; 2 brown spots in the bottom of the hollow.

octoradiata 37. P. convex; ribs 11 to 16; 8 larger, tuberculated; 1¾ inch long. American islands.

rubra. 38. P. toothed; red under the brown skin, with elevated, rounded striæ, and lesser imbricated ones; within white; 1½ inch long.

hepatic[a] 39. P. ovate, gibbous, thin, toothed; liver-colour; striæ elevated, keel-shaped and obtusely spined; crown white; 1½ inch long.

badia. 40. P. subconvex, brown, with 12 larger rays, each surrounded by a rib, and as many lesser ones: 2¾ inches long.

fuscesce[ns] 41. P. flattish, brown, with 10 elevated striæ; crown of a different colour; bottom of a pale liver colour; spatulated spot, edged with glaucous and gold; inner margin brown; 2 to 3 inches long.

maculo[sa] 42. P. flattened; forepart narrow and rounded; yellowish, spotted with brown; crown white; rays 10 or 11 equal, rounded, flat; ¾ to 1 inch long.

rotund[ata] 43. P. suboval, flattened, varied with brown; ribs flat, rounded; crown and bottom differently coloured; 1 to 2 inches long.

pecten. 44. P. ovate, obscurely edged with white; radiated,

ed, ſtriæ diſtant, pectinated outwardly; crown gray; 1 to 2 inches long. North America.

ugata. 45. P. ovate, wrinkled, cheſnut; crown with a white circle; $\frac{1}{2}$ inch long.

radi-c 46. P. oval, brown, radiated with white on each ſide; ſtriæ elevated, pectinated; crown white; bottom yellowiſh; $\frac{3}{4}$ inch long.

acea. 47. P. ovate, olive-coloured; within brown varied with white, with elevated unequal ſtriæ; margin with 2 rows of unequal ſpines; brown, pale yellow; $1\frac{1}{2}$ inch long.

a. 48. P. ovate, wax-colour on both ſides; perpendicularly ſtriated; ribs 13, flattened; bottom white; $\frac{1}{2}$ inch long.

reſſa. 49. P. ovate, with ſtriæ elevated, tranſverſe, browniſh; ſpotted with white, and reaching half way down; crown with a white, impreſſed circumference; and 3 browniſh ſpots; $\frac{3}{4}$ inch long.

antia. 50. P. ovate, ſolid, citron undulated with brown; ſtriæ elevated, crowded, wrinkled; bottom white; 1 inch long.

ulum. 51. P. ovate, denticulated, cinereous, with three black belts; within milk-white, with elevated, unequal ſtriæ, nodulous on the outſide, and ſpinous at the margin; 1 inch long; crown acute, reddiſh or whitiſh.

lata. 52. P. ovate, white; ribs flattened, of unequal lengths; interſtices browniſh; crown obtuſe, with a brown belt; $\frac{1}{2}$ inch long.

gellani-c 53. P. thin, ovate; margin knotty; within pearly, with elevated cheſnut ſtriæ; crown pointed, brown; $\frac{1}{2}$ inch long. Straits of Magellan.

roleuca. 54. P. ochraceous, with three yellow bands, and elevated, acute, unequal ſtriæ; crown white; 1 inch high.

tata. 55. P. white, denticulated; ſtriæ unequal, elevated, acute; crown ſurrounded with a double row of cinereous dots, and a duſky gray band; 1 inch long.

oſa. 56. P. yellow, radiated with brown; ſtriæ unequal, elevated, knotty; crown and bottom white; $1\frac{1}{2}$ inch long.

erea. 57. P. toothed, cinereous; ſtriæ unequal, elevated; interſtices brown and rugged; crown pointed; milk-white or ſilvery.

lbida. 58. P. whitiſh, rays browniſh, and ſtriæ unequal, elevated, rounded; interſtices rugged; crown obtuſe, white, with a broad, interrupted brown band, and another marginal one; $\frac{3}{4}$ inch long.

cellata. 59. P. cinereous and brown, with decuſſated ſtriæ, and 2 rows of tubercles; crown yellowiſh; bottom with a ſpatulated white ſpot; $1\frac{1}{2}$ inch long. Jamaica.

is. 60. P. rounded, ſmooth, yellowiſh, with a broad, citron, marginal band, ſpotted with brown, and another narrower one; margin dilated, acute; crown varied with bluiſh and white; $1\frac{1}{2}$ inch long.

gentea. 61. P. ſmooth, thick, ſilvery; rays 11, brown; margin ſilvery: crown pale yellow; bottom ivory, with a double white ring; 2 inches long. Very rare.

rea. 62. P. white, with ſtrong, rounded, brown ribs; pearly within; crown and bottom copper-coloured; 2 inches long.

ida. 63. P. pale liver-colour on both ſides; ribs keel-ſhaped, alternately larger and leſs; crown flat, white; $1\frac{1}{4}$ inch long.

bra. 64. P. brown, glabrous above; ſtriæ beneath elevated, crowded, white; crown obtuſe, white; border fulvous; bottom fulvous; $1\frac{1}{2}$ inch long.

65. P. yellowiſh, varied with brown; ribs unequal, flattened; crown obtuſe; bottom varied reddiſh and white; 1 inch long. *flaveola.*

66. P. denticulated, compreſſed on each ſide; rounded, yellow, perpendicularly ſtriated; ribs keel-ſhaped; bottom varied, white and cinereous; $1\frac{1}{4}$ inch long. Rare. *infundibulum.*

67. P. rounded, glabrous, white; a ſmall ſhell. *cyathus.*

68. P. ovate, entirely yellow, with undulated grooves; perpendicularly ſtriated within; margin ſcalloped here and there; 3 inches long. China. *ſinica.*

69. P. roundiſh, white, with many coloured dots; radiated at the baſe, and ſurrounded with 2 brown rings; margin flexuous. *punctata.*

70. P. ovate, with annular ſtriæ; black with elevated, unequal ſtriæ; margin crenated; crown and bottom white. *lugubris.*

71. P. ovate, toothed, yellowiſh, with elevated flattened ſtriæ; crown pointed, orange. Liſbon. *ulyſſiponenſis.*

72. P. oblong, red, with elevated, unequal, white ſtriæ; margin crenated. Africa. *umbella.*

73. P. thin, pellucid, ſtriated, blackiſh with olive rays; within glaucous or cinereous; crown pointed; margin crenated, bottom milk-white. Shores of Africa, Malaga, Liſbon. *crenata.*

74. P. ferruginous, with angular or undulated ruſſet lines and cinereous belts; within milk-white, with elevated, knotty ſtriæ; crown pointed; margin plaited. *ferruginea.*

75. P. oval, ochraceous, with elevated black ſtriæ; within ſilvery, ſpotted; crown pointed, white, ſmooth, bottom with a ſtraw-coloured ſpot. *melanogramma.*

76. P. ovate, thin; margin flexuous; within ſilvery, with browniſh rays, and thin, undulated ſtriæ, with bay granulations. Seas of Magellan. *repanda.*

77. P. oval, white, thinly ſtriated, and varied with red ſpots and dots; margin with 8 angles. *anguloſa.*

78. P. oval, ſmooth, poliſhed, pellucid, ſtriated with 7 yellowiſh ribs; bluiſh olive dotted with brown; margin with 7 angles. *tigrina.*

79. P. oblong, flattiſh; bay ſtriated with white; within milk-white, with 11 elevated, unequal ſtriæ; crown rounded, white. American iſlands. *monopis.*

80. P. ovate, toothed, brown dotted with green; with 11 elevated, hollow, broader ſtriæ, and as many narrower ones; crown white. *chloroſticta.*

81. P. thin, white, unequally ſtriated, within pearly; crown with an orange mark, ſurrounded with a yellow ring: margin crenated. Iceland. *margaritacea.*

82. P. oval, thin, ochraceous, with angular cheſnut lines, and 10 to 12 elevated, obtuſe, hollow, unequal ſtriæ. *tenuiſſima.*

83. P. ſolid, ſubconic, tranſverſely plaited; margin flexuous. Barbadoes. *mitrula.*

84. P. ovate, toothed, with 30 elevated, obtuſe, undulated, and tranſverſely wrinkled ſtriæ. Shores of Magellan. *plicaria.*

85. P. whitiſh, obtuſely pentangular; margin crenated, dilated; crown obtuſe; bottom reddiſh. *pentagona.*

86. P. ovate, tender, pellucid; ſtriæ elevated; crown and bottom copper-coloured; $1\frac{1}{2}$ inch long. Straits of Magellan. *ænea.*

87. P. thin, oblong, ovate, with fine undulated ſtriæ; *conchacea.*

ſtriæ; yellowiſh with elevated dark rays; crown recurved. South America.

ſtannea. 88. P. ovate, ſilvery; ſtriæ elevated, flattened; crown obtuſe, copper colour; bottom with an oval bay mark; margin flexuous; 1 inch long.

candidiſſima. 89. P. ſuborbicular; ſtriated; white, with a browniſh band; dotted with brown; margin tranſverſely wrinkled.

C. *With the tip or crown pointed and recurved.*

hungarica. * 90. P. entire, conic, pointed, ſtriated, with a hooked, revolute crown; 2 inches high. America, Mediterranean, and Aſiatic ſeas; ſhores of Britain.

imbricata. 91. P. entire, oblong, imbricated; the crown placed behind.

mammellaris. * 92. P. entire, conic, ſtriated, ſubdiaphanous, with a ſmooth reflected crown. Shores of the Mediterranean and Africa, Britain.

tricarinata 93. P. ſubſtriated, with 3 ribs on the forepart; 2½ inches high.

pectinata. 94. P. entire, ovate, with wrinkled, ſlightly branched ſtriæ; crown nearly central; 2 inches long. Mediterranean.

lutea. 95. P. entire, oval, convex, ſtriated, with a ſubmarginal, reflected, mucronate crown; ſize of a melon ſeed. India.

criſtata. 96. P. crown revolute; back erected, keel-ſhaped.

lacuſtris. 97. P. entire, oval, membranaceous, with a central, mucronate, reflected crown; 1½ to 2½ lines long. Freſh waters of Europe, Britain.

fluviatilis. 98. P. entire, oval, a little horny, with a marginal, mucronate crown; aperture oval; 2½ lines long. Rivers of Europe, Britain.

cæca. 99. P. entire, with elevated dots and ſtriated; crown acute, ſtraight. Bays of Norway, on ſtones.

virginea. 100. P. entire, white, with 18 red bands. Bays of Norway, on fuci.

teſſelata. 101. P. entire, whitiſh, teſſelated with red. Norway, on rocks and fuci.

fulva. 102. P. entire, orange, with a mucronate and nearly vertical crown. Norway.

ſubſpiralis. 103. P. ovate, with an obtuſe nearly ſpiral tip. Norway.

ambigua. 104. P. ovate; margin ſlightly toothed; pointed reflected, ſomewhat acute. Norway.

rubicunda. 105. P. entire, ſubconic, ſmoothiſh, and reddiſh; 2½ lines long. Deeps of Greenland.

borniana. 106. P. ovate, entire, finely ſtriated longitudinally; white with red veins; 6 lines long.

calyptra. 107. P. entire; ribs ſomewhat imbricated; crown hooked; margin ſinuated. North America.

melanoleuca. 108. P. ſtriated, entire, alternately black and white; 1 inch long.

pectunculus. 109. P. oblong, convex, ſlightly toothed, within poliſhed; ſtriæ knotty, elevated; crown bent forwards; 1 inch long.

faſciata. 110. P. ovate, white, with a brown band; ſtriæ elevated, acute; margin dilated, crenated, and cinereous within; 1 inch long.

elegans. 111. P. with decuſſated ſtriæ, white radiated with red; denticulated; crown gray; 2 inches long.

ſquamoſa. 112. P. ſtriæ elevated, and tranſverſely undulated on the outſide; brown, ſilvery towards the margin; crown hooked and bronzed; 3½ inches long.

ſqualida. 113. P. entire brown, whitiſh within; margin bluiſh, radiated with brown, with elevated, obſolete ſtriæ; crown knotty.

crocea. 114. P. ſmooth, ſubangular, yellow radiated with brown; crown obtuſe, white; 1 inch long.

candida. 115. P. ovate ſmooth, white on both ſides, with a roſy belt on the outſide; crown lateral; ½ inch long.

trigona. 116. P. compreſſed, convex in the middle, cancellated, white, with a browniſh band on the outſide, and margined within; crown marginal, obtuſe; ½ inch long.

minima. 117. P. rounded, convex, thin; whitiſh with red ſpots; crown obtuſe, white, marginal; ¼ inch long. Ferro iſlands.

tranquebarica. 118. P. ovate, thin, pellucid, with fine crowded ſtriæ; cheſnut with white ſcales, within milk-white; with a brown ſpot at the bottom, and azure ſpot on the crown. Tranquebar.

perverſa. 119. P. oblong, horny, very thin, pellucid, glabrous, with a ferruginous baſe. Africa.

cernua. 120. P. with decuſſated grooves; thin, pale fleſh-colour; aperture oblong.

incurva. 121. P. entirely white, flat; point of the crown twiſted.

interrupta. 122. P. oval, depreſſed, browniſh, with green dots, diſpoſed in oblique, interrupted rays; crown with an obtuſe hook; 1 inch long.

D. *Entire, and not pointed at the tip or crown.*

afra. 123. P. conic, ſtriated, greeniſh or pale brown; within white; crown glabrous, white, obtuſe; margin glabrous. Iſland of Goree.

luſitanica. 124. P. conic, white, with brown rays marked with ſtriæ granulated with black; crown acute, ſurrounded with a cheſnut ring; very ſmall. Portugal, on the ſea rocks.

radiata. 125. P. rounded, convex, gray, with decuſſated ſtriæ; crown pointed, central, and marked with 12 orange, radiated lines; bottom horny. Jamaica.

areolata. 126. P. pyramidal reddiſh gray, with thin, circular ſtriæ croſſed by longitudinal ones; crown violet.

flammea. 127. P. ovate, with fine annulated ſtriæ, reddiſh gray, with undulated brown rays; crown acute, central; white in the middle.

indica. 128. P. reddiſh gray, with radiated ſtriæ, glabrous, narrower on one ſide; crown acute, ſmooth, ſurrounded with a reddiſh ring; 3¾ inches long. India.

ſurinamenſis. 129. P. thick, ſubovate, yellowiſh, with black rays, and longitudinal, unequal ſtriæ; and ſurrounded with knotty belts; crown obtuſe, ſmooth, white. Surinam.

vitellina. 130. P. ovate, yellow; baſe unequally ſtriated; crown whitiſh, obtuſe.

ſanguinolenta. 131. P. ovate, convex, white, ſolid, with flexuous, elevated, longitudinal ſtriæ, intermixed with capillary ones; crown lateral, ſurrounded with a broad ring, dotted with red. Africa.

lævigata. 132. P. ovate, yellow, within bluiſh white, with oblique flattened ſtriæ, alternately thicker and thinner; crown white, ſmooth, poliſhed.

punctulata. 133. P. rounded, white, with many-coloured dots, radiated towards the baſe, and ſurrounded with 2 brown rings.

pellucida. * 134. P. entire, obovate, gibbous, pellucid, with 4 blue rays; ſize of a walnut. European and northern ſeas, ſhores of Britain.

135. P.

udina- 135. P. entire, acute, ſmooth, glabrous. Indian and North ſeas.

udina- 136. P. entire, ovate, ſtriated; crown obtuſe, nearly central; 14 lines long. Greenland ſeas.

npreſſa. 137. P. entire, oval, oblong, ſtriated, ſmooth; compreſſed on the back; 14 inches long. India.

lica. 138. P. entire, conic, with 50 obtuſe ſtriæ; three inches long.

ca. 139. P. entire, ovate, obtuſe, with 39 cinereous, filiform, elevated ſtriæ.

ata. 140. P. entire, ſtriated, with a ſubmucronate, erect crown; within white, with a black, heart-ſhaped ſpot, white in the middle; minute. Mediterranean.

uciata. 141. P. entire, oval, ſubconvex; brown, with a white croſs; 1 inch long.

iculata. 142. P. entire, conic, compreſſed, with reticulated veins.

urata. 143. P. oval, entire, gilded; within ſilvery, with ſomewhat imbricated ſtriæ; margin with plaited teeth. Straits of Magellan, and Falkland iſlands.

llifera. 144. P. oval, entire, ſtriated; black brown radiated with white; within ſilvery. Friendly iſlands and New Zealand.

dians. 145. P. entire, oval, pellucid, depreſſed, ſtriated, horny, and radiated with black ſpots. New Zealand.

a. 146. P. roundiſh; the inſide ſilvery; the outſide with reddiſh ſtreaks, and a yellowiſh border. Indian and American ſeas.

ıbellata. 147. P. entire, roundiſh, diaphanous; depreſſed with yellowiſh rays within; crown pale yellow; margin very acute; 4 inches long. Indian ocean.

ſtulata. 148. P. thin, oval, depreſſed, radiated, white, dotted with red; within ſmooth; 6 lines long.

mmetri- 149. P. ovate, conic, ſolid; brown divided into partitions, by perpendicular white lines; within ſmooth, white; margin cut archwiſe; 6 lines long.

rina. 150. P. ovate, convex, with fine decuſſated ſtriæ; white, with two broad yellow bands; within whitiſh, with a milk-white bottom; crown browniſh; near 2 inches long.

penſis. 151. P. oval, with decuſſated ſtriæ, longitudinal ones alternately brown and white; within pearly, with a white bottom; 1½ inch long. Cape of Good Hope.

omala. 152. P. coarſe brown, orbicular, with the crown near the margin. Deeps of the ſeas of Norway.

ttata. 153. P. finely ſtriated and varied with dots of different colours; bottom duſky; 1⅕ inch long.

ytilifor-is. 154. P. glabrous, lead colour, with a white, horſe-ſhoe-ſhaped band within; ¼ inch long. Ferro iſlands.

itiformis 155. P. oval, thin, black, with white perpendicular flattened ſtriæ; crown gray; bottom with a browniſh ſpot; not an inch long.

chlearis. 156. P. white, flattiſh; one part narrow, channelled within, with a bluiſh callus, ſhaped like a horſe-ſhoe; the other part rounded; 1 to 2 inches long.

aticulata 157. P. oval, thin, depreſſed, cancellated, radiated; 1 to 1¼ inch long.

uentata. 158. P. oval, convex, varied with red, and ſlightly toothed, with elevated, unequal rough ſtriæ; 1 to 2 inches long.

ıpyracea. 159. P. depreſſed, thin, hyaline, dotted with red, with cheſnut rays outwardly, and crowned thinner, and granulated thicker ſtriæ; an inch long.

lindrica. 160. P. oval, flat, with crowded longitudinal ſtriæ, of unequal thickneſs and all granulated; an inch long.

161. P. ſomewhat convex; white, with crowded red dots; within radiated with red and white, with decuſſated glabrous ſtriæ, and a few longitudinal, thicker, white ones; 1¾ inch long. *decuſſata.*

162. P. thin, depreſſed, white, dotted with red; within browniſh, ſtriated; crown varied with cinereous and browniſh; near an inch long. *hematoſticta.*

163. P. flattiſh, cancellated, cinereous, with a cheſnut ſtar, and rays towards the margin; crown ſmooth, gray, ſurrounded with brown dots; an inch long. *aſteroides.*

164. P. oval, ſomewhat convex, thin; ſtriæ crowded; gray, with blackiſh rays and ſpots; an inch long. *ovalis.*

165. P. a little convex, ſtriated, reddiſh; crown whitiſh, ſpotted with red; bottom whitiſh; 1½ inch long. *rubella.*

166. P. flattiſh, a little wrinkled; ſtriated, reddiſh white, with a cheſnut band towards the crown, and another bay one at the margin; 3 inches long. *ſpectabilis.*

167. P. ſolid, flattiſh, ſtriated; black, with cinereous dots; within bluiſh; crown dirty yellow; two inches long. *conſpurcata.*

168. P. ſolid, flattiſh, ſtriated; whitiſh, with cinereous rays and black dots, diſpoſed in 5 or 6 belts; crown pointed and whitiſh. *melanoſticta.*

169. P. black, ſtriated, with a paler crown; bottom with a browniſh mark, ſurrounded with a white horſe-ſhoe-ſhaped band; 1¼ inch long. *atra.*

170. P. oval, convex, ſolid, glabrous; liver colour within, and the crown browniſh; the latter ſurrounded with a white border, and interrupted, whitiſh band. *ſpecularis.*

171. P. oval, black, within bluiſh, ſtriated; the larger ſtriæ flattened and gray; crown obtuſe, browniſh, with a whitiſh area; 2 inches long. *caneſcens.*

172. P. oblong, flattiſh, dilated on each ſide and ſtriated; olivaceous, radiated, and ſpotted with white; within blue; 1¼ inch long. *vireſcens.*

173. P. rounded, convex, longitudinally ſtriated and tranſverſely wrinkled, browniſh; within ruſſet brown, with whitiſh and browniſh rays, and two milk-white bands above; 1¼ inch long. *pulla.*

174. P. ſuboval, crenated, ſtriated, ochraceous, with red ſpots and rays, broader on one ſide; margin revolute; an inch long. *revoluta.*

175. P. ovate, convex, ſtriated; the ſtriæ ſcaly, varied with white and black; crown gray, nearly central; an inch long. *ſquamata.*

176. P. ovate, finely ſtriated, teſtaceous, with 3 tranſverſe browniſh rings; within pale yellow, with a whitiſh bottom; an inch long. *teſtacea.*

177. P. ovate, thin, brown, with darker bands and paler ſtriæ; within browniſh; crown and bottom white; ½ inch long. *capillaris.*

178. P. ovate, narrower on one ſide, finely ſtriated; bluiſh, with a white band towards the margin, and another bluiſh one; crown and margin white; ¾ inch long. *glauca.*

179. P. ovate, flattiſh, ſtriated; varied with yellowiſh and brown, and dotted with green; within brown; crown bay; ſcarcely ½ inch long. *obſcura.*

180. P. oval, ſubconvex, unequally ſtriated; whitiſh, with a few black lines, reaching half way; near an inch long. *exoleta.*

181. P. oval, flattiſh, ſolid, with a few black rays, reaching *affinis.*

reaching half way; bottom with a ſpatulated white ſpot; ¾ inch long.

rotalis. * 182. P. white, opaque, flat, round; margin regularly toothed. Sandwich. Rare.

fuſcata. 183. P. ovate, convex, finely ſtriated and varied with brown.

mellea. 184. P. rounded, ſolid, glabrous, honey-colour; white within; crown browniſh; margin ſpotted with brown, and ſilvery within; ¾ inch long.

anceps. 185. P. ſolid, glabrous, pointed, pale cheſnut; pale fleſh-colour within.

guineenſis. 186. P. ovate, convex, ſmooth; one ſide broader and cheſnut; the other with the crown pale yellow; margin fleſh-colour on each ſide; ¾ inch long. Guinea. Rare.

complanata. 187. P. depreſſed, hemiſpherical; obſoletely cancellated, varied with white and browniſh; margin white on one ſide.

virgata. 188. P. ovate, longitudinally ſtriated; whitiſh, with brown rays and crown; pearly within.

nivea. 189. P. ſubconic, ſolid, glabrous, ſnowy; with 7 to 8 tranſverſe concentric rings; crown rounded; 4 lines wide. Africa.

griſea. 190. P. oval, with crowded radiated grooves, poliſhed within; crown nearly central; an inch long. Africa.

navicula. 191. P. narrow, with decuſſated ſtriæ; roſy, with a whitiſh callous belt on one ſide in the middle; margin acute, revolute on each ſide; an inch long.

cingulata. 192. P. ſomewhat oval, obſoletely ſtriated, ferruginous, with two elevated, obſcurely barred belts; crown nearly central.

ſcapha. 193. P. clear white, with undulated ſtriæ, narrow; broader ſide with an acute callus; narrower ſide repand; crown towards the narrower ſide; 1¼ inch long.

parva. * 194. P. ſmall, entire, without gloſs, whitiſh, faintly radiated with red; rather larger than a pea. Devonſhire coaſts. Very rare.

E. *With the crown or tip perforated.*

fiſſura. * 195. P. oval, conic, with reticulated ſtriæ; cleft on the fore-part; crown recurved; ½ inch long. European and Barbary coaſts, Devonſhire.

fiſſurella. * 196. P. grooved and perforated on the fore-part; crown recurved; 3½ lines long. Iceland ſeas, Falmouth harbour.

puſtula. 197. P. oval, gibbous, convex, with reticulated ſtriæ; margin crenated; perforation near the poſterior margin. Mediterranean and Indian ſeas.

græca. * 198. P. ovate, convex, reticulated; crown not much elevated; perforation oblong; margin crenulated; length ¾ inch. Foreign ſpecimens 1½ inch. European ſeas, Sandwich.

nimboſa. 199. P. ovate, ſtriated, rugged, brown; perforation oblong; 2 inches long. Mediterranean and Atlantic.

nubecula. 200. P. ſubovate, rugged, white radiated with red; perforation ovate. Mediterranean.

picta. 201. P. ovate, ſolid, clouded white and green, with oblique, undulated, alternate, violet and white rays; 3½ inches long. Straits of Magellan.

barbadenſis. 202. P. oblong, unequally ſtriated; within ſmooth; milk-white with greeniſh bands; margin crenated; perforation circular, and ſurrounded with a cheſnut ring. Barbadoes.

jamaicenſis. 203. P. whitiſh, tranſverſely annulated with longitudinal ſtriæ; covered with foliaceous tubercles; perforation oblong. Jamaica and Barbadoes.

caffra. 204. P. ovate, compreſſed, ſtriated; finely annulated, and radiated with black; bottom milk-white; perforation nearly central.

perfora[ta]. 205. P. A little convex, tranſverſely wrinkled; browniſh, with ſtraw-coloured rays and ſpots; ſtriæ longitudinal, and alternately larger and ſcaly; 1½ inch long.

porphyr[o]zonias. 206. P. oblong, compreſſed, unequally ſtriated; white, with 5 purple, interrupted belts; greeniſh white within; perforation minute, ſurrounded on the inſide with a red circle. North America.

roſea. 207. P. thinly ſtriated with alternate roſy and white rays; perforation oval, and ſurrounded with a red ring on the inſide. Minute.

ſcutellu[m]. 208. P. repand on each ſide, compreſſed; perforation radiated with grooves; from 1 to 1½ inch long.

avellan[a]. 209. P. thin, white, and finely ſtriated; perforation oblong, and divided by a ligament.

ſpinoſa. 210. P. ovate, convex, white; ſtriæ elevated, thicker towards the margin, and marked with four rows of tubercles; exterior tubercles ſpinous; perforation oblong.

denticul[ata]. 211. P. ovate, gibbous; whitiſh, radiated with brown; green within; ſtriæ elevated, ſomewhat rugged, and alternately larger; margin denticulated; crenated within; perforation in form of a parallelogram.

noduloſ[a]. 212. P. ovate, convex; ſtriæ elevated, knotty, croſſing thinner tranſverſe ones; within white; crown black.

anguſta. 213. P. depreſſed, white; ſtriæ elevated, every 4th of which is larger; perforation narrow, ſurrounded with a cheſnut band on the outſide, and a green one within; ¾ inch long.

inæqual[is]. 214. P. ovate, convex; ſtriæ decuſſated; perforation ſurrounded with an elevated ring and red line; 1 inch long.

minuta. 215. P. oval, pyramidal, reddiſh, with 12 elevated white ſtriæ; bottom white; perforation oval and nearly central.

conſperſ[a]. 216. P. ovate, convex, ſtriated; yellowiſh, with red dots and 3 oblique rays; crown central; perforation linear.

rubeſcen[s]. 217. P. oval, ſtriated, reddiſh, with a white band in the middle; margin entire; perforation linear; 1 inch long.

ſanguine[a]. 218. P. oval, thin, red; within greeniſh white; ſtriæ longitudinal, croſſing finer tranſverſe ones, which are rugged outwardly; ½ inch long.

ventrico[ſa]. 219. P. oval, ventricoſe, with red decuſſated ſtriæ; crown depreſſed; perforation orbicular; an inch long.

triradia[ta]. 220. P. oval, flattiſh, ſtriated; white, with 3 brown rays; crown central; perforation linear; ½ inch long.

tenuis. 221. P. pellucid, oval, a little convex; longitudinally ſtriated; white, with 5 half brown rays; perforation with a cinereous margin; not ½ inch long.

melanozonias. 222. P. convex, roſy, with an interrupted black band, and elevated, unequal, white ſtriæ; crown pointed; perforation orbicular, and ſurrounded within with an elevated gray ring; 1¼ inch long.

223. P.

223. P. convex, rofy, with elevated, knotty, white, and alternately larger ftriæ; perforation round and large; 1½ inch long. *a.*

224. P. convex, chefnut; ftriæ unequal, crowded, decuffated; within fmooth, with alternate green and white bands; perforation round, furrounded with a chefnut ring, and an elevated white one within; above an inch long. *cea.*

225. P. convex, white fhaded with red; here and there ftriated with red; within fmooth, white; perforation oval. *fcens.*

226. P. convex, above clear white, and cancellated; longitudinally ftriated towards the margin, with a rofy band; perforation orbicular; an inch long. *idiata.*

227. P. convex, white; ftriæ glabrous, acute, unequal; crown rofy; perforation large, orbicular; an inch long. *ea.*

228. P. convex, rofy, ftriated; ribs 12, fmooth; within fmooth, and greenifh white; one and one-fourth of an inch long. *amida-*

229. P. narrow, alternately radiated with chefnut and white; ftriæ unequally thick, lamellated; margin inflected; perforation oblong; 1¼ inch long. *lor.*

230. P. convex, white, with red lines outwardly, and elevated, rugged, contrary ftriæ; 10 of them larger; margin repand, inflected; crown reddifh; 1¼ inch long. *hroce- la.*

231. P. above brown, ftriated, terminated by a knotty belt; beneath radiated with red, with acute, knotty ribs; perforation orbicular; three-fourths of an inch long. *rucofa.*

232. P. convex, with nodulous, unequal ribs; larger ones yellowifh brown, and marked with black dots, difpofed in interrupted circles; crown cinereous; perforation furrounded within with an elevated, grafs-coloured ring, and a brown circle. *tami- a.*

233. P. a little convex, narrow, white, with red lines; outwardly fpotted with black, with elevated, convex, unequal ftriæ; perforation oblong, with a chefnut margin within, with a reddifh ring; ¾ inch long. *ata.*

234. P. white, chefnut towards the margin, with 20 alternately larger ribs; crown reddifh, with an oblong perforation; near an inch long. *dicans.*

235. P. ovate, pointed, white; above fmooth, with an elevated belt in the middle; dotted with ferruginous towards the margin; with elevated, unequal, fmooth ftriæ; perforation narrow, orbicular; ¼ inch long. *incta.*

236. P. flattifh, white, fuborbicular, with 20 elevated, alternately lefs and fhorter ftriæ, perforation round, and furrounded on each fide with a reddifh circle; ½ inch long. *lla.*

237. P. thin, effufe, pointed, finely ftriated, yellowifh, with 6 brown rays; crown cinereous; perforation oblong. *efcens.*

238. P. convex, obfoletely ftriated, and furnifhed with concentric, imbricated wrinkles; perforation oval, or nearly round; ½ inch diameter. *iquata.*

239. P. folid, ovate, compreffed; within white; crown a little recurved, and obtufe; perforation linear; 6 lines long. *ata.*

240. P. convex, with decuffated lines and black rays. Falkland iflands. *fonatc.*

61 Dentalium.

Gen. 33. DENTALIUM, *Tooth-fhell.*

Gen. Char.—The animal a terebella; fhell univalve, tubular, ftraight or flightly curved, with an undivided cavity open at both ends.

SPECIES.

1. D. with 10 ribs, flightly curved and ftriated; 4 inches long. Indian and European feas. *elephantinum.*

2. D. with 10 ribs, fmooth, and flightly curved. Indian feas. *aprinum.*

3. D. ribbed, curved, fubulate, of one colour, greenifh. *arcuatum.*

4. D. with 8 ribs and 8 ftriæ, pointed; green, tipped with white. Sicilian feas. *ftriatulum.*

5. D. ribs 6, ftriated. Found foffil at Loretto. *fexangulum.*

6. D. with 20 ftriæ, flightly curved, interrupted; red, tipt with white. Mediterranean. *dentalis.*

7. D. finely ftriated, flightly curved; gray, with darker bands; thicknefs of a crow quill. Sicily. *fafciatum.*

8. D. ftraight, doubly or triply ftriated, and annulated. *rectum.*

9. D. roundifh, fomewhat obtufe; finely and equally ftriated. Foffil near Loretto. *foffile.*

10. D. round, obliquely ftriated. Found foffil. *annulatum.*

11. D. flightly curved, fomewhat obtufe; ftriæ decuffated, longitudinal ones granulated; an inch long. Found foffil in Piedmont. *radula.*

12. D. ftriæ decuffated, all of them fmooth; longitudinal ftriæ with finer interrupted ones. Found foffil in Piedmont. *interruptum.*

13. D. round, flightly curved, continued, with crowded, annular ftriæ; 1½ inch long. Indian and European feas. *politum.*

14. D. white, fmooth, round, flightly curved, with remote rings. India. *eburneum.*

* 15. D. round, flightly curved, fmooth, gloffy, tapering to a fmall point; pervious; 1½ inch long. Indian and European fhores; weftern coafts of England. *entalis.*

16. D. round, curved, continued and fmooth. Scandinavia. *arietinum.*

17. D. round, flightly curved, interrupted, opaque; 1¼ inch long. African ocean. *corneum.*

18. D. curved, very fmooth, white, with fulvous clouds and fpots. Sicily. *nebulofum.*

19. D. horny, flexile, ftraightifh, round and fmooth; 2½ inches long. North feas. *pellucidum.*

20. D. hyaline, glabrous, flightly curved, and tapering gradually; ¾ inch long. Found foffil in Piedmont. *vitreum.*

21. D round, ftraightifh, fmooth, minute; not larger than a briftle. Mediterranean. *minutum.*

* 22. D. white, opaque, tranfverfely ftriated and imperforated; minute. Sandwich, Falmouth harbour. *imperforatum.*

* 23. D. fubpellucid, fubarcuated, tapering to a fmall point; pervious, contracting a little towards the larger end; white, gloffy, and fmooth. Britifh channel; called by the mariners *hake's tooth.* It is frequently brought up with the founding line. *gadus.*

* 24. D. fubcylindrical, arcuated, marked with regular, ftrong, tranfverfe ftriæ; aperture round, tapering *trachea.*

to

to the other extremity, which is cloſed; $\frac{1}{8}$ inch long, reſembles the trachea of an animal. Milton, Devonſhire. Rare.

glabrum. * 25. D. cylindric, arcuated, ſmooth, gloſſy, without ſtriæ or wrinkles; aperture orbicular; the other end cloſed, rounded; length one line. Devonſhire coaſt. *Montagu, Teſt. Brit.* p. 497.

62 Serpula.

Gen. 34. Serpula.

Gen. Char.—The animal a terebella; ſhell univalve, tubular, generally adhering to other ſubſtances; often ſeparated internally by entire diviſions at unequal diſtances.

Species.

nautiloides. * 1. S. flattiſh, minute, confluent, verrucoſe, ſpiral, with very thin, internal, ſemilunar diviſions. Seas of Norway, and on the byſſus of the *pinna ingens* on the coaſt of Devonſhire.

ſeminulum. 2. S. regular, oval, looſe, glabrous, not larger than a grain of ſand. Adriatic and Red ſeas; and is ſometimes found foſſil.

planorbis. 3. S. orbicular, regular, flat, equal; reſembles a round ſcale; adheres to ſhells.

ſpirillum. * 4. S. regular, ſpiral, orbicular; whirls round, gradually decreaſing. Found in the ocean, on zoophytes, on the *corallina officinalis* from Milton rocks, Devonſhire.

ſpirorbis. * 5. S. regular, ſpiral, orbicular; whirls ſlightly channelled above and inwardly, and diminiſhing gradually towards the centre. Found in moſt ſeas, adhering to *fuci.* Shores of Britain.

triquetra. * 6. S. ſtrong, opaque, irregularly twiſted and contorted; triangular; $\frac{1}{2}$ to 1 inch long. Found in the ocean, adhering to marine ſubſtances, ſtones, and the bottoms of ſhips. Coaſts of Britain.

intricata. * 7. S. filiform, rough, and intricately twiſted; greeniſh white, a little rugged and coarſe. European and Indian ſeas; ſhores of Britain, on ſhells.

filograna. 8. S. capillary, faſciculated, unbranched complications, and cancellated; forms a beautiful kind of network; 4 inches long. Mediterranean.

granulata. 9. S. round, ſpiral, glomerated; 3 elevated ribs on the upper ſide; ſize of a coriander ſeed. North ſeas, in maſſes adhering to ſhells and ſtones.

contortuplicata. * 10. S. angular, rugged, and irregularly entwined; tranſverſely ſtriated; 3 to 4 inches long. European and American ſeas; ſhores of Britain.

glomerata. 11. S. round, glomerated, with decuſſated wrinkles. European and Atlantic ſeas.

lumbricalis. 12. S. round, flexuous, with a ſpiral, acute tip; tranſverſely ribbed, and longitudinally wrinkled; 3 to 5 inches long. Atlantic and Indian ſeas, in large maſſes.

polythalamia. 13. S. round, diaphanous, ſmooth, ſtraightiſh, with numerous internal diviſions. Mediterranean and Indian ſeas, under the ſands.

arenaria. 14. S. jointed, entire, diſtinct, flattiſh beneath. India and Africa.

anguina. 15. S. roundiſh, ſomewhat ſpiral, with a longitudinal, jointed cleft. Indian ocean.

vermicularis. * 16. S. round, tapering, curved, wrinkled; 2 to 3 inches long. European ſeas; coaſts of Britain.—The animal which inhabits this ſhell is of a bright ſcarlet colour, and is furniſhed with elegant feathered tentacula, from the midſt of which ariſes a trumpet-ſhaped tube, and a leſſer ſimple one.

penis. 17. S. *Watering-pot;* round, ſtraight, taper, with a dilated, radiated, larger extremity; the diſc is covered with cylindrical pores; 3 to 5 inches long. Indian ocean.

echinata. 18. S. roundiſh, flexuous, roſy, with numerous rows of prickles, obtuſe at the end; aperture margined; ſize of a crow quill.

ocrea. 19. S. brown, roundiſh, ſtriated. Indian ocean, adhering to corals.

protenſa. 20. S. poliſhed, ſmoothiſh, with annulated plaits, a little tapering towards the end; ſize of a quill. Indian and American ſeas.

decuſſata. 21. S. round, with decuſſated ſtriæ, ſlightly wrinkled, flexuous, red; within ſmooth, white.

proboſcidea. 22. S. ſmooth, white, the broader part ſtraight, and tranſverſely plaited; 2 to 4 inches long.

afra. 23. S. ſubſtriated, yellowiſh brown, round, twiſted into 3 whirls, with a central tip.

cereolus. 24. S. long, narrow, round, ſmooth, yellowiſh; many times twiſted. America.

cornucop[ia]. 25. S. conic, ſpirally twiſted, yellowiſh, with brown bands; the middle round and twiſted; aperture orbicular.

goreenſis. 26. S. round, cancellated, yellow, within horny; 8 to 9 inches long. Goree.

inteſtinal[is]. 27. S. triangular, twiſted, tuberculated, with hollow dots; 8 to 9 inches long. Africa.

infundibulum. 28. S. round, white, tranſverſely ſtriated, and thrice twiſted; the firſt turn, ſeemingly compoſed of 5 funnels placed in each other. Indian ocean; fixed to ſtones.

pyramidalis. 29. S. cinereous, convex above, beneath flat; pyramidal, and many times twiſted; an inch long; open at the narrower end. Indian ſea.

denticulata. 30 S. white, round, ſubulate, ſtraight, and toothed at the ſides; with a longitudinal, glabrous rib in the middle; tip glabrous, a little incurved; $\frac{3}{4}$ inch long. Found in the lepas tintinnabulum.

melitenſi[s]. 31. S. roundiſh, twiſted, umbilicated, with decuſſated ſtriæ, and longitudinal, knotty ribs; within ſmooth, with numerous diviſions. Found foſſil in Malta.

norwegic[a]. 32. S. round, ſmooth, incurved; baſe nearly obſolete, undulated; mouth obliquely truncated. Norway.

porrecta. 33. S. round, ſmooth, poliſhed, aſcending in a flexuous manner from the ſpire or baſe.

vitrea. * 34. S. round, regular, ſpiral, orbicular, wrinkled, with a thickened aperture. Greenland ſeas; ſhores of Britain.

cancellat[a]. 35. S. ſpiral, glomerated, with three grooves, the lower interrupted by tranſverſe ribs; aperture 2-toothed. Greenland ſeas.

ſtellaris. 36. S. ſub-orbicular, umbilicated, convex, radiated with wrinkles. Greenland ſeas.

gigantea. 37. S. ſomewhat triangular, and a little flexuous, gradually tapering, violet; within ſmooth and pale yellow; aperture white, with undulated ſtriæ, and armed with a conic tooth; a foot high, and as thick as the little finger. Africa and America.

cinerea. 38. S. filiform, glabrous, conglomerated, perforated. Shores of Maſſilia.

fulcata. * 39. S. whirls 2, deeply and fpirally grooved; greenifh; minute. Coaft of Pembrokefhire, on the roots of fucus digitalis.

ovalis. * 40. S. fuboval, with 2 bends, imperforated; minute. Found at Denbigh.

reflexa. * 41. S. regular, rounded; margin reflected at the aperture; minute. Pembrokefhire fands.

cornea. * 42. S. regular, rounded, pellucid, with three whirls; horny. Pembrokefhire coaft.

bicornis. * 43. S. femilunar, ventricofe, white, opaque, gloffy; minute. Sandwich and Reculver.

perforata. * 44. S. white, opaque, gloffy; femilunar and perforated; minute. Sandwich. Rare.

lactea. * 45. S. oval, thin, fmooth, pellucid, with milky veins; minute. Sandwich; very rare.

lagena. * 46. S. round, ftriated, grooved, with a narrow neck, like an oil flafk; minute. Sandwich and Sheppey.

retorta. * 47. S. rounded, margined, with a flender recurved neck. Sandwich; rare.

incurvata. * 48. S. ftraight, with 3 clofe whirls at the fmaller end; minute. Sandwich.

63 Teredo.

Gen. 35. TEREDO.

Gen. Char.—The animal is a terebella, with two calcareous, hemifpherical valves, cut off before, and two lanceolate ones; the fhell tapering, flexuous, and penetrating wood.

SPECIES.

navalis. 1. T. *Ship-worm;* fhell thin, cylindrical, fmooth; more or lefs twifted; rather obtufe at the tip; 4 to 6 inches long.

At the fmaller end the fhell becomes thick and ftrong, and is furnifhed within with plaits or laminæ, which contract that part, leaving a very fmall opening. The anterior valves attached to the head of the animal, are of a hemifpherical form, one half of the front projecting in a fharp angle, and fomewhat pointed. The infide of each valve is white, furnifhed with a long, flat, curved tooth, projecting inwards, under the hinge, and a fhort lateral tooth at the extremity of the hinge, correfponding in each valve. The margin oppofite the hinge runs to an acute angle, at the point of which, in each valve, is a fmall knob, which comes in contact when the valves are brought together. Near the extremity of the tail there are two valves, one on each fide; a little concave on the infide, and rounded at the end. By their means the extremity of the tube at the thickened part is clofed. Thefe are properly to be confidered as the fhell of the animal, becaufe they are attached to it. The tube, or teftaceous fheath, which lines the hole made in the wood, appears only to be formed as an apartment, in which the animal may move with more eafe; for it is found that two tubes never come in immediate contact with each other, although the fibres of the wood between them are frequently no thicker than paper. This tube is feldom fo long as the animal; the internal part of the perforation is ufually not lined with it for the fpace of 2 inches, and fometimes more; but the fmaller end is always even with the furface of the timber which is perforated; but fo fmall, as not eafily to be difcovered, yet it is fufficient to admit the water, which is regulated by the pofterior valves of the animal.

It is found in the fides and bottom of fhips, and even the ftrongeft oak, which has been fome time under water. This teftaceous animal was originally a native of the warmer climates, and was brought to Europe, where it has been produced, and has proved extremely deftructive to the bottoms of fhips, and to works conftructed of wood, which remain for fome time conftantly under water. It appears, from fome piles of folid oak which were examined in the dock-yard of Plymouth, and which had remained under water for about four or five years, that the deftructive effects of thefe animals are very great in that time; for thefe piles were found to be greatly perforated, which rendered it neceffary to remove them, and replace them with others. The bottoms of fhips which frequent warm climates, it is well known, are fheathed with copper, to fecure them from the effects of thefe deftructive animals. But the method which is adopted about the dock-yards to preferve the timbers which are conftantly under water, is to cover them with broad-headed nails; which, by the effects of the fea water are foon incrufted with a coating of ruft, which is found to be impenetrable to the fhip-worm.

It has been obferved that the *teredo navalis* cuts acrofs the grain of the wood as feldom as poffible. After it has penetrated a little way, it turns and continues with the grain, till it meets with another fhell, or a knot in the wood. The courfe which it then takes is regulated by the nature of the obftruction. If this be confiderable, it makes a fhort turn back in the form of a fyphon, rather than continue for any diftance acrofs the grain.

2. T. folid, cylindrical, undulated; 7 inches long. In wood. *utriculus.*

3. T. clavated at one end, incurved at the other; narrower, obtufe and perforated in the middle; 2 inches long. Found in the feed-veffels of the xylofteum granatum. *clava.*

64 Sabella.

Gen. 36. SABELLA.

Gen. Char.—The animal a nereis, with a ringent mouth, and two thicker tentacula behind the head; fhell tubular, compofed of particles of fand, broken fhells, and vegetable fubftances, united to a membrane by a glutinous cement.

SPECIES.

1. S. folitary, loofe, curved, with lentiform, gloffy granulations; thicknefs of a fwan's quill. India and American iflands. *fcrupofa.*

2. S. folitary, fixed by the bafe, fimple, curved, with radiated, rough granulations. America. *fcabra.*

* 3. S. numerous, parallel tubes, communicating by an aperture, forming in the mafs the appearance of honey combs; 2 to 3 inches long. European coafts, Britain. *alveolata.*

* 4. S. folitary, fubcylindrical, papyraceous, chiefly compofed of fragments of fhells, thicknefs of a quill; 2 to 6 inches long. European and Indian feas, fhores of Britain. *chryfodon.*

* 5. S. ftraight, conic, compofed of minute particles of fand; 2 to 3 inches long. European coafts, fhores of Britain. *belgica.*

6. S. brown, with alternate white and black rings; ftraight, with a rectangular gibbous extremity; 9 inches long. *rectangula.*

7. S-

capenſis. 7. S. cylindrical, conic, open at both ends; membranaceous; rough, with interrupted, tranſverſe ſtriæ. Cape of Good Hope.

nigra. 8. S. cylindrical, black, ſmoothiſh on the outſide; compoſed of minute particles of ſand; ½ inch long. Rivulets of Thuringia.

ſtagnalis. 9. S. ſtraight, tapering, open at both ends; ſmooth, with a margined aperture, compoſed of very minute particles of ſand. Rivers of Thuringia.

conica. 10. S. narrow, conic, ſmooth, ſtraight, cinereous; with a blackiſh open tip, compoſed of very minute particles of ſand; not ½ inch long.

uncinata. 11. S. ſmooth, round, tapering, with an open hooked tip; ¾ inch long. Rivers of Thuringia.

ſabuloſa. 12. S. cylindrical, cloſed at the tip, ſubclavated, perforated, and compoſed of larger grains of ſand; not an inch long. Thuringia and Belgium.

vegetabilis. 13. S. depreſſed, compoſed of fragments of twigs, ſtems and bark, and broken pieces of the tellina cornea; an inch long. Waters of Thuringia.

ammoniata 14. S. polygono-cylindrical, within ſmooth, compoſed of fragments of cornu ammonis. Rivers.

helicina. 15. S. round, within ſmooth, compoſed of fragments of the helix puſilla; an inch long. Stagnant waters of Thuringia.

dimidiata. 16. S. one part of the ſhell compoſed of ſand or gravel, the other thicker, clavated, and compoſed of fragments of ſhells. Waters of Thuringia.

fixa. 17. S. compoſed of ſmall ſtones; tapering towards the tip; an inch long; affixed to ſtones in the water, and open at the ſide by which it is fixed. Thuringia.

clavata. 18. S. compoſed of ſmall ſtones; the open end clavated, and conſiſting of larger ſtones; ſolitary. Thuringia.

corticalis. 19. S. compoſed of pieces of bark, towards the end of broken ſtems.

arundinacea. 20. S. ſubconic, open at both ends, compoſed of fragments of the bark of reeds, placed on each other; an inch long.

aculeata. * 21. S. compoſed of ſmall twigs, the points of which project a little; an inch long. Thuringia, Britain.

marſupialis. 22. S. black; open end cylindrical and narrower, the other part tinged and ovate; 2 inches long.

norwegica. 23. S. roundiſh, open at both ends, brittle, membranaceous; compoſed of very minute grains of ſand; 4 inches long. Norway.

lumbricalis. 24. S. coarſe, creeping, fragile, open at both ends; the animal not furniſhed with tentacula at the mouth; body pricky, jointed. Deeps of the Greenland ſeas; fixed to ſtones.

indica. 25. S. cylindrical, compoſed of capillary, ſubcylindrical, agglutinated cryſtals of quartz. Indian ocean.

arenaria. * 26. S. extremely fragile, cylindrical, compoſed of pure ſand, ſlightly cemented together, without any internal membrane; ſize of a raven's quill; from 1 to 2 inches long. Dorſetſhire coaſt. *Montagu.*

ſubcylindrica. * 27. S. long, ſubcylindric, ſlender, fragile, compoſed of fine ſand, and minute bits of broken ſhells, cemented together on a fine membrane; 3 inches long. Salcomb-bay. *Montagu.*

ſetiformis. * 28. S. long, ſlender, gradually tapering to the lower end, compoſed of fine fragments of ſhells, and minute flat bits of ſtones, cemented together at their edges; 3 to 4 inches long. Salcomb bay.—Some have been obſerved with a lateral branch near the ſmaller end, which is ſuppoſed to be a young one. *Montagu.*

curta. * 29. S. ſmall, ſhort, compoſed of ſand and minute bits of flat ſtones, agglutinated to a tough membrane; ſize of a crow quill; an inch long. Inlet near Kings-bridge. This ſabella is gregarious, covering the whole ſurface of the ſhore, appearing like bits of ſtraw covered with mud. *Montagu.*

compreſſ[a]. * 30. S. ſhort, broad, and very flat, compoſed of large fragments of flat, bivalve ſhells, placed with the concave ſide inwards; 1½ inch long. Deeps at Torcroſs, Devonſhire.

65 Enumeration of the ſpecies.

Number of Species included under each Genus, in the preceding Claſſification.

I. MULTIVALVES.

Genera.	Species.	
1. Chiton, - -	29	
2. Lepas, - -	33	
3. Pholas, - -	12	
	—	74

II. BIVALVES.

Genera.	Species.	
4. Mya, - -	31	
5. Solen, - -	24	
6. Tellina, - -	94	
7. Cardium, - -	52	
8. Mactra. - -	27	
9. Donax, - -	21	
10. Venus, - -	152	
11. Spondylus, - -	4	
12. Chama, -	25	
13. Arca, - -	43	
14. Oſtrea, - -	136	
15. Anomia, - -	51	
16. Mytilus, - -	65	
17. Pinna, - -	18	
	—	743

III. UNIVALVES.

Genera.	Species.	
18. Argonauta, - -	5	
19. Nautilus, - -	34	
20. Conus, - -	71	
21. Cyprea, - -	120	
22. Bulla, - -	57	
23. Voluta, -	144	
24. Buccinum, - -	200	
25. Strombus, - -	53	
26. Murex, - -	180	
27. Trochus, -	131	
28. Turbo, - -	152	
29. Helix, - -	267	
30. Nerita, - -	76	
31. Haliotis, - -	19	
32. Patella, - -	240	
33. Dentalium, - -	25	
34. Serpula, - -	48	
35. Teredo, - -	3	
36. Sabella, - -	30	
	—	1855
Total number of ſpecies,		2672

Species

Species of Shells which have been found in the Foſſil State.

Lepas Anſerifera.
Cardium Lithocardium. Only found foſſil.
Venus Caſſina.
——— Mercenaria. Mountains of Sweden.
——— Imbricata. France.
Chama Foliacea. Campania.
Arca Foſſilis. Limbourg.
——— Nucleus.
Ostrea Diluviana. Sweden.
——— Mytiloides. Alſace.
——— Torta. Alſace.
Anomia Craniolaris.
——— Gryphus.
——— Pecten.
——— Striatula. Exiſts only foſſil.
——— Reticularis.
——— Plicatella. Only foſſil.
——— Criſpa. England and Switzerland.
——— Lacunoſa. Only foſſil.
——— Cuſpidata. Derbyſhire.
——— Farcta. Switzerland.
——— Terebratula.
——— Angulata.
——— Hyſterita. Germany.
——— Biloba. Only foſſil.
——— Spinoſa. England.
——— Dorſata.
——— Sandalium. Germany.
Nautilus Helicites.
——— Lituus.
——— Orthocera.
——— Belemnita.
Voluta Foſſilis. Only foſſil.
Buccinum Foſſile. Germany.
——— Marginatum.
Strombus Spinoſus. Only foſſil.
——— Fiſſurella. Campania.
——— Siniſter. Foſſil only. Helvetia.
Murex Triacanthus.
——— Triptenus. Campania.
——— Coſtatus. Campania.
——— Lævigatus. Campania.
——— Foſſilis. Campania.
——— Campanicus. Campania.
Trochus Schrœteri. Campania.
Nerita Clathrata. Campania.
——— Perverſa. Only foſſil.
Haliotis Perverſa.
——— Plicata.
Patella Echinata.
Dentalium Sexangulum. Loretto.
——— Foſſile. Loretto.
——— Annulatum.
——— Radula. Piedmont.
——— Interruptum.
——— Vitreum. Piedmont.
Serpula Seminulum.
——— Melitenſis. Malta.

CHAP. V. OF THE CONSTITUENT PARTS OF SHELLS, &c.

Of the Conſtituent Parts of Shells, &c.

HAVING in the former chapter enumerated, under each genus, all the ſpecies of teſtaceous animals which have been hitherto diſcovered; and having given the characteriſtic marks by which each is diſtinguiſhed, which marks are derived from the ſhell or teſtaceous covering; we now propoſe to inquire what is the nature of this ſubſtance; in what way it is produced by the animal, and how it is enlarged as the animal increaſes in ſize. Theſe topics ſhall be the ſubject of the preſent chapter, which may be conveniently divided into the following ſections. 1. Of the conſtituent parts of ſhells. 2. Of their formation. 3. Of the colours of ſhells. 4. Of the formation of the umbilicus and protuberances, &c. 5. Of the pearl.

Sect. I. *Of the Conſtituent Parts of Shells.*

The nature and component parts of teſtaceous ſubſtances have been particularly inveſtigated by Mr Hatchett, from whoſe paper we extract the following obſervations.

In his examination of marine ſhells, Mr Hatchett found, from the nature of the ſubſtance of which they are compoſed, that they might be arranged in two diviſions. Under the firſt are included thoſe which have a porcellaneous appearance and enamelled ſurface, and exhibit, when broken, ſomething of a fibrous texture. The other diviſion is diſtinguiſhed, by having a ſtrong epidermis or covering, under which is the ſhell, compoſed principally or entirely of mother-of-pearl. To the firſt diviſion belong different ſpecies of voluta, cypræa, and others. The ſecond comprehends the oyſter, the river muſſel, and ſome ſpecies of haliotis and turbo.

68
Porcellaneous.

Porcellaneous ſhells.—The ſhells of this deſcription which were examined, were different ſpecies of voluta and cypræa. When they were expoſed to a red heat for a quarter of an hour, they crackled, and loſt the colours of their enamelled ſurface. No apparent ſmoke, and no ſmell, like that of burnt horn or cartilage, were emitted during the proceſs. The figure remained the ſame, excepting a few flaws; and they became of an opaque white, partially tinged with pale gray. When they were diſſolved in acids, after being burnt, they depoſited a ſmall quantity of animal coal, which proves that they contain ſome portion of gluten. Shells which had not been expoſed to the fire, diſſolved with great effervеſcence in the different acids; and the ſolution remained tranſparent and colourleſs; from which it appears, that the proportion of gluten is ſmall, ſince it could not be traced in the ſolution of the unburnt ſhells.

In examining the different ſolutions of ſhells, whether burnt or unburnt, by chemical teſts, it was found, that no trace of phoſphate of lime, or of any other combination of phoſphoric acid, exiſted in theſe ſubſtances. And it appeared from many experiments, that the component parts of porcellaneous ſhells, are carbonate of lime, cemented with a very ſmall portion of animal gluten.

Some

Of the Constituent Parts of Shells, &c.

Some ſpecies of patella, which were brought from Madeira, were alſo ſubjected to chemical examination, by the ſame philoſopher. When expoſed to a red heat in a crucible, they emitted a perceptible ſmell of horn or feathers; and by farther examination, by ſolution, the proportion of carbonic matter depoſited appeared to be greater, and the proportion of carbonate of lime leſs, than what was indicated by the reſult of the experiments on porcellaneous ſhells. When unburnt ſhells belonging to the ſame ſpecies, were immerſed in nitric acid very much diluted, the epidermis ſeparated, and the whole of the carbonate of lime was diſſolved. A gelatinous ſubſtance, nearly in a liquid ſtate, remained, but it did not retain the figure of the ſhell, and exhibited no appearance of a fibrous ſtructure. Theſe ſhells, therefore, contain a larger portion of gelatinous matter than the porcellaneous ſhells, but the other component part conſiſts entirely of carbonate of lime.

69 Mother-of-pearl.

Shells compoſed of mother-of-pearl.—Shells of this deſcription were ſubjected to ſimilar experiments with the former. When the common oyſter was expoſed to a red heat, the effects were the ſame as thoſe which were produced by the ſame proceſs on the ſpecies of patella from Madeira. The ſolution of the unburnt ſhell was alſo ſimilar, excepting only that the gelatinous part was of a greater conſiſtency. When the river muſſel was burnt in a crucible, it emitted much ſmoke, with a ſtrong ſmell of burnt horn or cartilage; the ſhell became of a dark gray colour, and exfoliated. By ſolution in the acids, the proportion of carbonic matter ſeparated was greater, and that of carbonate of lime obtained was leſs, than from the other ſhells on which experiments were made.

When an unburnt ſhell of this deſcription was immerſed in diluted nitric acid, a rapid ſolution and effervеſcence took place; and at the end of two days, the whole of the carbonate of lime was nearly diſſolved. A ſeries of membranes now only remained, of which the epidermis conſtituted the firſt. Theſe membranes ſtill retained the figure of the ſhell. The carbonate of lime was at firſt readily diſſolved, becauſe the acid came eaſily in contact with it; but the proceſs became ſlower, as it was more difficult for the acid to inſinuate itſelf between the different membranes of which the ſhell is compoſed. The haliotis iris, and the turbo olearius, were found to reſemble this muſſel, except that the membranaceous parts were more compact and denſe.

When theſe ſhells are deprived by an acid of the carbonate of lime, which gives them their hardneſs, they appear to be formed of different membranes, applied ſtratum ſuper ſtratum. Each membrane is furniſhed with a correſponding coat or cruſt of carbonate of lime, and it is ſo ſituated, that it is always between every two membranes, beginning with the epidermis, and ending with the internal membrane, which has been laſt formed. The animals which inhabit theſe ſtratified ſhells, increaſe their habitation by the addition of a ſtratum of carbonate of lime, which is ſecured by a new membrane. And as every additional ſtratum exceeds in extent that which was previouſly formed, the ſhell becomes ſtronger in proportion as it is enlarged; and thus the growth and age of the animal may be denoted by the number of ſtrata of which the ſhell is compoſed. Similar experiments were made on pieces of mother-of-pearl as they are imported from China, and with preciſely the ſame reſults. They appeared to be compoſed of the ſame gelatinous matter and carbonate of lime. In all the ſhells of this deſcription which were immerſed in acids, the membranaceous parts retained the exact figure of the ſhell, and they appeared diſtinctly to be compoſed of fibres, arranged in a parallel direction, correſponding to the configuration of the ſhell.

70 Pearl.

Pearl.—The conſtituent parts of pearl appear to be ſimilar to thoſe of mother-of-pearl. They are compoſed of concentric coats of membrane and carbonate of lime, and reſemble in ſtructure the globular, calcareous concretions which are known by the name of *piſolithes.* The irideſcence and undulated appearance of pearl and mother-of-pearl, evidently depend on their lamellated ſtructure and ſemitranſparency.

71 Component parts.

From theſe experiments it appears, that ſhells are compoſed of carbonate of lime and gluten. In ſome, as in the porcellaneous ſhells, the proportion of carbonate of lime is great, while that of the animal matter is ſmall; and theſe may be regarded as the beginning of the ſeries; while ſhells that come under the deſcription of mother-of-pearl are to be placed at the other extremity, having a ſmaller proportion of carbonate of lime, and a greater proportion of membranaceous ſubſtance. In the firſt the carbonate of lime is merely cemented by the animal matter; in the latter the carbonate of lime ſerves to harden the membranaceous ſubſtance. But between theſe two extremes, in the proportion of carbonate of lime and animal gluten, of which all teſtaceous ſubſtances are compoſed, there are no doubt numerous intermediate gradations, ariſing from the nature of the animal to which they form a covering, its peculiar habits, or mode of life.

SECT. II. *Of the Formation of Shells.*

THE ſhell or covering of teſtaceous animals, has been conſidered as in ſome meaſure analogous to the bones of other animals, although its formation and growth are very different, ſince it ſerves as a baſe or ſupport to the muſcles, which are attached to its internal ſurface. The principal uſe of the ſhell, however, is to ſerve as a covering or defence to the animal.

72 Teſtaceous animals oviparous and viviparous.

Teſtaceous animals are not only extremely different in external form, but alſo in the mode of their production. Some are viviparous, as the moſt of thoſe which inhabit bivalve ſhells, multivalves, and even ſome of the univalves; while the others, which form the far greater proportion, are oviparous. In one point, however, they all agree, that whatever be the mode of production, whether from an egg, or directly from the uterus of the mother, the ſhell is formed on the body of the young animal, and is proportioned to its bulk.

73 Reaumur's inveſtigation.

The beſt obſervations which have yet been made, and the moſt elaborate inveſtigation which has hitherto appeared, concerning the formation and developement of ſhells, are thoſe of the celebrated Reaumur, which were publiſhed in the Memoirs of the Academy of Sciences for the year 1709. The ſame ſubject has been proſecuted by other authors, but their reſults have been nearly the ſame as thoſe of this diſtinguiſhed naturaliſt. Klein is almoſt the only author who has advanced a different opinion. In his diſſertation concerning the formation of

he Con-ſtituent Parts of Shells, &c.

of ſhells, he charges Reaumur with ſupporting the opinion, that teſtaceous animals, when they proceed from eggs, are not furniſhed with the ſhell, but that it is formed after being hatched. This opinion indeed has been aſcribed to Reaumur by the hiſtorian of the academy, who, in the analyſis of his excellent memoir on the formation of ſhells, has obſerved, "that hitherto the curious have been ſtruck with the prodigious variety, the exact regularity of ſtructure, the ſingular beauty and ſplendour of colour of ſhells; but naturaliſts have been leſs attentive in ſtudying and inveſtigating the mode of their formation. They ſeem to have thought that although ſhells, as well as the covering of cruſtaceous animals, are bones placed externally to the animals which they cover, it was neceſſary to conſider them as part of their bodies, and to include this inexplicable circumſtance under that of the general formation of animals, which is incomprehenſible to the human mind. They have therefore ſuppoſed that the animal and its ſhell proceeded from the ſame egg, and were developed together; and they have reſted ſatisfied in admiring the economy of nature in providing ſo elaborate a covering for ſo low an order of animals. But this ſuppoſition, although probable, is not founded in truth. The animal only, not the ſhell, is produced from the egg. The diſcovery of this fact is owing to Reaumur."

74 opinion taken.

It muſt ſeem very extraordinary, that ſuch an error ſhould have crept into the abſtract of the memoir of this celebrated philoſopher, who in the courſe of it has clearly expreſſed a contrary opinion. "I have frequently," ſays Reaumur, "compared the ſhells of ſnails which were juſt hatched, and even thoſe which I had taken from the eggs before they were hatched, with other ſhells of full grown ſnails of the ſame ſpecies, with which I had left only the ſame number of whirls of the ſpire with the ſmall ſhells, and then they appeared in all reſpects the ſame." He farther obſerves, "that what has been ſaid with regard to the increaſe of ſhells, renders it unneceſſary to enter into the detail of their original formation; for it is eaſy to conceive, that when the body of a ſmall embryo which is one day to fill a large ſhell, has arrived at a certain ſtate, in which the different teguments in which it is included have ſufficient conſiſtence to ſecrete from their pores the peculiar fluid which is deſtined to the formation of the ſhell, this fluid may be depoſited on the ſurface, may thicken, and at laſt become firm and ſolid. And thus commences the formation of the ſhell, in the ſame way as its increaſe is continued. Snails do not proceed from the egg without being previouſly furniſhed with this ſhell, which then has one turn and a little more of the ſpire.

75 ll teſtaceous animals rniſhed th the ell before being tched.

When the eggs of teſtaceous animals are hatched, the young appears with its ſhell already formed, and according to the obſervation of Reaumur, it has then one complete turn of the ſpire and a little more; but at that period the ſhell is extremely thin. It ſeems probable that the formation of the ſhell is poſterior to that of the principal organs of the animal, as the bones in the fœtus of other animals are formed after the brain and heart.

76 hell laſt rmed.

Reaumur has ſuſpected that the ſhell is the laſt formed, and if proofs are wanting to eſtabliſh this fact, it is certain that at particular periods, if the eggs of teſtaceous animals are opened, the external parts of the embryo are found already developed, without any appearance of the ſhell. But whatever may be the period of the formation of the ſhell, it may be received as an eſtabliſhed fact, that the animal is furniſhed with it at the time it leaves the egg. Leeuwenhoek firſt obſerved this fact with regard to oyſters; the ſame obſervation was afterwards made by Liſter, and extended to others, both land and river ſhells. This obſervation has been confirmed by other naturaliſts, and particularly by Rumphius, Swammerdam, Reaumur, and Adanſon. From the inveſtigations of the latter it appears, that although there are many of the marine teſtaceous animals which are viviparous, they reſemble thoſe which are oviparous, in being furniſhed with the ſhell when they are ſeparated from the parent.

77 Two opinions of the formation of ſhells.

Since then it appears, that the ſhell of teſtaceous animals is completely formed previous to the developement of the animal, and that it may be conſidered as an eſſential part of its organization, let us now inquire into the mode by which its growth is effected. According to the deciſive experiments of Reaumur, the enlargement of ſhells is owing to juxta-poſition, or ſucceſſive additions of earthy and animal matter, indepenpent of any organized ſtructure. Klein has ſupported a contrary opinion, and ſuppoſes that the growth of ſhells is effected by intus-ſuſception, or a kind of circulation. The opinion of Reaumur, however, has moſt generally prevailed. Excepting Bonnet, few naturaliſts have adopted that of Klein; and it will appear that this celebrated naturaliſt was led to entertain this opinion concerning the mode of the formation of ſhells, by the experiments of Heriſſant on the generation of bone and ſhell. From theſe experiments it was clearly demonſtrated, that ſhells are compoſed of two ſubſtances, the one a membranaceous or animal ſubſtance, and the other an earthy matter; but no ſuch concluſion can be drawn from them in ſupport of the opinion, that the ſhell is a continuation of the body of the animal, or that it is ſo cloſely connected as the bones in the bodies of other animals; or even that this connexion is formed by means of fibres of the ligament which attaches the animal to its ſhell: for it has been ſhown, that theſe muſcular or ligamentous fibres, in all deſcriptions of teſtaceous animals, are ſucceſſively ſeparated, in proportion to the increaſe or enlargement of the ſhell. This could not poſſibly take place, if the evolution and formation of the ſhell, according to the opinion of Heriſſant, depended on an internal circulation, analogous to what happens in the body of the animal. In this caſe the veſſels which proceed from its body, having no longer a communication with thoſe which are ſuppoſed to exiſt in the ſhell, it would be deprived of nouriſhment, and conſequently could not increaſe in ſize. And it is found, that this ſeparation takes place in all ſhells. It is gradually completed as the growth of the ſhell advances.

78 Bodies organized or inorganized.

A body may increaſe in volume in two different ways. Either the particles of which it is compoſed paſs through that body by means of circulation, and undergo certain changes by which they are prepared to form part of the body; or the particles of which a body is compoſed, may unite with it by juxta-poſition, without any previous circulation or preparation within the body, to the increaſe of which they are deſtined.

It

Of the Constituent Parts of Shells, &c.

It is in the firſt way that the growth of vegetables and animals is accompliſhed; the ſecond is the mode by which ſhells receive new additions of matter, and enlarge in ſize. The firſt is the mode of increaſe peculiar to living, organized ſubſtances; by the ſecond, inorganized ſubſtances receive new additions of matter, and increaſe in volume. Theſe indeed afford ſufficient characteriſtic marks for a natural diviſion of bodies into two claſſes, namely organized and inorganized ſubſtances.

79
Reaumur's experiments.

The experiments of Reaumur have deciſively proved, that the growth of ſhells is owing to the latter mode of increaſe. Theſe experiments were made, not only on ſea ſhells, but alſo on land and river ſhells; on univalves and bivalves; and, in all, the reſult was invariably the ſame. In conducting theſe experiments, he incloſed the ſhells, on the progreſs of which he made his obſervations, in boxes pierced with ſmall holes, ſo as to admit the water, but ſo ſmall as to prevent the egreſs of the animal. Theſe boxes were ſunk into the ſea, or the river, and in this way he was enabled to watch the progreſs of the growth of the ſhell. He firſt obſerved, that when the animal which exactly filled its ſhell began to increaſe its ſize, the ſhell in a ſhort time not being ſufficiently large to cover its whole body, part of it was naked or unprotected. This part of the animal muſt always be towards the opening of the ſhell, becauſe the ſhell being previouſly completely filled, it cannot extend in any other direction. All animals which inhabit ſhells of a ſpiral form, ſuch as the ſnail and volute, can only extend at the head, or the opening of the ſhell; whereas the animals in bivalve ſhells, ſuch as the muſſel and the oyſter, may enlarge in their whole circumference. In all the ſpecies of teſtaceous animals, it is this part which appears by the increaſe of the animal when it enlarges the ſhell. This increaſe takes place, according to Reaumur, by the following mechaniſm.

80
Proceſs of the formation of ſhells,

It is a neceſſary effect of the laws of motion, when liquids run in canals, that the ſmall particles of theſe fluids, or the ſmall foreign bodies mixed with them, which on account of their figure, or their leſs degree of ſolidity in proportion to their ſurface, move ſlower than the others, fly off from the centre of motion, and approach towards the ſides of theſe canals. It even frequently happens, that theſe ſmall particles attach themſelves to the internal ſurface of theſe canals or tubes, and form concretions of different degrees of thickneſs. It is beſides certain, that the fluids which circulate in theſe tubes, preſs againſt their ſides on every point of their interior ſurface; ſo that if they were pierced with a number of ſmall holes of ſufficient diameter to give paſſage to the ſmall particles of matter floating in theſe fluids, theſe particles would be depoſited on the external ſurface, where a cruſt would be formed, ſimilar to that in the inſide; with this difference, that it would become thicker and more ſolid, being leſs expoſed to the friction of the fluid, than that which is depoſited in the interior of the tube.

81
By ſecretion from the animal.

To a ſimilar mechaniſm Reaumur aſcribes the increaſe of ſhells. The external ſurface of that part of the body of the animal which has extended beyond the limits of the old ſhell, is furniſhed with a great number of canals, in which circulate the neceſſary fluids for the nutrition of the animal. A great many ſmall particles of a viſcid and earthy matter are mixed with theſe fluids. Now, as theſe particles are leſs fluid than thoſe of which the liquids themſelves are compoſed, they approach the ſides of the veſſels, which are themſelves furniſhed on that ſide of the external ſurface of the body of the animal, with a great number of pores, which allow them to eſcape from the veſſels, ſo that they are depoſited on the external ſurface of theſe tubes, or rather in that of the body of the animal itſelf, which is uncovered by the ſhell.

Theſe particles of earthy and viſcid matter having reached the ſurface of the body of the animal, readily unite with each other, and with the extremity of the old ſhell, eſpecially when the exceſs of moiſture is diſſipated; and thus by their union they compoſe a ſmall ſolid body, which is the firſt layer of the new addition. Other particles of ſimilar matter continuing to eſcape in the ſame way from the excretory veſſels of the animal, form a ſecond layer under the firſt; afterwards a third, and a fourth, or more, till the new part of the ſhell has acquired ſufficient conſiſtence and thickneſs. It is, however, obſerved to continue thinner for a certain time than the former opening, till the increaſe of the animal requires another enlargement of its covering.

When a teſtaceous animal is going to enlarge its ſhell, as for inſtance the common ſnail, the body projects from the opening. It is then ſeen to attach itſelf to a wall or ſome other ſolid ſubſtance, and the portion of its body which is unprotected by the ſhell, is ſoon covered with the fluids which are excreted from its ſurface. The pellicle which they produce when the fluid dries, is at firſt thin and elaſtic, but gradually aſſumes more conſiſtence, and becomes at laſt ſimilar to the old part of the ſhell. If in this ſtage of the proceſs a bit of the ſhell is broken and removed, without injuring the body of the ſnail, the ſkin of the animal is ſoon covered with a fluid, which gradually thickens, and becomes ſolid. Twenty-four hours after the operation, a fine cruſt may be obſerved, which conſtitutes the firſt and external layer, for repairing the breach which was made. At the end of ſome days this layer has become thicker, and in 10 or 12 days, the new piece of ſhell which is formed, has acquired the ſame thickneſs as that which was removed. In making this experiment, certain precautions are neceſſary, otherwiſe there is ſome riſk of its failure. If, after the broken piece of the ſhell has been removed, and particularly if the fracture is made near the edge of the opening, the animal is not ſupplied with a ſufficient quantity of nouriſhment, its volume or bulk is ſoon diminiſhed; and now finding that what remains of the ſhell is a complete covering to its diminiſhed body, no excretion takes place for the production of a new portion. In removing ſnails from a wall to which they had attached themſelves, for the purpoſe of obſerving the progreſs of the formation of the ſhell, ſome days will eſcape after they are placed in the box, before the proceſs commences, becauſe the teſtaceous matter which had been already expended after fixing on the wall, muſt be fully ſupplied before any new portion can be again formed.

82
Time neceſſary to [form a] ſhell.

This experiment ſhows clearly, that ſhells are only enlarged by receiving new additions of matter, after it has been excreted from the body of the animal, and not

Of the Constituent Parts of Shells, &c.

not by *intus-susception*, or a circulation through the body of the shell itself. If this were the case, the production of new matter to fill up the breach made in the shell, would first appear all round the edge of the opening, and forming a kind of callus, similar to what happens in the reproduction of bony matter in other animals, it would gradually extend till the whole breach is filled up. But, on the contrary, this matter first appears on the body of the animal from which it has exuded, and the whole extent of the opening is closed at once by the fluid which has been directly secreted from the surface of the body. Nor can it be supposed, that the liquid has insensibly exuded from the shell, and falling on the body of the animal, is there collected in sufficient quantity for the formation of the new piece of shell. This is fully demonstrated by the two following experiments of the same naturalist.

83 Other experiments of Reaumur.

Reaumur broke several shells of snails; and, having made a very large hole about the middle of the shell, and about an equal distance between its summit and opening, he introduced between the body of the animal and its shell, through the hole, a piece of skin which was extremely fine, but of a very close texture. He glued this skin to the internal surface of the shell, so that it shut up accurately the artificial opening which he had made. It must then be obvious, that if the reproduction of the piece of shell which was removed, depended on the excretion of a fluid from the shell itself, and not on that which proceeds from the surface of the animal's body, the new piece of shell would be formed on the external surface of the piece of skin which was introduced; and it is not possible that it could be formed between the skin and the body of the animal. But the contrary of this has always happened. The new testaceous matter is always deposited on the internal surface of the skin; that is, on the side which is in contact with the animal's body; and no matter whatever was deposited on the other surface. This experiment has been repeated by others, and has been invariably attended with the same result.

The second experiment made by Reaumur is not less decisive than the first. He took a number of snails and broke the shells, so that he diminished the number of the turns of the spire about $\frac{1}{7}$ part. Having in this manner rendered the shell too small to cover the body entirely, they were nearly in the same situation as when an increase of the animal's body requires an augmentation of the shell. He then took a bit of skin, as in the former experiment, sufficiently large for the opening of the shell, and introduced one of its edges between the body of the animal and the shell, to the interior surface of which he glued it; after which having folded back the other extremity of the skin on the external surface of the shell, he glued it in like manner, so that the whole external opening was completely covered with the skin. The results were exactly the same as before. The shell grew, the skin remained in its place, and that part of it which was attached to the interior surface was fixed between the new piece and the old shell, which consequently could not contribute to its formation.

From these experiments, which may be easily repeated, it appears that the increase of shells is owing to the secretion of an earthy and viscid animal matter, which is prepared in the body of the animal, and which is successively formed by layers from the interior part of the shell to the external surface. This formation is determined by the previous enlargement of the animal. The different strata or layers of which shells are composed, can be easily demonstrated by exposing them to the action of fire, and removing them before their structure is entirely destroyed. By this process the animal matter is consumed, and the earthy substance remains, exhibiting a laminated structure. The same structure may be demonstrated, as has been already observed, in detailing Mr Hatchett's experiments, by immersing a shell of the description of mother-of-pearl in a diluted acid. The earthy matter in this case is dissolved by the acid, and the layers of animal matter which are interposed, resisting the action of the acid, remain unchanged, and still retain the original figure of the shell.

84 Layers of shells seen by burning.

85 Turns of the spire increased.

It is a necessary consequence of the mode in which the shells of snails are increased, that they cannot enlarge in volume, but by the augmentation of the turns of the spire, and that the length of each turn of the shell already formed remains always the same. This may be easily put to the test of experiment, by reducing the shell of a snail which has reached its full size to the same number of turns with those of younger shells of the same species. The two shells do not then exhibit any other difference than in their thickness; and it would be the same, by comparing the youngest shells, those which have been just separated from the egg, with the first turns of those of the same species which have been reduced by breaking them to an equal diameter. The number of turns or whirls of which the spire of a shell is composed, increases very considerably the size of the shell in univalves, and one turn more or less makes a great difference in their volume. According to Reaumur, the diameter of each turn of the spire is in the snail nearly double that of the preceding one, and $\frac{1}{2}$ of that which follows; but in many other shells, both marine and river, the last whirls of the spire, compared with the preceding ones, greatly exceed this proportion. In some, the external opening is 12 times greater than the preceding one, and in others, it is not more than eight times. This depends entirely on the increase of the animal's body, and the proportion of that increase. The growth of some is lengthwise, and in them the increase of diameter is proportionally less; while others increase more in thickness than in length. Those testaceous animals which have only a few turns in the spire of the shell, are of this description. To the former belong such as have a greater number of turns in the spire.

86 The animal is detached from the shell in many cases.

Those who have adopted the opinion of Klein with regard to the formation of shells, have denied the separation of the animal from the shell, which successively takes place near the tip in univalves. It is indeed on this circumstance of the connexion of the animal with the shell, that the truth of this theory depends. According to it, the animal is attached to the internal surface of the tip of the shell in univalves, and on this connexion depend the increase of the shell and even the life of the animal. But it is a certain fact, that the posterior part of the body of the animal is entirely detached from the tip of the shell; and this holds, not

Of the Constituent Parts of Shells, &c.

not only with regard to all land and sea shells which have lost the first turns of the spire, and consequently those of the tip; but also in a great number of other marine testaceous animals. It seems not only certain, but even necessary, that this separation between the animal and the shell should also take place in bivalve shells, if we take a distinct and rational view of their growth. Whether this separation is suddenly effected, or by gradual process, which is most probable, it seems to be sufficiently obvious, by examining the internal surface of the valves. This is still more strongly confirmed by sawing univalve shells, particularly those which are considerably elongated and have a great number of turns in the spire, in a direction perpendicular to their axis. In old shells, several of the first turns of the spire will be found completely filled up with testaceous matter, so that the tip of the shell has become quite solid, or at least it will appear to have been long unoccupied by any part of the body of the animal. But in transparent shells, as in some species of helix, it is seen that this attachment does not exist; and the H. planorbis can be preserved alive, although the tip of the spire is broken off.

Sect. III. *Of the Colours of Shells.*

37 Inquiry curious.

The infinite variety of the colours of shells is one of the most striking parts of their history; and it becomes a curious and interesting object of investigation to inquire, whether these colours are uniform and constant in the species, and from what proceed this regularity and uniformity. The experiments and observations of Reaumur will assist us in this investigation. When a hole is made in a shell, nearly at an equal distance between its tip and opening, the new piece of shell which is formed to shut up the hole is usually of a white colour, and often very different from that of the rest of the shell. It would appear at first that the new piece is of a different nature, and that it is not formed in the same way as the rest of the shell. To meet this difficulty, it will be necessary to explain on what depends the regular variety of the colours of certain shells: the same experiments which lead to the discovery of the cause of the one, will serve to unfold the other.

38 Colours vary from particular circumstances

This remarkable variety of colour is in no shell more remarkable than in the *helix nemoralis*. The ground of this shell is white, citron or yellow, or a compound of different shades of these colours. Different coloured rays are traced on this ground, turning spirally with the shell; in some they are black, in others brown, and sometimes reddish. The breadth of each of these rays gradually increases as they approach to the opening of the shell. It even sometimes happens, that two of these bands are so much extended in breadth, that they meet together and form one. Some individuals have five or six of these bands, while others have three or four, and even two, and sometimes only one. Others again have none at all, although of the same species; and among the individuals which are marked with coloured bands, they are not always of the same breadth, in the same parts of the shell; from which it appears, that no certain specific characters can be derived from the colour, since it is subject to so much variety. According to Reaumur, the viscid and earthy matter of which the shell is composed is secreted from the surface of the animal's body; but in certain places of the surface, particles which produce a different colour are separated; and whether this depends on a peculiar organization of those places, or on the form of the particles themselves, it appears that these particles, either of a different nature or of a different figure, by uniting, form bodies which reflect different rays of light; that is to say, form parts of the shell of different colours.

8 Colouring matter secreted by the neck.

This seems to be a necessary consequence of the mode in which the growth of shells is accomplished. The whole external layer of the shell is formed by the neck of the animal, because it is that part which is nearest to the head, and consequently as the animal increases in size, this part ceases to be covered with the old shell. It, therefore, depends on this part of the animal to extend the shell, and for this purpose it is sufficient that the neck be furnished with glands for secreting the different fluids, to form a shell of different colours. If, for instance, there are two or three glandular bodies which secrete brown or black particles, and that these glandular bodies are disposed in a parallel direction to each other, while the glands on the rest of the surface only secrete particles of matter which reflect the light of a citron colour, the shell formed by these bodies will have a citron ground, with black or brown bands, nearly parallel, or which gradually approach to each other, and become larger in the same proportion as the external organs of the animal increase in size.

9 Proved by experiment.

If no such glandular structure, or difference in the matter secreted, could be traced on the neck of the *helix nemoralis*, this explanation of the cause of the variety of colours in shells would appear extremely probable; but this probability amounts to certainty, from the actual observation of the existence of this peculiarity of structure and effect. When the *helix nemoralis* is deprived of part of its shell, the body appears of a white colour, excepting towards the neck, where the white inclines to yellow, and where besides there is a number of black or brown bands, equal to that of the bands on the shell, and arranged in the same direction. It has been observed, too, that the individuals which have only one black stripe on the shell, have only one single black spot on the neck; and those having four spots on the neck, have four stripes of the same colour on the shell. These rays are placed immediately under those of the shell; they commence at the distance of about a line from the extremity of the neck, which is itself usually spotted with black all round. The existence, therefore, of these excretory organs can no longer be doubted. The difference of colour seems to prove the difference of structure. But to establish this beyond the possibility of doubt, it is only necessary to have recourse to experiment, by observing what happens in the new piece of shell which is renewed, in place of that portion which has been removed; and if it appear that that part of the shell which is formed opposite to the black rays of the animal, is black, and if that which is formed between the stripes be of a different colour from that of the stripes themselves on the rest of the body, no farther proof can be required. Now, it has been observed, that that part of the new shell formed on the neck opposite to the black or brown stripes on the

the animal's body, is itſelf black or brown, that formed between the ſtripes is white or citron, while the reſt of the body is white, but different from that of the neck, when it is of this colour.

It ſometimes happens, that the part of the ſhell which has been renewed is of a different colour. This apparent deviation will appear leſs difficult to be reconciled to the explanation of the proceſs which has now been given, if we attend to the circumſtance that the new ſhell formed oppoſite to the neck of the animal is never different from that of the old ſhell, excepting that the external ſurface is extremely rough, and preſents numerous furrows or grooves, in place of the ſmoothneſs and fine poliſh of the old ſhell. In this caſe, the inequality of ſurface is occaſioned by the motion of the animal retiring within its ſhell, before the new piece has acquired ſufficient conſiſtency and ſolidity; and thus the new ſhell, having contracted on its ſurface wrinkles or furrows, the light is very differently reflected. But there is another cauſe for this difference of colour in theſe circumſtances. When a large piece of ſhell is removed, the firſt layer which is formed is uſually white. The particles of the fluid which are neceſſary for the formation of the ſhell of this colour, ſeem to be more eaſily excreted from the ſurface of the body than the particles of fluid which go to the formation of any other colour. It is obſerved that the body of the animal is covered with this fluid, long before there is any appearance of ſecretion about the neck. This liquid is extended to the neck, and there produces a new layer of white ſhell; but as this layer is extremely thin and tranſparent, it does not prevent the uſual ſecretion of the colouring matter at the neck to appear. In this period of the proceſs, if the animal retire within its ſhell, the new layer, ſtill adhering in many points to its body, and not having acquired ſufficient ſolidity, will be diſtorted and wrinkled; and not only exhibit that inequality of ſurface which generally appears in ſhells thus formed, but the arrangement of the ſtripes or colours will alſo be deſtroyed.

92

It would be a very falſe concluſion from this account of the mode of the formation of the ſtripes which appear on certain ſpecies of ſhells, that the external ſurface of all ſhells ſhould be marked with colours, or ſhould be uniformly of the ſame colour; and that there ſhould be no ſhells whoſe external ſurface is marked with different ſpots, differently arranged, of an irregular figure, and ſeparated from each other by unequal intervals. For if it has been ſhown, that theſe colours are produced on the ſurface of the ſhell, only by means of the ſecretory organs, ſituated on the neck of the animal, it cannot be ſuppoſed that the ſame effects will follow, unleſs the animal is placed in the ſame circumſtances. Theſe ſecretory organs, therefore, muſt exiſt during the entire formation of the ſhell, to furniſh the ſame quantity of colouring matter during the whole of its progreſs. But if it happen, on the contrary, that theſe organs undergo any change;

93

if the pores through which the liquid is poured out to form a ſhell or part of a ſhell of a brown colour, become too large or too ſmall, or in other reſpects change their form, after having poured out a certain quantity of this fluid; and that thoſe which furniſh the fluid of which the white part of the ſhell is compoſed, are alſo changed, it muſt happen that the ſhell which is produced is marked with different black and white ſpots, combined with a degree of irregularity correſponding to the change on the ſecretory organs. This will appear to be the caſe, by attending to the changes which take place in the ſecretory organs of ſnails which produce coloured ſhells; for in them it may be obſerved, that the colours are diſtinct and well marked in ſome, towards the opening, while they are ſcarcely perceptible on the firſt turn of the ſpire towards the tip of the ſhell; and theſe changes of colour cannot be ſuppoſed to exiſt without a correſponding change on the ſecretory organs.

94
Difference of fluidity in the matter ſecreted.

The fluidity of the liquid ſecreted for the formation of the ſhell, has probably alſo ſome effect in the regular diſtribution of the colours which appear on ſome ſpecies. It is eaſy to imagine that ſome animals may ſecrete a fluid for the formation of the ſhell, of ſuch a degree of fluidity as to flow eaſily from one place to another, and thus produce irregular marks on the ſhell. But beſides, if there are ſecretory organs ſituated on the neck of the animal, which prepare fluids of different colours; if the animal moves, or is diſturbed by any means, when theſe fluids are excreted on the ſurface, the colours will appear in a different place from their original diſtribution, or be mixed and blended together, and thus occaſion that irregularity which is obſerved in thoſe parts of ſhells which have been laſt produced, or renewed.

95
Motion of the animal during the depoſition of the matter.

96
Secretory organs enlarge with the animal.

But it will be neceſſary to have recourſe to the firſt of theſe cauſes, namely to the change of ſtructure in the ſecretory organs of the neck, to explain the regular diſtribution of the round ſpots, or of thoſe of a ſquare or rectangular figure, with which certain ſhells are marked, and to ſuppoſe that thoſe veſſels which are arranged in a ſquare or rectangular manner, which furniſh peculiar fluids, are ſhut or open at different periods. It may happen that the developement of a great part of the animal, occaſioned by a more vigorous growth in certain ſpecies than in others, may, in ſome caſes, be the only cauſe of thoſe regular ſpots, ſometimes white on a coloured ground, and ſometimes coloured on a white ground, which the ſhell exhibits, if the glands which ſecrete the colouring matter correſpond in their diſtribution to that of the diviſions on the ſhell, and if they occupy a greater ſpace on the neck than is uſual in other ſpecies. In this way may be accounted for, the regularity of theſe marks, and the increaſe of their ſize, which is uſually proportioned to that of the turns of the ſpire, from the conſideration of the ſecretory organs of the animal enlarging in the ſame proportion as the other parts of its body, and their effects in the formation of the ſhell correſponding to the developement of theſe parts. Hence it follows, that the largeſt marks are obſerved on the external convolutions of the ſhell.

97
Laſt formed layer uſually white.

According to Reaumur, the laſt layer of the ſhell which is formed from a fluid ſecreted from that part of the ſurface of the animal's body which does not reach the neck, ſhould be white, and this is moſt generally the caſe. In thoſe ſhells which are internally coloured, the fluids ſecreted from the body of the animal are of the ſame colour, and they take the place of thoſe which are uſually white, or of a pearly nature, as is obſerved in many others. The nature of theſe internal

ternal layers is always obvious; for if they are not white, they exhibit everywhere a uniform colour, and never variegated, like what appears externally. By removing with a file any part of the external ſurface of the ſhell, the layers which appear immediately under the ſurface, are thoſe which have been furniſhed by the body of the animal; while thoſe on the ſurface itſelf, uſually more variegated than the reſt, owe their formation to the veſſels about the neck, and have been formed in the way already deſcribed.

98 Formation of ſtriæ.

The growth of ſhells, being proportioned to that of the inhabitant, proceeds almoſt imperceptibly. In moſt ſhells, however, it is eaſy to diſtinguiſh the different additions which they have received; for they are marked on their convex ſurface with different eminences which are parallel to each other, ſimilar to lines of different degrees of depth, which give the ſhell a fibrous ſtructure. Theſe elevations are called *ſtriæ*, may be traced through the whole of the ſhell in bivalves, and in the longitudinal direction of thoſe which have a ſpiral form. From the ſlighteſt obſervation of the manner in which ſhells are formed, it is eaſy to ſee that they receive no addition, without leaving, in a greater or leſs degree, ſome traces of theſe inequalities; for every ſmall addition of teſtaceous matter which is made, muſt be attached to the old part of the ſhell, which conſequently muſt be more elevated than the former, whatever be its thickneſs, when the enlargement of the animal requires the formation of the latter. Thus, the ſhell will be marked with a great number of theſe ſtriæ, parallel to each other, which may be diſtinctly ſeen on many different ſpecies.

99 Growth interrupted.

Every ſhell has uſually ſome of theſe eminences at greater diſtances, and more elevated than the others. By theſe the different periods when the ſhell ceaſed to increaſe, or rather thoſe when its growth was interrupted, are marked; and they have ſome degree of analogy with the different ſhoots from the branch of a tree. The heat of ſummer or the cold of winter interrupting the growth of the animal, at leaſt among ſuch as are teſtaceous, which live on the land, or inhabit rivers in temperate regions, the ſhell is not enlarged in extent during theſe ſeaſons. It is otherwiſe, however, with regard to its thickneſs, for there is continually exuded from the body of the animal, ſmall quantities of fluid, which increaſe its thickneſs. Hence it is, when the ſhell begins to increaſe in extent, the edge to which the new portion is cemented, is much thicker than when the growth was gradual and imperceptible, and conſequently the place at which the growth commences after a long interruption is diſtinguiſhed by a more elevated ridge, than in the continued progreſſive additions which it receives. The numerous inſtances of this interruption in the growth of ſhells, will occur to the attentive conchologiſt in the progreſs of his reſearches. We have at preſent in our poſſeſſion, a fine illuſtration of the ſame thing, in a ſpecimen of

100 Example of this.

murex ramoſus. The animal, it would appear from the original part of the ſhell, had been for ſome time in a ſickly or unhealthy ſtate; for it has undergone many of the changes to which dead ſhells are ſubject. It has loſt its enamel; it ſeems to have undergone ſome degree of decompoſition, and ſome ſpecies of *ſerpula* and other paraſitical animals had made it their abode; but from this ſickly ſtate it ſeems to have recovered, and acquired great vigour; for the next addition which is made to the ſhell, is equal to its original bulk. It is clean, entire, and in perfect preſervation, forming a ſingular contraſt with the old ſhell.

101 Diſtinguiſhed by the difference of colour.

The place at which ſhells begin to increaſe, after the growth has been for ſome time interrupted, may be diſtinguiſhed by a difference of colour in the ſtripes with which the ſhell is uſually marked. In theſe places, black or brown ſtripes exhibit more vivid colours, and ſometimes even little different from thoſe on the reſt of the ſuperior ſurface of the ſhell. The cauſe of this change is not difficult to trace, if we recollect that the ſecretory organs which prepare the colouring matter, at leaſt in the *helix nemoralis*, have their origin at ſome diſtance from the extremity of the neck, from which we have ſeen that the firſt layer of ſhell which is traced to the extremity itſelf, ſhould be of a different colour from that of the ſtripes; but as the increaſe of the animal occaſions the ſtripes to be formed under the firſt ſhell, during which it is ſtill very thin, and conſequently tranſparent, it does not prevent the ſhell produced under it, of a black colour, to appear ſo. But when the animal has ceaſed to grow for ſome time, it then increaſes the thickneſs of the ſhell laſt formed, ſo that the ſhell which is next produced from the colouring matter, when the animal begins to grow, being laid on one part of the old ſhell much thicker and leſs tranſparent, the colour of theſe ſtripes muſt appear leſs bright, and therefore different in thoſe places, from the other parts of the ſhell.

102 Colours owing to the glands about the neck.

In taking a review of what has been ſaid concerning the production of the colours of ſhells, it muſt appear that theſe rays or coloured lines are owing to glands which ſecrete the colouring fluid, and which are arranged on the anterior edge of the neck, while the poſterior part furniſhes only a fluid of a different colour, and uſually leſs deep than the firſt. By means of this principle it is not difficult to account for the arrangement of the different colours which are ſo ſplendidly exhibited among this claſs of natural objects. Theſe colours may be reduced to one or more, which are more vivid on a lighter ground; to coloured, circular bands on a ground of a leſs vivid colour, or pure white; to longitudinal lines, round or ſquare ſpots, and in a regular, or irregular, zig-zag form. All theſe may be eaſily explained, according to the principles which have been laid down, the application of which, from what has been ſaid, will not, we hope, be found difficult.

103 Colours of porcelain ſhells.

But from this mode, which is the moſt general in the production of the colours of ſhells, there are certain deviations. In that diviſion of ſhells which is made by ſome naturaliſts, and which is diſtinguiſhed by the names of *porcelain ſhells*, on account of the fine enamel with which they are covered, there are two ſets of colours, which are diſpoſed in a parallel direction to each other. The external range of theſe colours is owing to a peculiarity of ſtructure in the animals which inhabit them, different from that of other teſtaceous animals, and to an operation which does not take place in other ſhells. In theſe ſhells, the colouring matter ſeems to be depoſited in two different ways, and at two different periods. In the firſt proceſs, when the body of the ſhell is formed, the colouring matter is excreted from the glands, in the ſame way as

as in other teſtaceous animals; and it is arranged according to the diſpoſition of the glands on the body of the animals. At this period of the proceſs, the ſhell is only of a moderate thickneſs, and much leſs than what it afterwards acquires, when completely formed. On the external ſurface of the ſhell firſt formed, another layer is depoſited, which is more compact than the firſt, in ſome places thicker, and uſually variegated with different colours. The external ſurface of the ſhell being thus completely covered with this ſecond layer, the original colours are concealed; and if the ſame ſhell were examined at different periods of its formation, it would appear like two diſtinct ſpecies. The organs which are employed by the animal in the production of this ſecond layer of ſhell, and ſet of colours, are two ſoft, membranaceous wings, which being protruded from the opening of the ſhell, completely cover the whole of its external, convex ſurface. Theſe two wings, which are quite diſtinct from the glandular ſtructure above the neck of the animal, which is ſituated a little lower, are alſo provided with glands, which furniſh colouring matter, uſually different from that which is furniſhed by the glands of the neck; and it is the upper ſurface of the wings, which is alone provided with this glandular ſtructure. This ſurface, when this part of the animal is protruded from the ſhell, and extended over it, comes in contact with the external ſurface of the latter. Hence it is, that thoſe membranaceous organs depoſit on the firſt formed and coloured layers of the ſhell, new layers of teſtaceous matter, which is differently coloured, and diverſified with entire ſpots, either circular, or in a waved direction, which are ſometimes of a more vivid tint than that of the ground, or white upon a dark ground, or brown upon a yellow ground; or are compoſed of ſtraight lines, or curved, or interlaced with each other, reddiſh, brown, yellow or white, on different coloured grounds, or in dots or points whoſe ſhades and arrangement are not leſs diverſified.

This mode of the formation of the external layer of porcelain ſhells, has been proved by the actual obſervation of ſome naturaliſts. In ſome ſpecies, a longitudinal line of a paler colour is obſerved on the convex ſurface of the ſhell. This is aſcribed to the junction of the two wings of the animal, where a ſmaller quantity of colouring matter has been depoſited, or where the ſhell has been leſs completely covered with the protruded part of the animal. But the exiſtence of this ſecond layer is ſtill more diſtinctly proved by mechanical means. The external layer may be removed by means of a file, and the ſhell reſtored to its original ſtate; and then the colours which it firſt received are brought into view. This circumſtance is ſtill farther demonſtrated by an attentive examination of different ſpecies of ſhells, and particularly the *cypræa argus*. In examining this ſhell, there are obſerved under the external layer, which is of a yellow colour, ſome ſlight traces of four tranſverſe bands of a brown colour, which ſurround the ſhell, and which muſt have been formed previous to the more ſuperficial yellow layer. By a more minute examination, it will appear that the circular ſpots with which the external yellow layer is marked, have been poſteriorly formed to this layer; and finally, on the four turns of the ſpire forming a ſlight projection at the baſe of the ſhell, there are ſome brown, circular ſpots, which are quite ſuperficial, and which ſometimes include two turns of the ſpire, which could not happen if the yellow colour had not been prior in its formation to theſe circular ſpots. If the colouring matter of which theſe ſpots are compoſed, had been depoſited at the time that the different parts of the ſpire were formed, one ſpot could not have included two turns of the ſpire at the ſame time.

Of the Conſtituent Parts of Shells, &c.

106
Shell becomes thicker from the ſame cauſe.

This effect of communicating a new ſet of colours to the external ſurface of the ſhell, is not the only one which is produced by the membranaceous ſtructure of the animal which inhabits the porcelain and other ſhells. The form of the ſhell is alſo changed in a remarkable manner, a great quantity of teſtaceous matter being depoſited on the ſurface of the opening, which then aſſumes a conſiderable thickneſs. The turns of the ſpire are incruſted, and ſometimes diſappear on the outſide of the ſhells; and wrinkles, furrows, and even tubercles, which exiſt on the ſurface of ſome ſpecies, are alſo formed. The ſurface of *cypræa pediculus* exhibits circular ſtriæ which did not originally exiſt, and which owe their formation to this cauſe. In other ſpecies, the ſurface is marked with projecting points or tubercles, which are produced in the ſame manner as the circular ſtriæ of the former, and which alſo depend on the ſtructure of the membranaceous wings of the animal, and the teſtaceous ſubſtance which is ſecreted and depoſited from their ſurface. Thus, it appears that porcelain ſhells, and thoſe of ſome other ſpecies, are formed at two diſtinct periods. It is during the ſecond period of the proceſs that the colour of the complete ſhell is formed. In farther illuſtration of this point, of the formation of ſhells of this deſcription at two different periods, one or two examples may be given of the difference which takes place, when the laſt layer formed is removed. In the *cypræa exanthema*, the ſhell is ferruginous, with whitiſh round ſpots and eyes; but when the outer coat is worn off, it becomes barred or teſſelated with brown or blue. The *cypræa arabica*, as its name imports, exhibits characters on its ſurface, having ſome reſemblance to Arabic letters. The ground on which theſe characters, which are of a brown colour, are placed, is whitiſh or bluiſh; but when the outer coat is worn down, the ſhell is ſometimes bluiſh with brown bands, or pale with darker angular ſpots and lines, brown mixed with violet, or reddiſh blue.

107
External layer removed, different colours appear.

108
Effects of light on ſhells.

But beſides the cauſes which have been mentioned concerning the production and variety of the colours of ſhells, ariſing from the difference of ſtructure in the organs which ſecrete the colouring matter, and the changes to which theſe organs are ſubjected in the growth of the animal, the effects of light and heat, altogether independent of the animal itſelf, are probably very conſiderable. Two individuals of the ſame ſpecies, the one from the Mediterranean or European ſeas, and the other from the tropical regions, exhibit very different ſhades of colour. The colours of the inhabitant of the torrid zone are always more bright and vivid than thoſe of the native of more temperate climates. The two ſhells, although ſimilar in form, ſize, and other characters, are uniformly different in the intenſity of their colours. Theſe differences, which have led conchologiſts to increaſe the number of ſpecies, obviouſly depend on the action of the climate, and particularly of light, on nouriſhment, and other circumſtances which

Of the Constituent Parts of Shells, &c.

have hitherto eluded the obſervation of naturaliſts, are uniform and conſtant, as long as the cauſes which operate in their production, continue to act. At firſt ſight it might be ſuppoſed that the difference of temperature is the cauſe of the difference in the intenſity of colour, in ſhells produced in different climates. It might be ſuppoſed too, that the different depths at which ſhells are found in the ocean, the medium in which they live being thus very different, would occaſion great diverſity in the colour. Near the ſurface, where the heat is greateſt, if the operation of this cauſe were conſiderable, the colours of ſhells ſhould be expected to be moſt vivid, and as the depth increaſed, at leaſt to a certain extent, the intenſity of colour ſhould be diminiſhed. But it has been obſerved in bivalve ſhells which are found at great depths, ſuch as ſome ſpecies of oyſter and ſpondylus, that the lower valve which is attached to the rock, is almoſt always white or colourleſs, while the upper valve often exhibits bright and vivid colours; but this difference cannot be aſcribed to the difference of temperature, for in both valves it muſt be the ſame; the matter ſecreted for their formation is prepared by the ſame organs, and is depoſited in a ſimilar manner; and indeed they are altogether placed in the ſame circumſtances, and have been expoſed in their production and growth to the operation of the ſame cauſes, excepting that the upper valve is expoſed to the rays of light, and is therefore coloured, while the lower valve is removed from the action of this cauſe, and is colourleſs.

109 Lower valve colourleſs,

The ſame difference is obſerved in the valves of other ſhells, which are produced in ſimilar circumſtances. The different ſpecies of pholas which make their abode in calcareous or coral rocks, and the *teredo navalis*, or ſhip-worm, which pierces wood, and makes it its habitation, are uſually colourleſs. Thoſe teſtaceous animals too, which live at great depths in the ocean, and are thus far removed from the influence of light, are alſo diſtinguiſhed by very faint colours, or are entirely white.

110 and ſhells included in other bodies.

SECT. IV. *Of the Formation of the Umbilicus, Protuberances, &c.*

We have hitherto conſidered only the general formation of ſhells. In the preſent ſection we ſhall treat of ſome other circumſtances which produce variations in their external figure. Such, for inſtance, is the formation of the umbilicus, of ſpines, tubercles, ribs, and other protuberances.

111 Four claſſes of ſpiral ſhells

Umbilicus. Univalve ſhells, which are furniſhed with a regular ſpire, may be divided with regard to their form, into four claſſes; namely, ſhells having a diſc, cylindrical ſhells, turbinated, and ovoid or egg-ſhaped ſhells. Theſe four forms are the moſt common which ſpiral univalve ſhells aſſume, and they depend on the manner in which the turns of the ſpire are applied to the common axis, and the difference of their arrangement. They derive their primitive figure from the ſmall ſhell while it is yet included in the egg, and probably from that of the external organs of the animal which is contained in it. But although all univalve ſhells may be referred to one or other of theſe four principal forms, they exhibit a great variety of ſlighter ſhades of difference. Let us now ſee in what way it may be conceived that the bodies of the animals which inhabit univalve ſhells, give them a ſpiral form. If we can ſuppoſe that from the firſt production of theſe animals, when they begin to be developed, the fibres of one part of the body, ſuch as thoſe of the external ſurface, are longer than thoſe of the oppoſite ſurface, it is obvious that the body of the animal continuing to increaſe, according to this original tendency, will aſſume a curved form, the concave part of which will be on that ſide where the fibres are ſhorteſt; and if the long fibres on the external ſurface, and the ſhort fibres on the internal ſurface, continue to increaſe in the ſame proportion, this muſt give the body a ſpiral form; but in this caſe, the different convolutions of which the animal is compoſed, will be in the ſame plane, and can only apply to a ſmall number of ſhells included in the firſt diviſion, namely thoſe which are characterized with having a diſc.

112 Owe the ſhape to the form of the animal.

The convolutions of the ſpire which are deſcribed by the ſhell of univalve teſtaceous animals, and the body which ſerves as a mould for theſe, are diſpoſed in different planes. Some other cauſe, therefore, muſt operate in producing this deviation. Between the two ſurfaces of the body of the animal, which is ſuppoſed to be furniſhed with fibres of different lengths, it is eaſy to conceive two other ſurfaces directly oppoſite to each other, an upper and an under ſurface, each of which is included between the two preceding ſurfaces, but of ſmaller extent; and it is eaſy to conceive farther, that theſe two latter ſurfaces are ſo formed, that the fibres of the one are longer than the correſponding and oppoſite fibres of the other. According to this ſtructure, the body of the animal will tend to that ſurface on which the fibres are ſhorteſt, and thus deſcribe, during its developement, a ſpiral line in different planes, in proportion to the difference of tenſion between the ſuperior and inferior ſurface of the body, as well as between the lateral ſurfaces.

113 Umbilicus produced

The form of the ſhell depending on the external form of the body of the animal, the umbilicus, which is a different cavity from that of the opening of the ſhell in which the animal is contained, and which is ſeen on the inferior ſurface of ſome ſhells, in the centre of the convolutions of the ſpire, depends entirely on the plane on which the animal has formed the additions to its ſhell. If the plane of theſe convolutions has been directed round a conical or elliptical axis, and each convolution of the ſpire be more or leſs diſtant towards the centre of the ſhell from this hollow point, a ſhell may be thus formed, whoſe umbilicus will be more or leſs open, according to the greater or leſs degree of ſeparation which the animal muſt give to the convolutions of the ſpire, correſponding to its ſtructure. An oppoſite effect will be obſerved, if the increaſe of the convolutions of the ſpire is ſuppoſed to take place round an axis which is ſo ſmall as to permit them to come in contact with each other. In this caſe no cavity will be formed in the centre, no appearance of umbilicus will be ſeen. But if we conceive that the animal, in enlarging itſelf, turns round a ſolid of a curved figure, in place of the conic axis above alluded to, and that the end of this ſolid is at the ſummit of the ſhell, it is obvious that an opening or an umbilicus of the ſhape of this ſolid, will be formed in the ſhell.

Ribs. The longitudinal elevations which are obſerved

served on univalve shells, which run in a transverse direction to the successive growth of the convolutions of the spire, have been denominated *varices*, by Linnæus, in allusion to the dilated veins on the bodies of other animals. They are composed of one or more elevations, usually arranged in a line parallel to the axis of the shell, and sometimes slightly oblique. They consist of the same substance as that of the rest of the shell, but are thicker and always more elevated than the surface of the convolutions of the spire on which they are placed. To explain the manner in which these elevations are formed, we may examine the opening of land shells which have arrived at the last stage of their growth. This period is marked in these shells by a kind of margin of about a line in breadth, which is sometimes turned outwards, although the rest of the shell turns on a regular, spiral line. This reflected margin never appears in land shells, but when they have reached the last period of their growth, and when it is once formed, the animal of some species ceases afterwards to continue the convolutions of its spire. Having now arrived at that period of its growth, when it is fit to perform the act of generation, it protrudes itself more frequently from its shell, and each time it returns, a viscid fluid which exudes from its neck, is interrupted and deposited on the external margin of the shell. The bulk which the anterior parts of the body have acquired in consequence of the evolution of the generative organs which are contained in that part of the body, causes it to press more strongly than formerly on the edges of the opening of the shell, every time it protrudes itself, and gradually forces the particles of testaceous matter which have been recently deposited, to the external surface, and in a direction quite different from that of the former plane of the spire. A short time only is requisite for the complete formation of this elevation; but after it has been formed, if the animal has the power of continuing the spire on the former plane, the shell which had arrived at a larger size will exhibit from time to time, if the same process be repeated, longitudinal projecting ribs, convex or bent, exactly similar to the external swelling of the opening of the shell, and analogous to the *varices* which are seen on some species of marine shells.

115 [Lim]ited to [sea] shells.

This power of continuing the spire, after the formation of the eminence at the opening, is peculiar to sea-shells. No farther increase, after it is once formed in land shells takes place. The young of some sea-shells, as some species of *murex*, also possess this faculty of continuing the growth of the shell after the formation of similar elevations, even from the earliest period of their existence, and long before it can be supposed that the organs of generation are evolved. This no doubt depends on some peculiar structure or organization of the animal, and particularly on those of the anterior parts of the body.

116 [Tu]bercles [pro]duced [by] the same [bod]y.

Tubercles. Many shells are furnished with tubercles, which are produced by the same organs as the rest of the shell. The fleshy protuberances which are placed on the external surface of the neck of the animals which inhabit them, serve as a mould, and according as there are more or less of these tubercles, while the animal enlarges the turn of the spire, and increases its shell so much, there is the same number of protuberances in the convolution. These protuberances, while they remain on that part of the body of the animal on which they were formed, are hollow, and during the remaining part of its existence, as the body enlarges, they are partly hollow, and partly solid, being filled up with testaceous matter, excreted from the body of the animal, and then the internal surface of the shell becomes smooth and even.

Spines, and fringed or irregular protuberances, with which some shells are armed, have, according to all appearance, the same origin as the other inequalities on the external surface of shells. They are usually formed at the end of the different successive periods of the growth of the shell. This will be sufficiently obvious, if we trace the whole series of wrinkles or striæ which run parallel to the circumference of the opening. Those which arise immediately from the ribs or *varices*, are produced by particular organs which surround the extremity of the neck, and stretch out from every part of its circumference, secreting a testaceous matter, which partly forms a sheath around them, gradually increases in thickness, and successively assumes the form of that part of the body which in some measure serves the purposes of a mould. In all the species of murex, which are furnished with spines, the elevations called varices or ribs, as well as the spines with which they are armed, are placed on the shell at equal distances; and the intermediate parts of the shell, although frequently grooved or striated, are not furnished with spines. This uniform observation, not only in shells belonging to this genus, but also in almost all spinous shells, proves, that the spines, as well as the ribs, are to be considered as formed by the margin of the anterior parts of the body, which is renewed in the same proportion as the change in the position of this part of the body takes place. It proves also, that the formation of shells is entirely owing to the successive and regular enlargement of the animal; and that it increases every time it is displaced from the whole extent in breadth of the anterior part of the body, the margin of which only being furnished with long fleshy processes or fringed appendices, is in reality the only part which produces them on the shell at each period of its increase. In the same way is formed the beak or prolongation of the shell, which terminates the inferior extremity in the form of a canal. This canal is produced in all shells in which it exists, by a cylindrical organ, susceptible of extension and contraction, and which, according to some naturalists, is employed by the animal as a kind of feeler, and occasionally to attach itself to solid bodies. It excretes and deposits a testaceous layer which serves it as a kind of sheath, in a similar manner to the production of spines.

117 Spines produced by fleshy processes.

118 Formation of ribs and grooves.

It is easy to explain the formation of the grooves or elevated ribs which are found on the outer surface of other shells; while the whole of the internal surface is smooth and polished. In bivalve shells, which exhibit this structure, the whole anterior surface of the animal is grooved or channelled in the same way; and from this the shell derives its shape and structure. In these shells it may be observed, that it is only the anterior margin that is grooved on the internal surface; because, in the progress of the growth of the animal, that part of the body which presents a smooth equal surface has advanced, and nearly filled the whole of the shell; and the testaceous matter secreted from this

Of the Constituent Parts of Shells, &c.

part of the body being deposited on the grooves, channels, or striæ, which were formed when the anterior part of the body occupied that part of the shell, fills them up completely, and leaves the surface quite smooth and polished. New additions being made to the shell as the growth of the animal requires it, the smooth surface of the body advances forward, and fills up with its secretions what is now grooved; while the new part of the shell, which corresponds to that part of the body which has an unequal surface, only presents this appearance. It is in this way that the ribs or grooves are formed in different species of ostrea, cardium, and other bivalve shells.

119 Formation of hollow ribs,

But there is a peculiarity of structure in a species of cockle, the white fluted or ribbed cockle, *cardium costatum*, which seems more difficult of explanation in its mode of formation. The ribs of this species are not only of the usual structure of other species of ribbed or grooved shells, but are particularly distinguished by having them hollow. The whole number of the ribs amounts to about 18 on each valve, of which the 11 exterior ones are of a triangular form, of about three lines high, and hollowed through their whole length, from the beak to the margin of the valves. To have a distinct notion of the formation of these hollow, triangular ribs, it is necessary to conceive, that the margin of the anterior part of the animal is deeply channelled or grooved; and when this part of the body is in contact with the recent shell, the tips or elevations are formed, and are then open to the internal surface of the shell; but the posterior part of the body being hard and smooth, never comes in contact with the excavated part of the ribs. On the contrary, as the testaceous matter is excreted from this part of the body, it is deposited on that part of the internal surface of the shell which it touches, stretches across the deep grooves, and forms the third and interior side of the triangular ribs.

120 and of striæ, &c.

Thus it appears, that spines, tubercles, and all other protuberances on the surface of bivalve shells, owe the peculiarity of their form and shape to the peculiar structure of different organs situated on the anterior margin of the body of the animal, and are composed of the testaceous matter which is excreted by these organs. The nature of the process is the same as in univalve shells of a spiral form. The diversity only appears in the difference of the organs and structure of the animals which inhabit different shells. To a similar process may be ascribed the formation of striæ, of scales, and of various excavations which sometimes accompany them.

Sect. V. *Of the Production of Pearls.*

121 Pearl found in mother-of-pearl shells.

In treating of the constituent parts of shells, it was observed, that the composition of the pearl appears, from analysis, to be precisely the same as the mother-of-pearl, or those shells in which the pearl is usually found. From this we must conclude, that the pearl, and the mother-of-pearl, are produced by the same secretion. It appears, from the observations of naturalists, and indeed it might have been expected, from the similarity of composition, that all testaceous animals, whose shells come under the description of mother-of-pearl, occasionally produce pearls.

Different opinions have been entertained with regard to the cause of the formation of this precious production. According to some, it is merely a morbid concretion, formed within some part of the body of the animal, or at least within the shell, without any apparent external injury; while others suppose that it is only owing to wounds which the shell, or the animal, or both, have received from accidental causes, or from the action of insects, or some testaceous animal, making perforations in the shell. It is not improbable that pearls may be formed in both ways.

122 Supposed to be morbid concretions;

Every day's experience informs us, that similar concretions are formed in different cavities of the bodies of other animals; but without any obvious cause or external injury. The formation of such concretions, as, for instance, biliary and urinary calculi, producing the most excruciating disorders in the human body, are too fatally known. These concretions, no doubt, owe their origin to the diseased or unhealthy action of the vessels secreting the fluids in which they are formed. By this diseased action producing a superabundance of the matter which enters into the composition of the concretion; or this matter in the fluid state meeting with some solid body, which becomes a nucleus, is attracted by it, and deposited in concentric layers, till the concretion acquires a larger or smaller size, according to the duration and quantity of the secretion and deposition. In the same way, it seems extremely probable the pearl may be frequently formed; the matter of which it is composed being constantly secreted by the animal for the production of the new part of the shell. If then this matter should at any time be produced in greater quantity than what is necessary to form the inner layers of the shell, and particularly if it should meet with a solid particle of any body, it will be attracted by it, and thus constitute the rudiments of a pearl, which will receive constant additions of concentric layers, and increase in size in proportion to the age of the animal and the quantity of matter deposited. Pearls, it is said, have been found within the body of the animal. If this be true, the pearly matter, in its passage through the vessels of the body, must have met with some nucleus, around which the concentric layers have been formed. In most cases, however, the pearl is found loose in the shell, entirely detached from the animal. It must then have been formed of the matter which was thrown out of the body; but it is not unlikely that pearls are formed both ways, or that the same pearl may be partly formed within the body of the animal, and be afterwards excluded, and arrive at its utmost size, while it remains loose in the shell.

123 or formed from external injury.

But, according to others, the pearl owes its formation to some external injury. The following seems to be a pretty distinct view of this opinion. When Faujas de St Fond visited Loch Tay, he was led to make some inquiries concerning the pearl-fishery, which had been carried on in several parts of the river Tay for some years. Shells were brought to him; and in these shells the fishermen pretended to find pearls, which they expected to sell at a higher rate, as they were found in the presence of the traveller. But he informs us, that they attempted to impose on him, by introducing a pearl secretly into the shells as they opened them. Observing this circumstance, he told them that he could know at once, by examining the outside of the

the ſhell, before opening it, whether it contained any pearl. He mentions this to introduce ſome ſpeculations concerning its formation. When no perforation or calloſity appeared on the outſide, he concluded that there was no pearl in the ſhell. The pearl-fiſh, he ſuppoſes, is attacked by two claſſes of enemies. One is what he calls the *auger-worm*, which penetrates into the inſide near the edge of the valve, by making a longitudinal paſſage between the layers of the ſhell. The length of the channel is one inch, or one inch and a half when it doubles back in a line parallel to the firſt. At the inner extremity there is a ſmall circular portion, formed by the worm in turning round. Theſe excavations are in the pearly part of the ſhell. The pearly juice, extravaſating, forms protuberances in the ſame direction; and the cylindrical bodies which are thus formed, may be conſidered as elongated pearls adhering to the internal ſurface. When ſeveral worms of this kind unite their labours by penetrating near each other, the reſult is a kind of pearly wen with irregular protuberances.

Another ſea-worm, which he ſays belongs to the multivalves, a ſpecies of pholas, alſo attacks the pearl ſhells. The ſhell of this ſpecies of pholas, has a hinge in the form of a crooked bill, as he ſaw in ſome ſpecies of oyſter, which he examined, from the coaſt of Guinea. The hole was of the ſhape of a pear. Pearls of this ſhape have been found, and have been held in great eſtimation. Obſerving this circumſtance, artificial perforations are made in the ſhell, and this forces the animal to produce pearls. In ſome ſhells brought from China, this artificial hole has been obſerved filled up with braſs wire, rivetted on the outſide like a nail, and the inner extremity of the wire was covered with a well-formed pearl, which ſeemed as if ſoldered to its extremity *.

Pearls are alſo produced by another artificial proceſs. The ſhell is opened with great care to avoid injuring the animal, and a ſmall portion of the internal ſurface of the ſhell is ſcraped off. In its place is inſerted a ſpherical piece of mother-of-pearl, about the ſize of a ſmall grain of lead ſhot. This ſerves as a nucleus, on which is depoſited the pearly fluid, and in time forms a pearl. Experiments of this kind have been made in Finland, and have been repeated in other countries.

Of the Habitation of Shells, &c.

124 Diſcovery of Linnæus.

A remarkable diſcovery has been aſcribed to Linnæus reſpecting the generation of pearls. This was a method which he found out, of putting the pearl-muſſel (*mya margaritifera*) into a ſtate of producing pearls at his pleaſure. It was ſome years before the final effect could take place; but, in five or ſix years after the operation, the pearl, it is ſaid, had acquired the ſize of a vetch. But it does not ſeem to be known in what this operation conſiſted. Whether it conſiſted in imitating the proceſs of inſects, by wounding the ſhell from the outſide, or by following the other proceſs, by ſcraping away part of the inner layer; nor is it much known what have been the effects of this operation, or whether it has turned to any account, or indeed is at all practiſed in Sweden or any of the northern ſtates, where it muſt have been originally known. For this diſcovery, however, the Swediſh naturaliſt, it is ſaid, was raiſed to the rank of nobility, and otherwiſe liberally rewarded by the ſtates of the kingdom.

The value which is put on the pearl depends on its ſize, colour, ſhape, and purity. The largeſt pearls are always held in the higheſt eſtimation, when their other qualities are in any degree of perfection. The fineſt ſhape of the pearl muſt be quite globular; it muſt be of a clear brilliant white, ſmooth, and gloſſy, and entirely free from ſpot or ſtain. Pearls were greatly eſteemed and much ſought after by the Romans. Servilia, the mother of Marcus Brutus, we are informed, preſented a pearl to Cæſar, which was valued at 50,000l. ſterling; and Cleopatra diſſolved one, which is ſaid to have been worth 250,000l. ſterling, in vinegar, which ſhe drank at a ſupper with Mark Antony.

CHAP. VI. OF THE HABITATION OF TESTACEOUS ANIMALS, METHODS OF FISHING, COLLECTING, &c.

TO the detailed account which we have now given of the natural hiſtory of teſtaceous animals, and particularly of the formation and growth of the ſhell, we have only to add a few obſervations concerning their habitation, the methods of fiſhing, collecting, and preſerving them. Theſe topics ſhall be the ſubject of the following ſections.

Sect. I. *Of the Habitation of Teſtaceous Animals.*

125 Found on every part of the globe.

Testaceous animals are found on every part of the ſurface of the globe. Some are inhabitants of the land, while others only frequent rivers and lakes, and a third and numerous claſs live in the ocean. From this a claſſification of ſhells has been formed, and they have been divided into land, freſh-water, and ſea ſhells. But whatever difference might exiſt in the habits and economy of teſtaceous animals which are produced in places ſo different, it affords few marks of diſcrimination for the purpoſe of claſſification.

126 Land ſhells very numerous.

Land ſhells are ſpread over the whole ſurface of the earth, and although more acceſſible, are perhaps leſs known than thoſe which inhabit the ocean. From the ſmall number of land ſhells which have been collected, it would appear at firſt ſight that they are leſs numerous than marine ſhells. This, however, ſeems not to be the caſe with regard to the number of ſpecies; and it is well known, that the number of individuals of land ſhells, in ſome inſtances, far exceeds that of ſea ſhells. The ſea ſhells of the Mediterranean have been obſerved by naturaliſts, to be nearly the ſame from the ſtraits of Gibraltar to the iſland of Sicily; but the land ſhells of Languedoc are different from thoſe of Provence, of Dauphiny, Piedmont, and different parts of Italy. Some are found in Spain, in Corſica, in Sardinia and Sicily, which are not to be met with in other places; and

Of the Habitation of ſhells, &c.

and from the great variety and number of land ſhells, it ſeems probable that many of them are yet unknown. But let us now take a general view of thoſe places of the world where different teſtaceous animals are moſt frequently found.

127
Shells moſt beautiful within the tropics.

It has been already obſerved, that light and heat have very conſiderable influence in adding to the ſplendour of the colours of ſhells. The moſt beautiful ſhells are found in countries between the tropics, where they are more immediately ſubject to the direct rays of the ſun, and a higher temperature. From theſe cauſes the ſhells produced in theſe countries have a luſtre and brilliancy which thoſe of colder climates never poſſeſs.

128
Shells found in Aſia.

The ſhores of Aſia furniſh us with the pearl-oyſters and ſcallops in great perfection. About Amboyna are found the moſt beautiful ſpecimens of the cabbage-ſhell, the arroſoir, the ducal mantle, and the coral oyſters, or echinated oyſters. Here alſo are found a great variety of extremely beautiful muſſels, tellinæ and volutæ; ſome few buccinums, and the ſhell called the *Ethiopian crown*, in its greateſt perfection. The dolia, the murices, and the caſſandræ, are alſo found on theſe coaſts in great beauty. Many elegant ſnails and ſcrew-ſhells are alſo brought from thence; and finally, the ſcorpion and ſpider ſhells. The Maldive and Philippine iſlands, Bengal, and the coaſt of Malabar, abound with the moſt elegant of all the ſpecies of ſnails, and furniſh many other kinds of ſhells in great abundance and perfection. China abounds in the fineſt ſpecies of porcelain ſhells, and has alſo a great variety of beautiful ſnails. Japan furniſhes us with all the thicker and larger bivalves; and the iſle of Cyprus is famous above all other parts of the world for the beauty and variety of the patella or limpet found there.

129
In America.

America affords many very elegant ſhells, but not in ſo great abundance or beauty as the ſhores of Aſia. Panama is famous for the cylinders or rhombi, and we have beſide, from the ſame place, ſome good porcelains and a very fine ſpecies of *dolium*, or *concha globoſa*, called from this place the *Panama purple ſhell*. One of the moſt beautiful of the cylinders is alſo known among our naturaliſts under the name of the *Panama ſhell*. About Braſil, and in the gulf of Mexico, there are found murices and dolia of extreme beauty; and alſo a great variety of porcelains, purpuræ, pectens, neritæ, bucardiæ or heart-ſhells, and elegant limpets. The iſle of Cayenne affords one of the moſt beautiful of the buccinum kind, and the Midas ear is found principally about this place. Jamaica and the iſland of Barbadoes have their ſhores covered with porcelains, chamæ, and buccina; and at St Domingo there are found almoſt all the ſame ſpecies of ſhells that we have from the Eaſt Indies; only they are leſs beautiful, and the colours more pale and dead. The pearl-oyſter is found alſo on this coaſt, but ſmaller than in the Perſian gulf. At Martinico there are found in general the ſame ſhells as at St Domingo, but yet leſs beautiful. About Canada are found the violet chamæ; and the lakes of that country abound with muſſels of very elegant pale blue and pale red colours. Some ſpecies of theſe are remarkably light and thin; others are very thick and heavy. The Great Bank of Newfoundland is very barren in ſhells; the principal kind found there are muſſels of ſeveral ſpecies, ſome of which are of conſiderable beauty. About Carthagena there are many mother-of-pearl ſhells, but they are not of ſo brilliant colours as thoſe of the Perſian gulf. The iſland of Magellan, at the ſouthern point of America, furniſhes us with a very remarkable ſpecies of muſſel called by its name; and ſeveral very elegant ſpecies of limpets are found there, particularly the pyramidal.

In Africa, on the coaſt of Guinea, there is a prodigious quantity of that ſmall ſpecies of porcelain which is uſed there as money; and there is another ſpecies of porcelain on the ſame coaſt which is all over white: the women make bracelets of the latter, and the people of the Levant adorn their hair with them. The coaſt of Zanguebar is very rich in ſhells; we find there a vaſt variety of the large porcelains, many of them of great beauty; and the *nux maris* or ſea nut is very frequent there. Beſide theſe, and many other ſhells, there are found on this coaſt all the ſpecies of nautili, many of which are very beautiful. The Canary iſles abound with a vaſt variety of the murices, and ſome other good ſhells; and we have from Madeira great variety of the echini or ſea-eggs, different from thoſe of the European ſeas. Several ſpecies of muſſels are alſo common there, and the ſea-ears are nowhere more abundant. The Red ſea is beyond all other parts of the world abundant in ſhells, ſcarcely any kind is wanting there; but what we principally have from thence are the purpuræ, porcelains, and echini marini.

The Mediterranean and Northern ocean contain a great variety of ſhells, and many of very remarkable elegance and beauty; they are upon the whole, however, greatly inferior to thoſe of the Eaſt Indies. The Mediterranean abounds much more in ſhells than the ocean. The gulf of Tarentum affords great variety of purpuræ, of porcelains, nautili, and elegant oyſters; the coaſts of Naples and Sardinia afford alſo the ſame, and with them a vaſt number of the ſolens of all the known ſpecies. The iſland of Sicily is famous for a very elegant kind of oyſter which is entirely white; pinnæ marinæ and porcelains are alſo found in great plenty there, with tellinæ and chamæ of many ſpecies, and a great variety of other beautiful ſhells. Corſica is famous, beyond all other places, for vaſt quantities of the *pinnæ marinæ*; and many other beautiful ſhells are found there. About Syracuſe are found the gondola ſhell, the winged murex, and a great variety of elegant ſnails, with ſome of the tuns and nerites. The Adriatic ſea, or gulf of Venice, is leſs furniſhed with ſhells than almoſt any of the ſeas thereabout. Muſſels and oyſters of ſeveral ſpecies are however found there, and ſome of the cordiform or heart ſhells; there are alſo ſome tellinæ. About Ancona there are vaſt numbers of the pholades buried in ſtone; and the ſea-ears are particularly frequent about Puzzoli. (*Bonani Recreat. Ment. et Ocul.*)

The ports of Marſeilles, Toulon, and Antibes, are full of pinnæ marinæ, muſcles, tellinæ, and chamæ. The coaſts of Bretagne afford great numbers of the conchæ anatiferæ and pouſſe-pieds; they are found on old rotten boards, on ſea ſubſtances, and among cluſters of ſponges. The other ports of France, as Rochelle, Dunkirk, Breſt, St Maloes, and others, furniſh oyſters excellent for the table, but of the common kind, and of no beauty in their ſhells; great numbers of muſſels are alſo found there; and the common tellinæ, the onion-peel oyſters, the ſolens, and conchæ

conchæ anatiferæ, are alſo frequent there. At Granville, in Lower Normandy, there are found very beautiful pectens, and ſome of the cordiform or heart-ſhells.

Our own Engliſh coaſts are not the leaſt fruitful in ſhells, though they do not produce ſuch elegantly painted ones as the Indies. About Plymouth are found oyſters, muſſels, and ſolens, in great abundance; and there, and on moſt of our ſhores, are numbers of the aures marinæ and dentalia, with pectens, which are excellent food; and many elegant ſpecies of the chamæ and tellinæ are fiſhed up in the ſea about Scarborough and other places. Ireland affords us great number of muſſels, and ſome very elegant ſcallop-ſhells in great abundance, and the pholades are frequent on moſt of our ſhores. We have alſo great variety of the buccina and cochleæ, ſome volutæ; and, on the Guernſey coaſt, a peculiarly beautiful ſnail, called thence the *Guernſey ſnail.*

The coaſts of Spain and Portugal afford much the ſame ſpecies of ſhells with the Eaſt Indies, but they are of much fainter colours, and greatly inferior in beauty. There are, according to Tavernier and others, ſome rivers in Bavaria in which there are found pearls of a fine water. About Cadiz there are found very large pinnæ marinæ, and ſome fine buccina. The iſles of Majorca and Minorca afford great variety of extremely elegant ſhells. The pinnæ marinæ are alſo very numerous there, and their ſilk is wrought into gloves, ſtockings, and other things. The Baltic affords a great many beautiful ſpecies, but particularly an orange-coloured pecten, or ſcallop-ſhell, which is not found in any other part of the world.

The freſh-water ſhells are found much more frequently, and in much greater plenty than the ſea kinds; there is ſcarce a pond, a ditch, or river of freſh water in any part of the world, in which there are not found vaſt numbers of theſe ſhells with the fiſh living in them. All theſe ſhells are ſmall, and they are of very little beauty, being uſually of a plain grayiſh or browniſh colour. Our ditches afford us chamæ, buccina, neritæ, and ſome patellæ; but the Nile, and ſome other rivers, furniſhed the ancients with a ſpecies of tellina which was large and eatable, and ſo much ſuperior to the common ſea tellina in flavour, that it is commonly known by the name of *tellina regia*, "the royal tellina." We have a ſmall ſpecies of buccinum common in our freſh waters, which is very elegant, and always has its operculum in the manner of the larger buccina; a ſmall kind of muſſel is alſo very common, which is ſo extremely thin and tender, that it can hardly be handled without breaking to pieces. The large freſh-water muſſel, commonly called in England the *horſe-muſſel*, *mya margaritifera*, is too well known to need a deſcription; and the ſize ſufficiently diſtinguiſhes it from all other freſh-water ſhells.

Sect. II. *Of the Methods of Fiſhing and Collecting Shells.*

Land ſhells are immediately within the reach of the hand of the collector, as well as many ſea and river ſhells, which inhabit ſhallow waters, or attach themſelves to rocks or marine plants on the ſhores of the ocean. Thoſe ſhells which are at moderate depths in the ſea, are to be collected by dredging. But in whatever way ſhells are found, thoſe are always to be preferred which ſtill contain the living animal; for then, not only ſome information may be obtained with regard to its ſtructure and natural hiſtory, but the ſhells themſelves are in all their natural beauty, and the full glow of their colours. Thoſe ſhells too ſhould be preferred, which are procured from the deeper parts of the ocean, becauſe they have then arrived at the largeſt ſize, and are in the greateſt perfection. But theſe are beyond the reach of man, and are only accidentally found on the ſhores after ſtorms, or attached to ſea-weeds which have been torn from the rocks by the agitation of the waves.

When ſhells are found with the animal alive; the method recommended to deſtroy it and ſeparate it entirely from the ſhell, is to boil it in water for a very ſhort time, and after allowing it to cool gradually, to lay it in cold water till it is cleaned. By this proceſs, the attachment between the ſhell and animal is deſtroyed, and the latter, which has become hard and contracted, is eaſily picked out from its covering. The ſhell, after this treatment, is ready to be placed in the cabinet, or to be poliſhed in the way we ſhall preſently deſcribe, according to the ſtate in which it is found, or the views of the collector.

As the pearl has been held in high eſtimation in all ages of the world, and as it is an important object of commerce in many parts of it, the hiſtory of the pearl fiſhery, or of thoſe ſhell fiſh which produce the pearl, cannot fail to be intereſting.

In different parts of Britain the pearl-fiſhery has been carried on to a conſiderable extent; and in ſome places it has been reckoned of ſuch value, that government has granted the right of fiſhing to individuals by patent. By a grant of this kind, Sir John Hawkins obtained the privilege of fiſhing for pearls in the river Irt in Cumberland; and Buchan of Auchmacoy ſeems to have held, by a ſimilar right, the ſole privilege of the pearl-fiſhery near the mouth of the river Ythan in Aberdeenſhire; for it appears that this grant was reſumed by government in 1633, in the firſt parliament of Charles I. In the ſame river, at the diſtance of 10 miles from the ſea, a ſucceſsful fiſhery of pearls has been frequently carried on; and a few years ago, in the river Cluny in the ſame county, a Jew employed a number of people to collect the muſſels which contained them, and ſome large and valuable pearls were found. Some years ago, in the river Teath in Perthſhire, the pearls which were got brought about 100l. ſterling to thoſe employed in ſearching for them, in the courſe of one ſeaſon. It was obſerved, that thoſe muſſels only which were crooked and diſtorted, yielded pearls. The method which has been practiſed in this river for fiſhing the pearl muſſel, is the following. The fiſherman provides himſelf with an inſtrument formed of two iron plates or ſpoons, having ſomething of the ſhape of the muſſel. Each of theſe is attached to an elaſtic handle of the ſame metal, terminating in an open tube, which is fixed to the end of a long wooden handle. The concave ſides of the plates approach other, and are kept in cloſe contact by the elaſticity of the handles. With this inſtrument the fiſherman enters the water, and directs his courſe to thoſe places which he ſuppoſes are reſorted to by the muſſels,

Margin notes: [left] Of the Habitation of Shells, &c. — 133 Britain. — 134 Spain and Portugal, &c. — 135 Fresh-water shells. — 136 Land shells. [right] Of the Habitation of Shells, &c. — 137 Sea ſhells. — 138 Method of killing the animal. — 139 Pearl-fiſhery. — 140 In Britain.

Of the Habitation of Shells, &c.

fels. Thefe he difcovers with his feet, and having found one, he preffes the inftrument upon it, the plates or valves of which, in confequence of the elafticity of the handles, feparate, and then grafp it firmly. In this way he can detach it from the place to which it adheres, and bring it to the furface of the water. The pearl-muffel is a native of many other of the rivers of Scotland, as of the Efk in Forfarfhire, where a pearl was found of the fize of a piftol bullet, and fold for 4l. fterling; of the Devon in Clackmannanfhire, the Clyde, and of Loch Ken in Galloway, where it is faid great numbers of pearls are fifhed in dry fummers, many of which fell from one fhilling to one guinea. But the greateft pearl-fifhery which has ever been eftablifhed in Scotland, of which there is any record, is that of the river Tay, about 30 years ago. The pearl-muffel is found in every part of this river, from its fource in Loch Tay, to its junction with the fea. In different parts of the river, but particularly in the vicinity of Perth, we are informed, that not lefs than 11,000l. worth of pearls were fent to London between the years 1761 and 1764. They were fold from 10s. to 1l. 16s. per ounce. About this time one pearl was found which weighed 33 grs. This fifhery, however, as well as the pearl-fifhery in the other rivers of Scotland, feems to be greatly exhaufted, and very probably, as it has been fuppofed, from the improvident avarice of the undertakers, not allowing the animal to arrive at that age which feems to be neceffary for the production of pearl.

141 In Ceylon.

But the pearl-fifhery of the warmer climates, in different places of the Eaft Indies, in the gulf of Perfia, and the Red fea, and particularly that which is annually carried on in the bay of Condatchy, in the ifland of Ceylon, is by far the moft extenfive and moft important of any in the world. The latter, of which we have given a detailed account in the defcription of CEYLON, and to which we refer our readers, has been under the infpection of government fince it fell into the hands of the Britifh, as it was under that of the Portuguefe and Dutch, its former mafters. To the Dutch, it is faid, while they were in poffeffion of the ifland, this fifhery brought an annual tribute of 20,000l. To the account which has been already given of this fifhery, we may add the following, from the Afiatic Annual Regifter for the year 1800.

"The perfon who farmed the pearl-fifhery at Ceylon, laft year, was a Tamu merchant, who for the privilege of fifhing with more than the ufual number of donies or boats, paid between two and three hundred thoufand Porto Novo pagodas (D), a fum nearly double the ufual rent. His excellency the honourable Mr North, by the laft fhips from Ceylon, has tranfmitted a very minute detail of the fifhery in all its ftages, fome of which are truly fingular and remarkable. It appears that the fear of fharks is the caufe of a great deal of interruption to the fifhery, the divers being extremely timid and fuperftitious; every one of them, even the moft expert, entertain a dread of fharks, and will not on any account defcend until the conjuror has performed his ceremonies. This prejudice is fo deeply rooted in their minds, that the government was obliged to keep two fuch conjurors in their pay, to remove the fears of the divers. The manner of enchanting confifts of a number of prayers learned by heart, that nobody, probably not even the conjuror himfelf, underftands, which he, ftanding on the fhore, continues muttering and grumbling from funrife until the boats return. During this period, they are obliged to abftain from food and fleep, otherwife their prayers would be of no avail; they are, however, allowed to drink, which privilege they indulge in a high degree, and are frequently fo giddy as to be rendered very unfit for devotion. Some of thefe conjurors accompany the divers in their boats, which pleafes them very much, as they have their protectors near at hand. Neverthelefs, I was told, faid Mr North, that in one of the preceding fifheries, a diver loft his leg by a fhark; and when the head conjuror was called to an account for the accident, he replied, that an old witch had juft come from the coaft, who, from envy and malice, had caufed this difafter by a counter-conjuration, which made fruitlefs his fkill, and which he was informed of too late; but he afterwards fhewed his fuperiority, by enchanting the fharks fo effectually, that, though they appeared to moft of the divers, they were unable to open their mouths. During my ftay, continues Mr North, at Condatchy, no accident of this kind happened. If a fhark is feen, the divers inftantly make a fignal, which on perceiving all the boats return immediately. A diver who trod upon a hammer oyfter, and was fomewhat wounded, thought he was bit by a fhark; confequently made the ufual fignal, which caufed all the boats to return; for which miftake he was afterwards punifhed. The largeft and moft perfect pearl taken laft feafon, was about the fize of a fmall piftol bullet."

SECT. III. *Of the Methods of Polifhing Shells.*

THE art of polifhing fhells has but lately reached its prefent ftate of perfection; and as the admiration of fea fhells has become fo general, it may be expected that we fhould give fome inftructions in the means of adding to their natural beauty.

142 Methods employed

Among the immenfe variety of fhells with which we are acquainted, fome are taken up out of the fea, or found on its fhores, in all their perfection and beauty; their colours being all difpofed by nature upon the furface, and their natural polifh fuperior to any thing that art could give. Where nature is in herfelf thus perfect, it were madnefs to attempt to add any thing to her charms: but in others, where the beauties are latent and covered with a coarfer outer fkin, art is to be called in; and the outer veil being taken off, all the internal beauties appear.

Among the fhells which are found naturally polifhed are the porcelains, or cowries; the caffanders; the dolia, or conchæ globofæ, or tuns; fome buccina; the volutes and the cylinders, or olives, or, as they are generally though improperly called, the *rhombi;* excepting only two or three, as the tiara, the plumb, and the butter-tub

(D) Perhaps near 100,000l. fterling. The pagoda is from 7s. to 8s. 6d. fterling

Of the Habitation of Shells, &c.

butter-tub rhombus, where there is an unpromiſing film on the ſurface, hiding a very great ſhare of beauty within. Though the generality of the ſhells of theſe genera are taken out of the ſea in all their beauty, and in their utmoſt natural poliſh, there are ſeveral other genera, in which all or moſt of the ſpecies are taken up naturally rough and foul, and covered with an epidermis, or coarſe outer ſkin, which is in many rough and downy or hairy. The tellinæ, the muſſels, the cochleæ, and many others, are of this kind. The more nice collectors, as naturaliſts, inſiſt upon having all their ſhells in their native and genuine appearance, as they are found when living at ſea; but others who make collections, hate the diſagreeable outſides, and will have all ſuch poliſhed. It would be very adviſable, however, for both kinds of collectors to have the ſame ſhells in different ſpecimens both rough and poliſhed: the naturaliſt would by this means, beſides knowing the outſide of the ſhell, be better acquainted with its internal characters than he otherwiſe could be; while thoſe who wiſh to have them poliſhed, might compare the beauties of the ſhell, in its wrought ſtate, to its coarſe appearance as nature gives it. How many elegancies in this part of the creation muſt be wholly loſt to us, if it were not for the aſſiſtance of an art of this kind! Many ſhells in their native ſtate are like rough diamonds; and we can form no juſt idea of their beauties till they have been poliſhed and wrought into form.

Though the art of poliſhing ſhells is a very valuable one, yet it is very dangerous to the ſhells; for without the utmoſt care, the means uſed to poliſh and beautify a ſhell often wholly deſtroy it. When a ſhell is to be poliſhed, the firſt thing to be examined, is whether it have naturally a ſmooth ſurface, or be covered with tubercles and prominences.

143 Method of cleaning them.

A ſhell which has a ſmooth ſurface, and a natural dull poliſh, need only be rubbed with the hand, or with a piece of chamoy leather, with ſome tripoli, or fine rotten ſtone, and it will become of a perfectly bright and fine poliſh. Emery is not to be uſed on this occaſion, becauſe it wears away too much of the ſhell. This operation requires the hand of an experienced perſon, that knows how ſuperficial the work muſt be, and where he is to ſtop; for in many of theſe ſhells the lines are only on the ſurface, and the wearing away ever ſo little of the ſhell defaces them. A ſhell that is rough, foul, and cruſty, or covered with a tartareous coat, muſt be left a whole day ſteeping in hot water: when it has imbibed a large quantity of this, it is to be rubbed with rough emery on a ſtick, or with the blade of a knife, in order to get off the coat. After this, it may be dipped in diluted aquafortis, ſpirit of ſalt, or any other acid; and after remaining a few moments in it, be again plunged into common water. This will add greatly to the ſpeed of the work. After this it is to be well rubbed with linen cloths, impregnated with common ſoap; and when by theſe ſeveral means it is made perfectly clean, the poliſhing is to be finiſhed with fine emery and a hair-bruſh. If after this the ſhell when dry appears not to have ſo good a poliſh as was deſired, it muſt be rubbed over with a ſolution of gum arabic; and this will add greatly to its gloſs, without doing it the ſmalleſt injury. The gum-water muſt not be too thick, and then it gives no ſenſible coat, only heightening the colours. The white of an egg anſwers this purpoſe alſo very well; but it is ſubject to turn yellow. If the ſhell has an epidermis, which will by no means admit the poliſhing of it, it is to be dipped ſeveral times in diluted aquafortis, that this may be eaten off; and then the ſhell is to be poliſhed in the uſual way with putty, fine emery, or tripoli, on the hair of a fine bruſh. When it is only a pellicle that hides the colours, the ſhell muſt be ſteeped in hot water, and after that the ſkin worked off by degrees with an old file. This is the caſe with ſeveral of the cylinders, which have not the natural poliſh of the reſt.

144 With pumice-ſtone.

When a ſhell is covered with a thick and fatty epidermis, as is the caſe with ſeveral of the muſſels and tellinæ; in this caſe aquafortis will do no ſervice, as it will not touch the ſkin: then a rough bruſh and coarſe emery are to be uſed; and if this does not ſucceed, ſeal-ſkin, or, as the workmen call it, *fiſh-ſkin* and *pumice-ſtone*, are to be employed.

When a ſhell has a thick cruſt, which will not give way to any of theſe means, the only way left is to plunge it ſeveral times into ſtrong aquafortis, till the ſtubborn cruſt is wholly eroded. The limpets, auris marina, the helmet-ſhells, and ſeveral other ſpecies of this kind, muſt have this ſort of management; but as the deſign is to ſhow the hidden beauties under the cruſt, and not to deſtroy the natural beauty and poliſh of the inſide of the ſhell, the aquafortis muſt be uſed in this manner: A long piece of wax muſt be provided, and one end of it made perfectly to cover the whole mouth of the ſhell; the other end will then ſerve as a handle, and the mouth being ſtopped by the wax, the liquor cannot get into the inſide to ſpoil it; then there muſt be placed on a table a veſſel full of aquafortis, and another full of common water.

145 With acids, &c.

The ſhell is to be plunged into the aquafortis; and after remaining a few minutes in it, is to be taken out, and plunged into the common water. The progreſs the aquafortis makes in eroding the ſurface is thus to be carefully obſerved every time it is taken out: the point of the ſhell, and any other tender parts, are to be covered with wax, to prevent the aquafortis from eating them away; and if there be any wormholes, they alſo muſt be ſtopped up with wax, otherwiſe the aquafortis would ſoon eat through in thoſe places. When the repeated dippings into the aquafortis ſhow that the coat is ſufficiently eaten away, then the ſhell is to be wrought carefully with fine emery and a bruſh; and when it is poliſhed as high as can be by this means, it muſt be wiped clean, and rubbed over with gum-water or the white of an egg. In this ſort of work the operator muſt always have the caution to wear gloves; otherwiſe the leaſt touch of the aquafortis will burn the fingers, and turn them yellow; and often, if it be not regarded, will eat off the ſkin and the nails.

Theſe are the methods to be uſed with ſhells which require but a moderate quantity of the ſurface to be taken off; but there are others which require to have a larger quantity removed, and to be uncovered deeper: this is called entirely ſcaling a ſhell. This is done by means of a horizontal wheel of lead or tin, impregnated with rough emery; and the ſhell is wrought down in the ſame manner in which ſtones are wrought by the lapidary. Nothing is more difficult, however, than the performing

Of the Habitation of Shells, &c.

performing this work with nicety: very often ſhells are cut down too far by it, and wholly ſpoiled; and to avoid this, a coarſe vein muſt be often left ſtanding in ſome place, and taken down afterwards with the file, when the cutting it down at the wheel would have ſpoiled the adjacent parts.

After the ſhell is thus cut down to a proper degree, it is to be poliſhed with fine emery, tripoli, or rotten ſtone, with a wooden wheel turned by the ſame machine as a leaden one, or by the common method of working with the hand with the ſame ingredients. When a ſhell is full of tubercles or protuberances which muſt be preſerved, it is then impoſſible to uſe the wheel: and if the common way of dipping into aquafortis be attempted, the tubercles being harder than the reſt of the ſhell, will be corroded before the reſt is ſufficiently ſcaled, and the ſhell will be ſpoiled. In this caſe, induſtry and patience are the only means of effecting a poliſh. A camels-hair pencil muſt be dipped in aquafortis; and with this the intermediate parts of the ſhell muſt be wetted, leaving the protuberances dry: this is to be often repeated; and after a few moments the ſhell is always to be plunged into water to ſtop the eroſion of the acid, which would otherwiſe eat too deep, and deſtroy the beauty of the ſhell. When this has ſufficiently taken off the foulneſs of the ſhell, it is to be poliſhed with emery of the fineſt kind, or with tripoli, by means of a ſmall ſtick; or the common poliſhing-ſtone uſed by the goldſmiths may be uſed.

This is a very tedious and troubleſome thing, eſpecially when the echinated oyſters and murices, and ſome other ſuch ſhells, are to be wrought: and what is worſt of all is, that when all this labour has been employed, the buſineſs is not well done; for there ſtill remain ſeveral places which could not be reached by any inſtrument, ſo that the ſhell muſt neceſſarily be rubbed over with gum-water or the white of an egg afterwards, in order to bring out the colours and give a gloſs; in ſome caſes it is even neceſſary to give a coat of varniſh.

146 Some ſhells are diſguiſed by poliſhing, ſuch as

Theſe are the means uſed by artiſts to brighten the colours and add to the beauty of ſhells; and the changes produced by poliſhing in this manner are ſo great, that the ſhell can ſcarcely be known afterwards to be the ſame it was; and hence we hear of new ſhells in the cabinets of collectors, which have no real exiſtence as ſeparate ſpecies, but are ſhells well known, diſguiſed by poliſhing. To caution the reader againſt errors of this kind, it may be proper to add the moſt remarkable ſpecies thus uſually altered.

147 the onyx-ſhell.

The onyx-ſhell or volute, called the *purple* or *violet-tip*, which in its natural ſtate is of a ſimple pale brown, when it is wrought ſlightly, or poliſhed with juſt the ſuperficies taken off, is of a fine bright yellow; and when it is eaten away deeper, it appears of a fine milk-white, with the lower part bluiſh: it is in this ſtate that it is called the *onyx-ſhell;* and it is preſerved in many cabinets in its rough ſtate, and in its yellow appearance, as different ſpecies of ſhells.

148 Violet ſhells.

The *violet ſhell*, ſo common among the curious, is a ſpecies of porcelain, or common cowry, which does not appear in that elegance till it has been poliſhed; and the common ſea-ear ſhows itſelf in two or three different forms, as it is more or leſs deeply wrought. In its rough ſtate it is duſky and coarſe, of a pale brown on the outſide, and pearly within; when it is eaten down a little way below the ſurface, it ſhows variegations of black and green; and when ſtill farther eroded, it appears of a fine pearly hue within and without.

149 Nautilus

The *nautilus*, when it is poliſhed down, appears all over of a fine pearly colour; but when it is eaten away but to a ſmall depth, it appears of a fine yellowiſh colour with duſky hairs. The burgau, when entirely cleared of its coat, is of the moſt beautiful pearl colour: but when ſlightly eroded, it appears of a variegated mixture of green and red; whence it has been called the *parroquet ſhell.* The common helmet-ſhell, when wrought, is of the colour of the fineſt agate; and the muſſels, in general, though very plain ſhells in their common appearance, become very beautiful when poliſhed, and ſhow large veins of the moſt elegant colours. The Perſian ſhell, in its natural ſtate, is all over white, and covered with tubercles; but when it has been ground down on a wheel, and poliſhed, it appears of a gray colour, with ſpots and veins of a very bright and highly poliſhed white. The limpets, in general, become very different when poliſhed, moſt of them ſhowing very elegant colours; among theſe the tortoiſe-ſhell limpet is the principal; it does not appear at all of that colour or tranſparence till it has been wrought.

150 Jonquil-chama.

That elegant ſpecies of ſhell called the *jonquil-chama*, which has deceived ſo many judges of theſe things into an opinion of its being a new ſpecies, is only a white chama with a reticulated ſurface; but when this is poliſhed, it loſes at once its reticular work and its colour, and becomes perfectly ſmooth, and of a fine bright yellow. The violet-coloured chama of New England, when worked down and poliſhed, is of a fine milk-white, with a great number of blue veins, diſpoſed like the variegations in agates.

151 The aſſes-ear ſhell

The *aſſes-ear ſhell*, when poliſhed after working it down with the file, becomes extremely gloſſy, and obtains a fine roſe-colour all about the mouth. Theſe are ſome of the moſt frequent among an endleſs variety of changes wrought on ſhells by poliſhing; and we find there are many of the very greateſt beauties of this part of the creation which muſt have been loſt but for this method of ſearching deep in the ſubſtance of the ſhell for them.

152 Dutch method of poliſhing ſhells.

The Dutch are very fond of ſhells, and are very nice in their manner of working them; they are under no reſtraint, however, in their works; but uſe the moſt violent methods, ſo as often to deſtroy all the beauty of the ſhell. They file them down on all ſides, and often take them to the wheel, when it muſt deſtroy the very characters of the ſpecies. Nor do they ſtop here: but determined to have beauty at any rate, they are for improving upon nature, and frequently add ſome lines and colours with a pencil, afterwards covering them with a fine coat of varniſh, ſo that they ſeem the natural lineations of the ſhell: the Dutch cabinets are by theſe means made very beautiful, but they are by no means to be regarded as inſtructors in natural hiſtory. There are ſome artificers of this nation who have a way of covering ſhells all over with a different tinge from that which nature gives them; and the curious are often enticed by theſe tricks to purchaſe them for new ſpecies.

There

There is another kind of work beſtowed on certain ſpecies of ſhells, particularly the nautilus; namely, the engraving on it lines and circles, and figures of ſtars, and other things. This is too obvious a work of art to ſuffer any one to ſuppoſe it natural. Buonani has figured ſeveral of theſe wrought ſhells at the end of his work; but this was applying his labour to very little purpoſe; the ſhells are ſpoiled as objects of natural hiſtory by it.—They are principally done in the Eaſt Indies.

Shells are ſubject to ſeveral imperfections; ſome of which are natural and others accidental. The natural defects are the effect of age, or ſickneſs in the fiſh. The greateſt miſchief happens to ſhells by the fiſh dying in them. The curious in theſe things pretend to be always able to diſtinguiſh a ſhell taken up with the fiſh alive from one found on the ſhores: they call the firſt a *living*, the ſecond a *dead* ſhell; and ſay that the colours are always much fainter in the dead ſhells. When the ſhells have lain long dead on the ſhores, they are ſubject to many injuries, of which the being eaten by ſea-worms is not the leaſt; age renders the fineſt ſhells livid or dead in their colours.

Of the Habitation of Shells, &c.

Beſides the imperfections ariſing from age and ſickneſs in the fiſh, ſhells are ſubject to other deformities, ſuch as morbid cavities, or protuberances, in parts where there ſhould be none. When the ſhell is valuable, theſe faults may be hid, and much added to the beauty of the ſpecimen, without at all injuring it as an object of natural hiſtory, which ſhould always be the great end of collecting theſe things. The cavities may be filled up with maſtic, diſſolved in ſpirit of wine, or with iſinglaſs: theſe ſubſtances muſt be either coloured to the tinge of the ſhell, or elſe a pencil dipped in water-colours muſt finiſh them up to the reſemblance of the reſt; and then the whole ſhell being rubbed over with gum-water, or with the white of an egg, ſcarce any eye can perceive the artifice: the ſame ſubſtances may alſo be uſed to repair the battered edge of a ſhell, provided the pieces chipped off be not too large. And when the excreſcences of a ſhell are faulty, they are to be taken down with a fine file. If the lip of a ſhell be ſo battered that it will not admit of repairing by any cement, the whole muſt be filed down or ground on the wheel till it become even.

EXPLANATION OF PLATES.

Plate CLII. Animals inhabiting Shells.

Fig. 1. *Chiton aculeatus.* Under part ſhewing the briſtly fringe.

Fig. 2. Animal inhabiting *Lepas tintinnabulum.*

Fig. 3. *Lepas balanus.*

Fig. 4. *Lepas anatifera.*

Fig. 5. Animal inhabiting the genus *Pholas.*

Fig. 6. Animal inhabiting the *Mya.*

Fig. 7. Animal inhabiting the *Solen.*

Fig. 8. Animal of the *Tellina.*

Fig. 9. Animal of the *Cardium.*

Fig. 10. Animal of the *Mactra.*

Fig. 11. Animal inhabiting the *Donax.*

Fig. 12. Animal inhabiting the *Venus.*

Fig. 13. Animal of the *Oſtrea.*

Fig. 14. *Chiton aculeatus.* Shell with 8 valves; *a*, *a*, the valves longitudinally arranged, and incumbent on the back; *b*, *b*, the rounded ſides.

Fig. 15. *Lepas anatifera.* Shell having 5 valves; *a*, the larger valves nearly quadrangular; *b*, the leſſer valves nearly triangular, at the apex of the ſhell; *c*, the ſolitary valve, rounded, acute.

Fig. 16. *Pholas dactylus.* The ſhell is bivalve, with *a*, *a*, *a*, three ſubſidiary valves; *b*, *b*, the upper extremity dotted like net-work; *c*, *c*, the ſuperior tranſverſely ſtriated.

Plate CLIII.

Fig. 17. *Mya margaritifera*, the pearl-bearing muſſel.

Fig. 18. *Solen radiatus*, radiated ſolen.

Fig. 19. *Tellina radiata*, radiated tellina.

Fig. 20. *Cardium cardiſſa*, Venus heart cockle; *a*, *a*, beaks approaching to each other.

Fig. 21. *Mactra ſtultorum*, ſimple mactra.

Fig. 22. *Donax denticulata*, denticulated donax.

Fig. 23. *Venus fimbriata*, bordered Venus ſhell.

Fig. 24. *Spondylus gœdaropus*, ſtilt ſpondylus.

Fig. 25. *Chama gigas*, giant chama, or gaping cockle.—This is the largeſt ſhell known.

Plate CLIV.

Fig. 26. *Arca Noæ*, Noah's ark.

Fig. 27. *Oſtrea pallium*, the ducal-mantle pecten.

Fig. 28. *Anomia ephippium.*

Fig. 29. *Mytilus margaritiferus*, pearl-bearing muſſel, or pearl-oyſter of the Eaſt Indies.

Fig. 30. *Pinna muricata*, muricated ſea-wing.

Fig. 31. *Argonauta argo*, paper nautilus; *a*, *a*, the ſhell; *b*, *b*, *b*, *b*, *b*, the animal protruded from the ſhell, as it moves on the ſurface of the water.

Plate CLV.

Fig. 32. *Nautilus beccarii*, chambered nautilus. A ſection of the ſhell; *a*, *a*, *a*, the genicula; *b*, *b*, *b*, the articulations; *d*, *d*, the lateral ſyphon.

Fig. 33. *Cypræa lynx*; *a*, *a*, the lips turned in and toothed; *b*, the linear aperture.

Fig. 34. *Cypræa moneta*, cowrie; *a*, *a*, knobbed margin; *b*, back gibbous; *e*, *e*, prominences inſtead of a ſpire.

Fig. 35. *Bulla ampullacea*; *a*, back without ſpire; *b*, vertex umbilicated.

Fig. 36. *Voluta muſica*; *a*, venter, marked with interrupted lines; *b*, baſe emarginated; *c*, *c*, wreaths crowned at the ſutures with obtuſe ſpines; *d*, *d*, columella or pillar, plaited; *e*, *e*, outer lip, ſmooth.

Fig. 37. *Buccinum harpa*, muſical-harp ſhell; *a*, dilated venter; *b*, *b*, *b*, longitudinal varices, crowned with *c*, *c*, *c*, ſharp ſpines.

Fig. 38. *Buccinum undatum.*

Fig. 39. *Strombus ſcorpio*, ſcorpion ſtrombus; *a*, *a*, *a*, back with knobby cingula and waved ſtriæ; *b*, ſpire conical; *c*, *c*, elevated ſutures; *d*, *d*, waved margin of the lip; *e*, *e*, caudal digitus; *f*, *f*, lateral digiti.

Explanation of the Plates.

Fig. 40. *Murex tribulus*, thorny woodcock.

Fig. 41. *Trochus telescopium*, telescope-top shell; *a*, the base; *b*, pillar projecting, spiral; *c*, outer lip dilated.

Fig. 42. *Turbo scalaris*, wentle-trap; *a*, *a*, cancellated wreaths; *b*, *b*, membranaceous cingula; *c*, spire acute, papillary; *d*, aperture circular; *e*, *e*, lip reflexed.

Fig. 43. *Helix lusitanica; a*, umbilicus; *b*, *b*, *b*, round venter; *c*, closed, semilunar aperture.

Fig. 44. *Helix decollata.*

Fig. 45. *Nerita canrena; a*, umbilicus gibbous, deep; *b*, *b*, outer lip dilated, arched, entire; *c*, lip of the pillar transverse, truncated.

Fig. 46. *Haliotis varia; a*, *a*, ribs acute, and striated crosswise; *b*, lateral spire, with its margin dentated.

Fig. 47. *Patella saccharina; a*, *a*, seven ridged acute ribs; *b*, obtuse vertex.

Fig. 48. *Dentalium arcuatum*, arched tooth-shell.

Fig. 49. *Serpula glomerata*,

Fig. 50. *Teredo navalis*, ship-worm.

Fig. 51. *Sabella alveolata.*

INDEX *of the* GENERA, *shewing the page on which the Classification of each Genus begins.*

A.
ANOMIA, p. 419
Arca, 413
Argonauta, 422

B.
Buccinum, 402
Bulla, 428

C.
Cardium, 406
Chama, 412
Chiton, 401
Conus, 424
Cypræa, 425

D.
Dentalium, p. 461
Donax, 408

H.
Haliotis, 455
Helix, 448

L.
Lepas, 402

M.
Mactra, 407
Murex, 438
Mya, 403
Mytilus, 420

N.
Nautilus, p. 423
Nerita, 453

O.
Ostrea, 414

P.
Patella, 456
Pholas, 453
Pinna, 422

S.
Sabella, 463
Serpula, 462
Solen, p. 404
Spondylus, 412
Strombus, 437

T.
Tellina, 404
Teredo, 463
Trochus, 442
Turbo, 445

V.
Venus, 408
Voluta, 429

INDEX.

ACORN-shell, species of, N° 25
Adanson, his system of shells, 11
Amphitrite, generic character of, 15
Ancients prosecute the study of shells, 3
Animal gives form to the shell, 112
method of killing, 139
Anomia, species of, 43
Arca, species of, 36
Argonauta, 46
Ark-shell, see *Arca*, 36
Ascidia, generic character of, 15

B.
Bivalves, terms of, defined, 18
generic characters of, 22
Breynius, his system of shells, 7
Buccinum, species of, 52
Bulla, species of, 50

C.
Cardium, species of, 30
Chama, species of, 35
Characters, generic, of testaceous animals, 15
Chiton, species of, 24
Classification of shells, 20
Clio, generic character of, 15
Cockle, see *Cardium*, 30
Colours of shells vary, N° 88
Colouring matter secreted from the neck, 89
proved, 90
seeming exceptions, 91
causes of these, 92
changes in the organs of, 93
difference of fluidity in the matter, 94
motion of the animal, 95
of porcelain shells, 103
affected by light, 108
Conchology introduction, 1
importance of, 2
cultivated by the ancients, 3
moderns, 4
Concretions, pearls supposed to be morbid, 122
Cone-shell, see *Conus*, 48
Conus, species of, *ib.*
Cowrie, see *Cypræa*, 49
Cypræa, species of *ib.*

D.
Da Costa, his system of shells, 14
D'Argenville, his system of shells, 9
Dentalium, species of,
Dipper, see *Bulla*,
Donax, species of,
Doris, generic character of,
Dutch method of polishing shells,

F.
Fishery, pearl,
in Britain,
in Ceylon,

G.
Gaping cockle, see *Chama*,
Geoffroy, his system of shells,
Grooves, formation of,
Growth of shells,
interrupted,

H
Haliotis, species of,
Helix, species of,

K.
Klein, his system of shells,
opinion of the formation of shells,

L.
Land shells very numerous,

Fig.1.

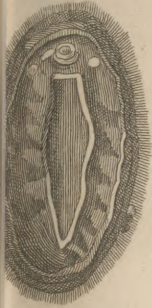


Fig. 2.

Fig. 3.

Fig.4.

Fig. 5.

Fig.6.

.7

Fig. 8.

Fig. 9.

Fig.10.

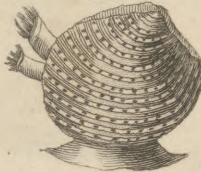


Fig.11.

Fig.12.

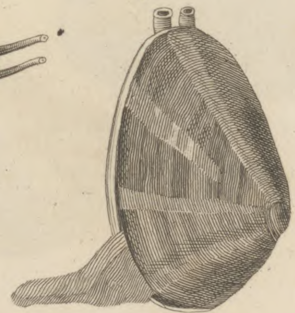


Fig.13.

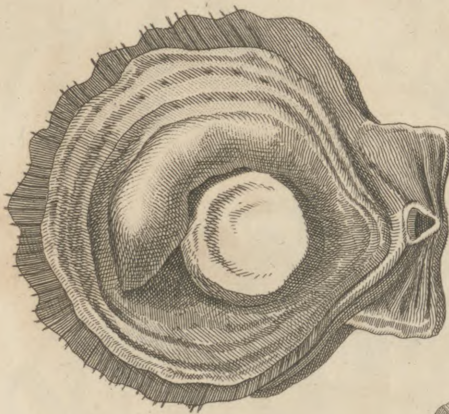
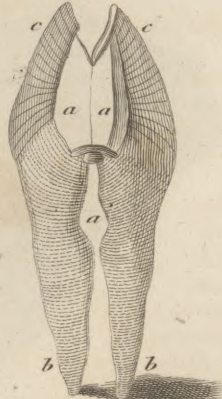


Fig.14.

Fig.15.

Fig.16.



W. Archibald Sculp.t

Fig. 17.

Fig. 18.

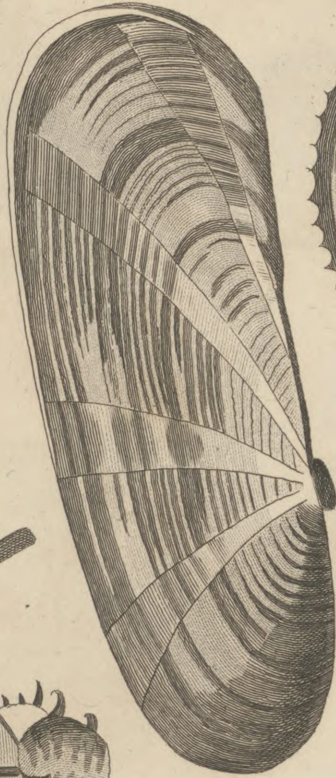


Fig. 20.

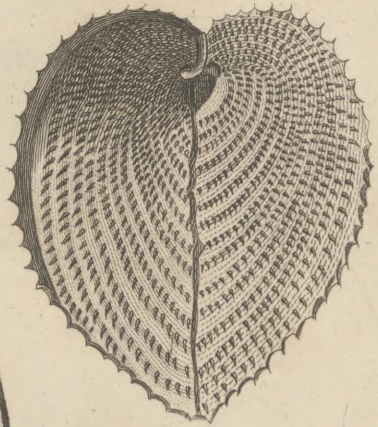


Fig. 24.

Fig. 21.

Fig. 22.

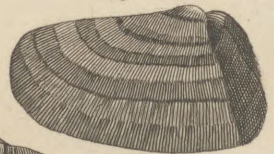
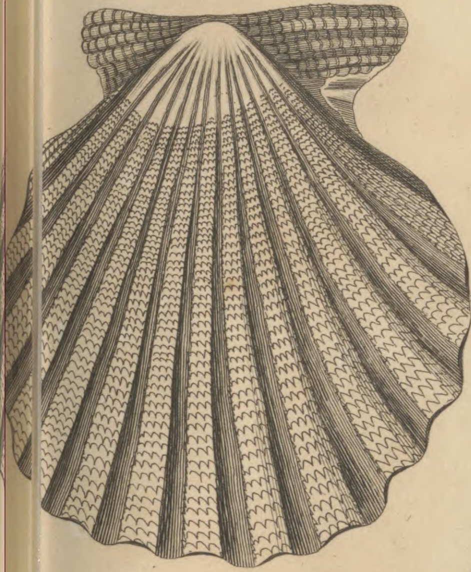


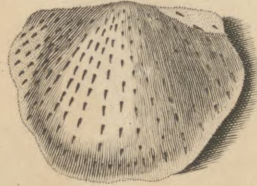
Fig. 19.

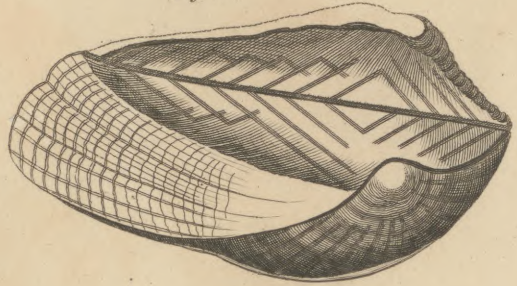
Fig. 23.

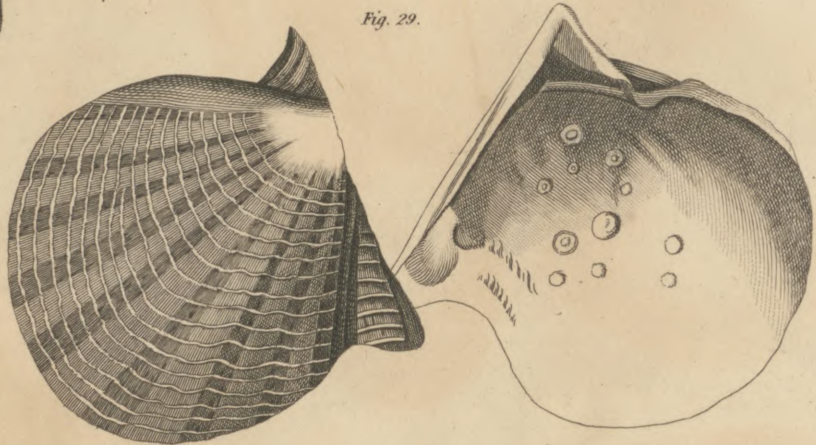
Fig. 25.

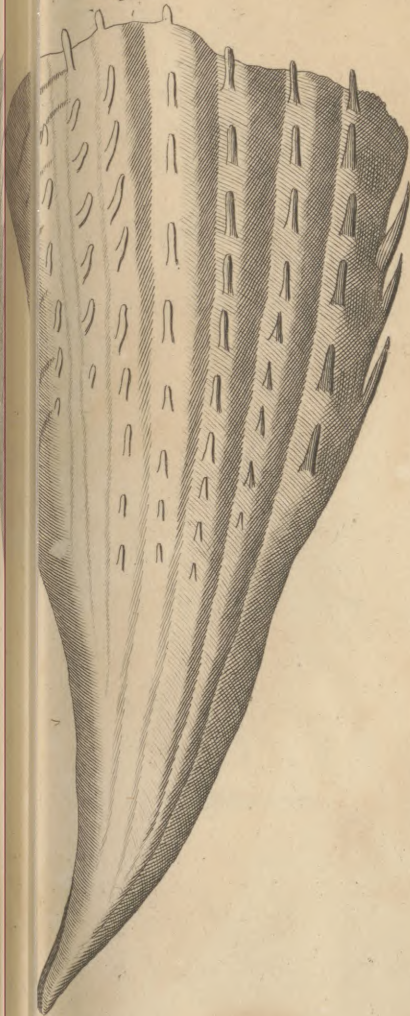
W. Archibald sculpt.





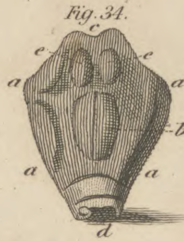


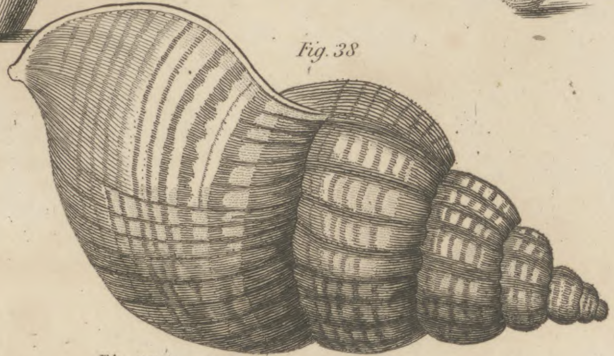


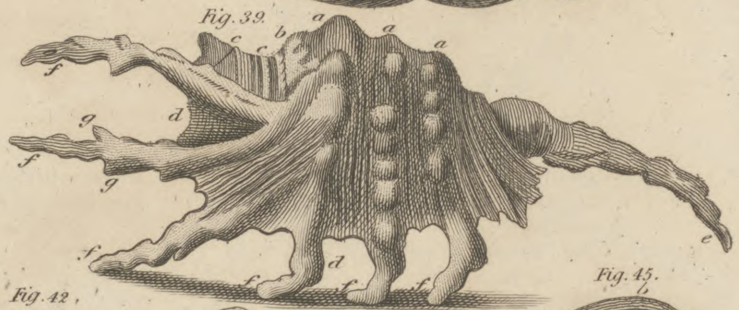


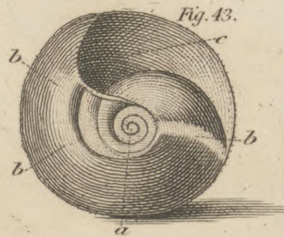
W. Archibald Sculp.t

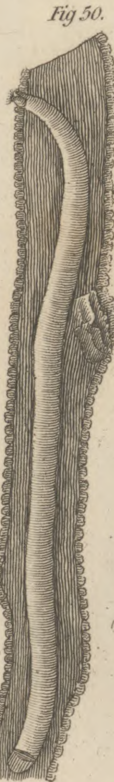
CONCHOLOGY. PLATE CLV.

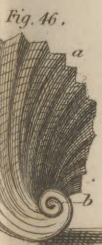


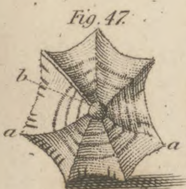




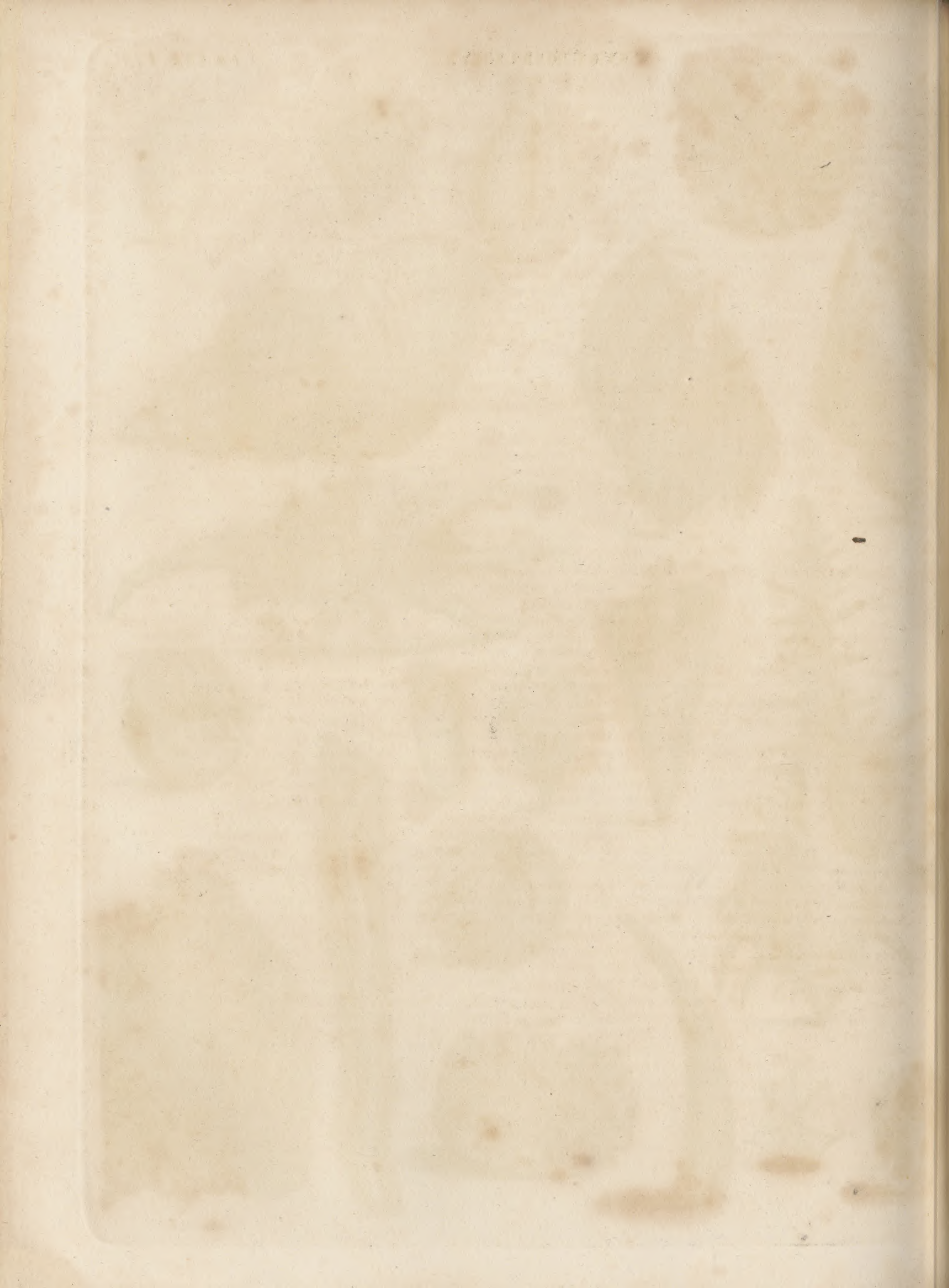








W. Archibald Sculp.t



Land shells, method of collecting, Nº 137
Langius, his syſtem of ſhells, 6
Layer of ſhells, laſt formed, white, 97
Lepas, ſpecies of, 25
Light, effects of, on ſhells, 108
Limax, generic character of, 15
Limpet, ſee *Patella*, 60
Liſter, his ſyſtem of ſhells, 5

M.

Mactra, ſpecies of, 31
Moderns, progreſs of, in conchology, 4
Muller, his ſyſtem of ſhells, 13
Multivalves, terms of, defined, 17
Murex, ſpecies of, 54
Muſſel, ſee *Mytilus*, 44
Mya, ſpecies of, 27
margaritifera yields pearl and mother-of-pearl, *ib.*
Mytilus, ſpecies of, 44
margaritiferus produces pearls, *ib.*

N.

Nautilus, ſpecies of, 47
Nereis, generic character of, 15
Nerita, ſpecies of, 58

O.

Organs ſecreting colouring matter, enlarge, 96
Oſtrea, ſpecies of, 37
Oyſter, ſee *Oſtrea edulis*, *ib.*
employed as food, 38
of different kinds, 39
grows on trees in warm climates, 40
in Jamaica, 111
the Britiſh noted among the Romans, *ib.*
retains its ſuperiority, 40
management of, 41
liquid of, ſeen by the microſcope, 42

P.

Patella, ſpecies of, 60
Pearl, component parts of, 70
found in mother-of-pearl ſhells, 121
ſuppoſed to be a morbid concretion, 122
from external injury, 123
diſcovery of its formation by Linnæus, 124
fiſhery, 140
in Britain, 141
in Ceylon, 142
Pholas, ſpecies of, Nº 26
ſtriata perforates wood acroſs the fibre, 111
Pilgrims viſiting the Holy Land, wear the ſcallop, 37
Pinna, ſpecies of, 45
Poliſhing ſhells, 143
with leather, 144
pumice-ſtone, 145
Dutch method, 153
Porcelain ſhells, colours of, 103
have an external layer formed, 104
proved, 105
become thicker, 106

R.

Razor-ſheath, ſee *Solen*, 26
Reaumur's inveſtigation of the formation of ſhells, 73
opinion miſtaken, 74
controverted, 77
experiments, 79
Ribs of ſhells, formation of, 114
only on ſea-ſhells, 115
hollow, 119

S.

Sabella, ſpecies of, 64
Scallop, ſee *Oſtrea maxima*, 37
worn by pilgrims, 111
Sea-ear, ſee *Haliotis*, 59
Sea-wing, ſee *Pinna*, 45
Sepia, generic character of, 15
Serpula, ſpecies of, 62
Shells, conſtituent parts of, 71
porcellaneous, 68
mother-of-pearl, 69
formed in the egg, 75
laſt formed, 76
proceſs of their formation, 80
formed by ſecretion from the animal, 81
time neceſſary, 82
layers ſeen by burning, 84
growth of, interrupted, 99
diſtinguiſhed by colour, 101
lower valve colourleſs, 109
ſpiral, four claſſes, 111
derive their form from the animal, 112
found on every part of the globe, 125
land numerous, 126
tropical, moſt beautiful, 127
ſea, methods of fiſhing, 138
Ship-worm, natural hiſtory of 63
Snails, ſee *Helix*, Nº 66
Solen, ſpecies of, 26
Species of ſhells enumerated, 65
found foſſil, 66
Spines produced, 117
Spio, generic character of, 15
Spires of the ſhell, turns increaſed, 85
Spondylus, ſpecies of, 34
Sprat's, Biſhop, hiſtory of the oyſter, 41
Striæ, formation of, 98
Strombus, ſpecies of, 53
Syſtems of conchology, 4
Liſters, 5
Langius's, 6
Breynius's, 7
Tournefort's, 8
D'Argenville's, 9
Klein's, 10
Adanſon's, 11
Geoffroy's, 12
Muller's, 13
Da Coſta's, 14

T.

Tellina, ſpecies of, 29
Teredo, ſpecies of, 63
Terebella, generic character of, 15
Terms explained, 16
in multivalves, 17
bivalves, 18
univalves, 19
Teſtaceous animals both oviparous and viviparous, 72
detached from the ſhell, 86
Tethys, generic character of, 15
Tooth-ſhell, ſee *Dentalium*, 61
Tournefort's ſyſtem of ſhells, 8
Triton, generic character of, 15
Trochus, ſpecies of, 55
Tropical ſhells moſt beautiful, 127
Tubercles on ſhells, formation of, 116
Turbo, ſpecies of, 56

U.

Umbilicus, formation of, 111
Univalves, terms of, defined, 19
generic character of, 23

V.

Valve, lower, of ſhells, colourleſs, 109
Venus, ſpecies of, 33
Voluta, ſpecies of, 51
Volute, ſee *Voluta*, *ib.*

W.

Wedge-ſhell, ſee *Donax*, 32
Whelk, ſee *Buccinum*, 52
Wreath, ſee *Turbo*, 56

CONCHYLIA, a general name for all petrified shells, as limpets, cochleæ, nautili, conchæ, lepades, &c.

CONCIATOR, in the glass art, is, for the crystal-glass, what the founder is at the green-glass houses. He is the person that weighs and proportions the salt on ashes and sand; and works them with a strong fire till they run into lumps and become white; and if the metal be too hard, and consequently brittle, he adds salt or ashes, and if too soft, sand; still mixing them to a fit temper, which is only known by the working.

CONCINNOUS INTERVALS, in *Music*, are such as are fit for music, next to, and in combination with, concords; being neither very agreeable nor disagreeable in themselves; but having a good effect, as by their opposition they heighten the more essential principles of pleasure: or as, by their mixture and combination with them, they produce a variety necessary to our being better pleased.

CONCINNOUS System, in *Music*. A system is said to be concinnous, or divided concinnously, when its parts, considered as simple intervals, are concinnous; and are besides placed in such an order between the extremes, as that the succession of sounds, from one extreme to the other, may have an agreeable effect.

CONCLAMATIO, in antiquity, a shout raised by those present at burning the dead, before they set fire to the funeral pile. See SHOUT. The word was also applied to the signal given to the Roman soldiers to decamp, whence the expression *conclamare vasa; conclamare arma*, was a signal for battle. It was likewise used for a practice of calling to a person deceased three times by his name; and when no reply was returned, they thus expressed his decease, *conclamatum est*. Whence the same term was afterwards applied to the cessation of the Roman empire.

CONCLAVE, the place in which the cardinals of the Romish church meet, and are shut up, for the election of a pope.

The conclave is a range of small cells, 10 feet square, made of wainscot: these are numbered, and drawn for by lot. They stand in a line along the galleries and hall of the Vatican, with a small space between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the constitutions of the church allow the cardinals to make choice of such a place for the conclave as they think most convenient; yet it is generally held in the Vatican.

The conclave is very strictly guarded by troops; neither the cardinals, nor any person shut up in the conclave, are spoken to, but at the hours allowed of, and then in Italian or Latin: even the provisions for the conclave are examined, that no letters be conveyed by that means from the ministers of foreign powers, or other persons who may have an interest in the election of the pontiff.

CONCLAVE is also used for the assembly, or meeting, of the cardinals shut up for the election of a pope.

CONCLUSION, in *Logic*, the consequences or judgment drawn from what was asserted in the premises; or the previous judgments in reasoning, gained from combining the extreme ideas between themselves.

CONCOCTION, in *Medicine*, the change which the food undergoes in the stomach, &c. to become chyle. See CHYLE.

CONCOMITANT, something that accompanies or goes along with another.

CONCORD, in *Grammar*, that part of construction called *syntax*, in which the words of a sentence agree; that is, in which nouns are put in the same gender, number, and case; and verbs in the same number and person with nouns and pronouns. See GRAMMAR.

CONCORD, in *Music*, the relation of two sounds that are always agreeable to the ear, whether applied in succession or consonance.

Form of CONCORD, in ecclesiastical history, a standard book among the Lutherans, composed at Torgaw, in 1576, and thence called the book of Torgaw, and reviewed at Berg by six Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains, in two parts, a system of doctrine, the subscription of which was a condition of communion, and a formal and very severe condemnation of all who differed from the compilers of it, particularly with respect to the majesty and omnipresence of Christ's body, and the real manducation of his flesh and blood in the eucharist. It was first imposed on the Saxons by Augustus, and occasioned great opposition and disturbance. The dispute about it was revived in Switzerland in 1718, when the magistrates of Berne published an order for adopting it as the rule of faith; the consequence of which was a contest, that reduced its credit and authority.

CONCORDANCE, a dictionary or index to the Bible, wherein all the leading words, used in the course of the inspired writings, are ranged alphabetically; and the various places where they occur referred to; to assist in finding out passages, and comparing the several significations of the same word.

Cardinal Hugo de St Charo, is said to have employed 500 monks at the same time in compiling a Latin concordance; besides which, we have several other concordances in the same language; one, in particular, called the *concordance* of England, compiled by J. Darlington, of the order of Predicants; another more accurate one, by the Jesuit de Zamora.

R. Mordecai Nathan has furnished us with a Hebrew concordance, first printed at Venice in 1523, containing all the Hebrew roots branched into their various significations, and under each signification all the places in scripture where it occurs: but the best and most useful Hebrew concordance is that of Buxtorf, printed at Basil in 1632.

Dr Taylor published, in 1754, a Hebrew concordance in two volumes folio, adapted to the English Bible, and disposed after the manner of Buxtorf.

The Greek concordances are only for the New Testament: indeed we have one of Conr. Kircher's on the Old; but this is rather a concordantial dictionary than a concordance; containing all the Hebrew words in an alphabetical order; and underneath all the interpretations or senses the LXX. give them; and in each interpretation all the places where they occur in that version.

In 1718, Trommius published his Greek concordance for the Septuagint at Amsterdam, in two volumes folio;

folio; and Schmidius improving on a fimilar work of H. Stephen, has given an excellent Greek concordance for the New Teftament, the beft edition of which is that of Leipfic, an. 1717.

Calafius, an Italian Cordelier, has given us concordances of the Hebrew, Latin, and Greek, in two columns; the firft, which is Hebrew, is that of R. Mordecai Nathan, word for word, and according to the order of the books and chapters: in the other column is a Latin interpretation of each paffage of Scripture quoted by R. Mordecai; this interpretation is Calafius's own; but in the margin he adds that of the LXX. and the Vulgate, when different from his. The work is in 4 vols folio, printed at Rome in 1621.

We have feveral very copious concordances in Englifh, as Newmann's, &c. but the laft and beft efteemed is that in 4to by Alexander Cruden.

CONCORDANT VERSES, fuch as have feveral words in common; but which, by the addition of other words, convey an oppofite, at leaft a different meaning. Such are thofe.

Et { *canis* / *lupus* } *in filva.* { *venatur* / *nutritur* } *et omnia* { *fervat.* / *vaftat.* }

CONCORDAT, in the canon law, denotes a covenant or agreement concerning fome beneficiary matter, as a refignation, permutation, promotion, or the like.

The council of Trent, feff. vi. *de reform.* cap. 4. fpeaking of concordats made without the authority and approbation of the pope, calls them *concordias quæ tantum fuos obligant auctores, non fucceffores.* And the congregation of cardinals, who have explained this decree, declares alfo that a concordat cannot be valid fo as to bind fucceffors, unlefs confirmed by the pope.

CONCORDAT is alfo ufed, abfolutely, among the French, for an agreement concluded at Bologna in 1516, between Pope Leo X. and Francis I. of France, for regulating the manner of nominating to benefices.

The concordat ferves in lieu of the pragmatic fanction, which has been abrogated; or rather, it is the pragmatic fanction foftened and reformed. The concordat between the pope and the republic of Venice refembles the former.

There is alfo a German concordat, made between the emperor Frederic III. and the princes of Germany, in 1448, relating to beneficiary matters, confirmed by Pope Nicholas V.

CONCORDIA, a town of Italy, in the duchy of Mirandola; feated on the river Sechia, 5 miles weft of Mirandola, and 15 miles fouth-eaft of Mantua; fubject to the houfe of Auftria. E. Long. 11. 13. N. Lat. 44. 52.

CONCORDIA, in *Ancient Geography*, a town of the Veneti, fituated at the confluence of the rivers Romatinus Major and Minor, 31 miles to the weft of Aquileia, (Pliny, Ptolemy, Antonine); a colony furnamed *Julia.* Its ruins ftill go by the name of *Concordia.*—Another Concordia (Ptolemy), of Lufitania, to the north-weft of Trajan's bridge, on the Tagus.—A third of the Nemetes, in Belgica, on the weft fide of the Rhine; a Roman fortrefs, fituated between Brocomagus and Noviomagus. Now Drufenheim, in Alface. E. Long. 8. N. Lat. 48. 40.

CONCORDIA, a Pagan divinity of the Romans. She had a temple on the declivity of the Capitol; another in the Portico of Livia; and a third on Mount Palatine, built of brafs by Cn. Flavius, on account of a vow made for reconciling the fenate and people. She was pictured with a cup in her right hand; in her left was fometimes a fceptre, and fometimes a *cornucopia.* Her fymbols were two hands joined, as is feen in a coin of Aurelius Verus, and another of Nero; alfo two ferpents twifting about a caduceus. She was addreffed to promote the peace and union of families and citizens.

CONCOU, in *Botany*, a name given by the people of Guinea to an herb, which is in great efteem among them for killing that troublefome fort of worm called the *Guinea-worm*, that breeds in their flefh. They bruife the leaves, and mixing them with oil apply them in form of a cataplafm.

CONCRETE, in the fchool-philofophy, an affemblage or compound.

CONCRETE, in *Natural Philofophy* and *Chemiftry*, fignifies a body made up of different principles, or any mixed body: thus, foap is a factitious concrete, mixed together by art; and antimony is a natural concrete, or a mixed body compounded in the bowels of the earth.

CONCRETION, the uniting feveral fmall particles of a natural body into fenfible maffes or concretes, whereby it becomes fo and fo figured and determined, and is endued with fuch and fuch properties.

CONCRETION is alfo the act whereby foft bodies are rendered hard; or an infenfible motion of the particles of a fluid or foft body, whereby they come to a confiftence. It is indifferently ufed for induration, condenfation, congelation, and coagulation.

CONCUBINAGE fometimes expreffes a criminal or prohibited commerce between the two fexes; in which fenfe it comprehends adultery, inceft, and fimple fornication.

In its more reftrained fenfe, concubinage is ufed for a man's and a woman's cohabiting together in the way of marriage, without having paffed the ceremony thereof.

Concubinage was anciently tolerated: the Roman law calls it an allowed cuftom, *licita confuetudo.* When this expreffion occurs in the conftitutions of the Chriftian emperors, it fignifies what we now call a *marriage in confcience.*

The concubinage tolerated among the Romans in the time of the republic, and of the heathen emperors, was that between perfons not capable of contracting marriage together; nor did they even refufe to let inheritances defcend to children which fprung from fuch a tolerated cohabitance. Concubinage between fuch perfons they looked on as a kind of marriage, and even allowed it feveral privileges; but then this concubinage was confined to a fingle perfon, and was of perpetual obligation as much as marriage itfelf. Hottoman obferves, that the Roman laws had allowed of concubinage long before Julius Cæfar made that law whereby every one was allowed to marry as many wives as he pleafed. The emperor Valentinian, Socrates tells us, allowed every man two.

CONCUBINAGE is alfo ufed for a marriage performed with lefs folemnity than the formal marriage: or a marriage

Concubinage, Concubine.

marriage with a woman of inferior condition, and to whom the husband does not convey his rank or quality. Cujas observes, that the ancient laws allowed a man to espouse, under the title of *concubine*, certain persons, such as were esteemed unequal to him, on account of the want of some qualities requisite to sustain the full honour of marriage. He adds, that though concubinage was beneath marriage, both as to dignity and civil effects; yet was concubine a reputable title, very different from that of mistress among us. The commerce was esteemed so lawful, that the concubine might be accused of adultery in the same manner as a wife.

This kind of concubinage is still in use in some countries, particularly in Germany, under the title of a *half marriage*, *morgengabic marriage*, or *marriage with the left-hand;* alluding to the manner of its being contracted, viz. by the man's giving the woman his left hand instead of the right. This is a real marriage, though without solemnity: the parties are both bound for ever; though the woman be thus excluded from the common rights of a wife for want of quality or fortune.

The children of concubines were not reputed either legitimate or bastards, but natural children, and were capable only of donations. They were deemed to retain the low rank of the mother; and were on this ground unqualified for inheriting the effects of the father.

CONCUBINAGE, in a legal sense, is used as an exception against her that sueth for dower, alleging thereby, that she was not a wife lawfully married to the party, in whose lands she seeks to be endowed, but his concubine.

CONCUBINE, a woman whom a person takes to cohabit with him, in the manner, and under the character, of a wife, without being authorized thereto by a legal marriage.

CONCUBINE is also used for a real, legitimate, and only wife, distinguished by no other circumstance but a disparity of birth or condition between her and the husband. Du Cange observes, that one may gather from several passages in the epistles of the popes, that they anciently allowed of such concubines. The seventeenth canon of the first council of Toledo declares, that he who, with a faithful wife, keeps a concubine, is excommunicated; but that if the concubine served him as a wife, so that he had only one woman, under the title of concubine, he should not be rejected from communion: which shows that there were legitimate wives under the title of concubines.

In effect, the Roman laws did not allow a man to espouse whom he pleased; there was required a kind of parity, or proportion, between the conditions of the contracting parties: but a woman of inferior condition, who could not be espoused as a wife, might be kept as a concubine; and the laws allowed of it, provided the man had no other wife.

It is certain the patriarchs had a great number of wives, and that these did not all hold the same rank; some being subaltern to the principal wife; which were what we call *concubines* or half-wives. The Romans prohibited a plurality of concubines, and only had regard to the children issuing from a single concubine, because she might become a legitimate wife. Solomon had 700 wives and 300 concubines; the emperor of China has sometimes two or three thousand concubines in his palace. Q. Curtius observes, that Darius was followed in his army by 365 concubines, all in the equipage of queens.

Concubine || Conde.

CONCUPISCENCE, according to divines, an irregular appetite, or lust after carnal things, inherent in the nature of man ever since the fall.

COND, CON, or CONN, in sea-language, signifies to guide or conduct a ship in her right course. He that cons her, stands aloft with a compass before him, and gives the word of direction to the man at the helm how he is to steer. If the ship go before the wind, or, as they call it, betwixt the sheets, the word is either Starboard, or Port the helm; according as the conder would have the helm put to the right or left side of the ship, upon which the ship always goes the contrary way. If he says, Helm a midship, he would have the ship to go right before the wind, or directly between her two sheets. If the ship sail by a wind, or on a quarter wind, the word is, Aloof, keep your luff, fall not off, veer no more, keep her to, touch the wind, have a care of the lee-latch: all which expressions are of the same import, and imply that the steersman should keep the ship near the wind. On the contrary, if he would have her sail more large, or more before the wind, the word is, Ease the helm, no near, bear up. If he cries Steady, it means, keep her from going in and out, or making yaws (as they call it), howsoever she sails, whether large or before a wind: and when he would have her go just as she does, he cries, Keep her thus, thus, &c.

CONDATE, in *Ancient Geography*, a town of Armorica in Gaul: called *Civitas Rhedonum*, in the Notitia; afterwards *Redonæ;* Redonica Regio, the district. Hence the modern name *Rennes*, in Britanny. W. Long. 1. 45. Lat. 48. 5. Another Condate of Britain (Antonine); now thought to be Congleton in Yorkshire; others say in Lancashire.

CONDE, LEWIS DE BOURBON, PRINCE OF, was born at Paris Sept. 7. 1621. He was styled Duke d'Enguien, till he succeeded to the title of Prince of Conde by his father's death in 1646. As he was of a tender and delicate constitution, the prince sent him to the castle of Montrond in Berry, that he might breathe a more pure and salutary air. Here he was educated in his infancy by some experienced and prudent citizens wives. When he was of a proper age, the prince took upon himself the task of governor, and appointed for his assistant M. de la Bouffieres, a private gentleman, a man of honour, fidelity, and good nature, and who made it a rule to observe inviolably the orders that were given him. Two Jesuits distinguished for their genius and knowledge were also given him for preceptors. He formed him a household of 15 or 20 officers, all men of the greatest virtue and discretion.

With these attendants the duke d'Enguien went to settle at Bourges, where he frequented the college of Jesuits. Here, besides the ordinary studies, he was taught ancient and modern history, mathematics, geography, declamation; also riding and dancing, in which last he soon excelled. He made such a surprising progress, that before the age of 13 he defended in public some questions in philosophy with incredible applause.

applause. At his return from Montrond, he had for his tutor M. de Merille; a man deeply versed in the knowledge of common law, of ancient and modern laws, of the holy scriptures, and of the mathematics. Under his direction the duke went through that new course with prodigious success. He acquired a critical taste in the arts and sciences, which he retained all his life; he never suffered a day to pass without dedicating two or three hours at least to reading; his thirst for knowledge was universal, and he endeavoured to search every thing to the bottom. His chief inclination, however, lay towards the military art; and at the age of 18 he obtained permission to make his first campaign as a volunteer in the army commanded by M. de la Meilleraye. This campaign was unfortunate; and the duke d'Enguien was only a witness of the marshal's imprudence and disgrace. Nevertheless, in this campaign he laid the foundation of that renown which made him afterwards considered as the greatest general of his age.

On his return to Paris, the duke waited upon Cardinal Richelieu at Ruel. That minister was so pleased with his conversation, that he soon after made proposals of an alliance with the prince of Conde, by marrying the duke d'Enguien to Claire Clemence de Maille Breza, the cardinal's niece. The duke consented to this match out of obedience to his father; but the force he put upon himself by yielding to it was so great, that he fell dangerously ill. It was long before he got the better of his distemper; but at length he not only recovered, but became so strong as afterwards to bear the greatest fatigues with ease.

The duke made two more campaigns as a volunteer; the one under the marshal de la Meilleraye, the other in the army of Louis XIII. which conquered Roussillon. In 1643, at the age of 22, he obtained from the king, at the persuasion of Cardinal Mazarin, the command of the army destined to cover Champagne and Picardy; which command was confirmed to him after the king's death by the queen regent, Anne of Austria, to whose interest he was strongly devoted. In this station, though he never had been present at any battle, he soon gave such a specimen of his abilities as crowned him with glory. The Spaniards, who threatened France with an invasion, were defeated by him at Rocroi; and this signal victory made him from that time considered as the guardian genius of his country. He next formed the project of besieging Thionville, and proposed it to the council of regency. They consented with fear and distrust; but the duke carried it into execution with such skill, activity, and courage, that he became justly the subject of general admiration. In two months time Thionville surrendered. At length, having covered Alsace and Lorrain from the enterprises of the Imperialists, the duke returned to Paris, where he obtained the government of Champagne, and of the city of Stenai.

The three following years were little more than a series of military operations. The three battles of Fribourg, in which the duke d'Enguien triumphed over Velt Marshal Count de Mercy, the greatest general in all Germany; the taking of Philipsbourg, and a great number of other places, which rendered him master of the palatinate, and of the whole course of the Rhine; the victory of Nortlingue, by which he revenged the viscount du Turenne's defeat at Mariendal; the siege and conquest of Dunkirk; the good and bad success of his arms in Catalonia, where, though he was forced to raise the siege of Lerida, he kept the Spaniards in awe, and cut to pieces their rear-guard; these are the principal events which distinguish the campaigns of 1644, 1645, and 1646.

The victories of the duke d'Enguien, his great reputation and esteem with the people, began now to give umbrage to Mazarin. The cardinal's dislike to him appeared on the death of the duke de Breze, admiral of France. The prince of Conde earnestly demanded for his son the duke de Breze's places. But Mazarin, afraid of increasing the wealth and power of a prince, whom his victories and the love and confidence of the people and the army had already rendered too formidable to him, evaded his request, by persuading the queen to take the admiralty to herself. On the death of his father, the minister's dislike to the young prince of Conde became still more apparent. By the minister's persuasion he had accepted of the command of the army in Catalonia; but, on his arrival at Barcelona, he found neither troops, money, artillery, provisions, nor ammunition. Enraged at this deception, he vented his resentment in bitter complaints and severe threats: but by the resources that he found in this dilemma, the prince added new lustre to his glory.

The campaign of 1648 was as glorious to Conde as those which preceded it had been. To disconcert at once the projects of the archduke Leopold, the prince resolved to attack him even in the heart of the Low Countries; and notwithstanding the considerable difficulties which he had to surmount, he besieged the important city of Ypres, and took it in sight of all the enemy's forces.

Notwithstanding this success, Conde saw himself at the point of experiencing the greatest reverse of fortune. His army was a prey to scarcity, to nakedness, contagious distempers, and desertion. For eight months it received no supply from the minister, but half a muster. Every thing was supplied by the prince himself; he lavished his money, and borrowed more to supply his troops. When it was represented to him that he was in danger of ruining himself by such an enormous expence, he replied, that "since he every day ventured his life for the service of his country, he could very well sacrifice his fortune to it. Let but the government exist (added he), and I shall want for nothing."

The French army having been reinforced by 4000 of the troops of Weimar, Conde attacked the Spaniards advantageously encamped near Lens, and gained a complete victory over them, which disabled them from attempting any thing more, and even from supporting themselves. Afterwards he besieged Furnes, the garrison of which, 500 men, surrendered themselves prisoners of war. But the prince was wounded there in the trenches by a musket-shot above the right hip; and the contusion was so great, that he was forced to submit to several incisions.

The French court, animated with the victory at Lens, thought this a proper time to take vengeance on

Conde.

on the factions which for some time had violently agitated the kingdom; and accordingly imprisoned Brouffel and Blancmenil, two of the principal leaders of the country party. This vigorous proceeding, however, occasioned a general revolt. Two hundred thousand men took arms in Paris, barricaded the streets, invested the palais-royal, and demanded the prisoners. It was necessary to release them; but from that time the regal authority was annihilated; the queen was exposed to a thousand insults, and Mazarin dared no longer venture out of the palais-royal. In this embarrassment the queen recalled the prince of Conde, as the only one from whom she could hope for support. He retired to Ruel, whither the regent had gone with the young king and Mazarin. Anne of Austria proposed to him the reducing of Paris by force of arms: but he calmed the resentments of that princess; and instead of being accessory to her vengeance, he directed all his views to pacify the kingdom, and at length brought about an accommodation between the parties, who desired it with equal ardour. But new incidents soon rekindled the combustion. The treachery of Mazarin, and the artifices of the leaders of the country party, occasioned new cabals and fresh troubles. Conde was caressed by the leaders of both parties; but at last, enraged at the arrogance of the malecontents, who every day formed new pretensions, he took part openly with the court, though he thought it ungrateful, and protected the minister, though he did not esteem him.

The royal family, the duke of Orleans, Conde, and Mazarin, left Paris privately in the night between the 5th and 6th of January 1646, and went to St Germains. The parliament sent deputies to learn from the queen herself the reasons of her departure, and to beg her to name the citizens whom she suspected, that they might be tried. Mazarin had the imprudence to dismiss them without any answer. Exasperated at this, the people again took up arms in order to defend themselves against the enterprises of the court, who had determined to block up and to starve the capital, in order to suppress the party of malecontents. With 7000 or 8000 men, the broken relics of the last campaign, the prince of Conde formed a design of reducing above 500,000 intrenched behind walls. He had neither money nor magazines; he saw himself in the depth of a most severe winter; nevertheless he triumphed over Paris, and this great success completed his glory. It did him so much the more honour, as during the siege he constantly defeated the troops of the malecontents; he prevailed on the army that marched to their assistance under Turenne, to abandon that general; he stopped the progress of the duke de Longueville, who had caused an insurrection in Normandy; and got the start of the Spaniards, who were advancing to give him battle.

Condi de Retz, coadjutor of Paris, and afterwards cardinal, was the life and soul of the revolters, and directed all their motions. He had taken Catiline for his model; and was equally intrepid and capable of the greatest actions; of an exalted genius, but governed by his ambition. He distinguished his hatred to Mazarin by arming the malecontents; and he himself raised at his own expence a regiment which he called the regiment of *Corinth*; as soon as this corps took the field during the blockade of Paris, it was defeated and dispersed. This check was called *the first to the Corinthians*. The peace was signed at St Germains; but neither party carried its point, and scarce any one but Conde acquired glory by this war. After the conclusion of the treaty, the prince repaired to the capital, and traversed all the streets in his coach alone. All persons of any consequence paid their compliments to him, and the parliament sent a solemn deputation to thank him for the peace to which he had so powerfully contributed. The people, however, made loud complaints on account of the king's absence (for the court was not yet returned to Paris), and the malecontents gave reason to apprehend a new insurrection. Conde encouraged the king and queen to return; and at length brought them to Paris, amidst the acclamations and blessings of the public.

The important service which Conde had just done the court entitled him to the acknowledgments of the queen, and especially of Mazarin; but the dark soul of that cardinal only remembered it to punish a too fortunate and too powerful protector. He privately swore the prince's destruction; at least that he should give the whole kingdom a pattern of submission and dependence on his will. However, not to excite the public indignation, he still kept up appearances with the prince, while he secretly spread about him disgusts, suspicions, snares of every kind, and the most heinous calumnies. The ungrateful minister deceived the prince by making him the most flattering proposals; and with the most alluring promises, which he always found means to avoid fulfilling. The enraged prince despised the minister, and treated him with disdain. After this they were reconciled again only to be again at variance. Each of them in their turn courted the country party, in order to make it subservient to their designs. At last Mazarin thought of an expedient, which but too effectually answered his purpose, of making an irreconcileable quarrel between that party and the prince. Among the malecontents, the marquis de la Boulaie, a man of an infamous character, had obtained the confidence of the party by false appearances of hatred to the cardinal, but secretly kept up a correspondence with him. It is pretended that he made him an offer of privately killing Conde. Mazarin was charmed with the proposal; yet he only required Boulaie to exhibit all the proofs of an assassination, and to act in such a manner that every thing might concur to render the country party suspected of that crime. He was punctually obeyed; the coach was stopped; some pistols were fired at it, by which two of the footmen were dangerously wounded; and, after that shameful exploit, la Boulaie took refuge in the hotel of the duke of Beaufort, who was the hero of the party, in order no doubt to countenance the prince's suspicion of the malecontents. Luckily Conde was not in his coach when it was stopped; the cardinal had spread the report of his intended assassination; and in concert with the queen and the prince he had prevailed to have the coach sent away empty, to prove the reality of the attempt. Mazarin counterfeited a zeal for the prince's life; he furiously declaimed against the malecontents, who, he pretended, had made an attempt on a life so precious to the state; and he inflamed Conde's resentment against the duke of

Beaufort

Beaufort and the coadjutor, whom he ſuppoſed to be the authors of this heinous outrage. The prince was ſo ſtrongly prejudiced, that he refuſed to hear them when they appeared before him to juſtify themſelves. He demanded juſtice againſt them of the king: he formally accuſed them before the parliament, and remained inflexible in ſpite of the pains which the leaders of the party took to demonſtrate to him that he had been impoſed upon. However, the affair was brought before the parliament; the accuſed defended themſelves, and the coadjutor, who had diſcovered the cardinal's ſecret, unmaſked him ſo well, that the prince agreed to a private negociation with the malecontents; he required nothing more than the coadjutor's leaving Paris, but with the rank of ambaſſador to Rome or Vienna. That prelate would have conſented to it, to ſatisfy Conde, if Mazarin, ſome days after, had not given him the choice of any recompenſe, in order to engage his concurrence in the prince's deſtruction. Affairs were now in ſuch a dangerous ſituation, that the cardinal ſaw clearly it was neceſſary to haſten to the winding up of the plot. Maſter of the queen's mind, which he guided as he pleaſed; and ſure of having inflamed againſt Conde all the reſentment of the malecontents; he ſought and obtained, by means of the ducheſs Chevreuſe, the ſupport of that powerful faction, which connected itſelf the more readily with him, in hopes that the prince's fall would ſoon enable it to cruſh without difficulty the cardinal himſelf. The coadjutor had private conferences with the queen and the miniſter. Conde had notice of it; and in order to diſcover if it were true, he endeavoured to ſurpriſe it from Mazarin's own mouth. "Cardinal (ſaid he, one day), it is publicly reported that you have nightly meetings with the coadjutor, diſguiſed like a trooper." He accompanied this ſpeech with a quick and penetrating look: but the cardinal, who was a perfect maſter of diſſimulation, anſwered him in ſuch a free, artleſs-like manner, that he entirely removed Conde's apprehenſions; and he ſlighted the information he had received, of the plot forming againſt him.

Mazarin wanted nothing but the ſupport of the duke of Orleans; and at laſt found means, by the ducheſs of Chevreuſe, to inflame the jealouſy of that fickle and inconſtant prince, and to engage him to conſent to the impriſonment of Conde. Having thus united all parties, and fearing no other obſtacle, this ungrateful and perfidious miniſter made preparations for privately arreſting the prince; the order for it was ſigned January 18. 1650. Conde having that day repaired as uſual to the palais-royal, to aſſiſt at council with the prince of Conti and the duke of Longueville, the queen gave orders to arreſt them all three, and to convey them without any noiſe to the caſtle of Vincennes. She was inſtantly obeyed, and the princes were ſtrictly guarded in that priſon.

In this unexpected reverſe of fortune, the fortitude and greatneſs of Conde's mind appeared only the more remarkable. Confined with the other two princes in the tower of Vincennes, where neither ſupper, furniture, nor beds, were provided, he contented himſelf with two new laid eggs, and threw himſelf in his clothes, on a truſs of ſtraw, where he ſlept 12 hours without waking. He ſtill retained his cheerfulneſs, and dedicated the greateſt part of his time to reading; the reſt to converſation, playing at battle-door and ſhuttle-cock, to bodily exerciſes, and the cultivation of flowers.

Mazarin triumphed at the diſgrace of the princes, proſcribed all thoſe who were attached to Conde, and behaved in the moſt inſolent and arbitrary manner. The prince's friends, however, notwithſtanding their being ſtrictly watched, found means to keep up a punctual correſpondence with him. They made various attempts to releaſe him: they raiſed troops, in particular, the dukes of Bouillon and Rochefoucault, and the viſcount de Turenne. The princeſs of Conde engaged the province of Guienne to declare in his favour; ſhe made war, in order to force the court to releaſe him; at length the partizans of the prince ſigned a treaty with the Spaniards, to labour in concert for his enlargement. But all theſe efforts would, perhaps, have been ineffectual, if other more powerful reſources had not been employed.

In that gallant and warlike age, every thing was managed by the paſſions and intrigues of five or ſix women, who poſſeſſed the confidence of the leaders of the ſtate, and of the various parties. The princeſs of Mantua, wife to one of the ſons of the elector Palatine, king of Bohemia, principally directed the counſels in the party of the princes. She found means to reconcile the duke of Orleans, the coadjutor, and the malecontents, with the friends of the prince, and united their efforts againſt the cardinal. The parliament, on the other ſide, loudly demanded the releaſe of the priſoners. All the orders of the ſtate united in ſoliciting it, inſomuch that the queen was at laſt prevailed on to give her conſent. At this news, Mazarin was ſo confounded, that he fled in the diſguiſe of a trooper, and arrived at the gates of Richlieu, where a body of horſe waited for him. The parliament, informed by the queen of his flight, thundered forth an arret, by which he was obliged to leave the kingdom, with his family and foreign ſervants, in the ſpace of 15 days, under the penalty of being expoſed to a criminal proſecution. The queen deſired to follow him with the king; but the nobles and burghers inveſted the palais-royal, and prevented the execution of this project, which would have kindled a civil war. Mazarin, therefore, perceiving that it was impoſſible for the queen to join him, determined to go himſelf to reſtore the princes to their liberty, and to get the ſtart of the deputies who were coming to acquaint them with it. On his arrival at Havre, he informed the princes that they were free; he entreated Conde's friendſhip; and was ſo abject as to proſtrate himſelf at the feet of him whom he had ſo baſely oppreſſed. Conde gave him a polite reception, and ſpoke to him in a free and cheerful tone; but tired with the mean ſubmiſſions which the cardinal laviſhed upon him, he left him without making any promiſe, and ſet out in his return to Paris, which he entered as it were in triumph, amidſt the acclamations of all orders of men, and the demonſtrations of a moſt ſincere and general joy.

After this a civil war enſued, in which the prince of Conde ſided with the malecontents. Being preſſed by the king's army, he retired into the ſuburbs of St Anthony, where he behaved with the utmoſt bravery; when the citizens opened their gates and received

ceived him in; and a peace ensued soon after. His hatred of the cardinal, however, made him quit Paris, and take refuge among the Spaniards, who made him generalissimo of their forces; and he took Rocroi. The peace of the Pyrenees restored him to his country; and he again signalized himself at the head of the king's armies. Being afflicted with the gout, he refused the command of the army in 1676, and retired to Chantilly, where he was as much esteemed for the virtues of peace, as he had been before for his military talents. He died in 1686, at Fontainbleau.

CONDE, a town of the French Netherlands, in the province of Hainault, with the title of a principality, and a castle. It is one of the strongest towns in this country, and seated near the confluence of the rivers Haisne and Scheldt. It was taken by the allies in 1793, and retaken by the French in 1794. Its name by the convention was changed to Nord Libre. E. Long. 3. 39. N. Lat. 50. 27.

CONDE, a town of France, in the department of Calvados, which carries on a considerable trade; seated on the river Nereau, 15 miles west of Paris. W. Long. 0. 37. N. Lat. 48. 50.

CONDEMNATION, the act of giving judgment, passing or pronouncing sentence against a person, who is thus subjected to some penalty or punishment, either in respect of life, reputation, or fortune.

CONDENSATION, the act whereby a body is rendered more dense, compact, and heavy. The word is commonly applied to the conversion of vapour into water, by distillation, or naturally in the clouds. The way in which vapour commonly condenses, is by the application of some cold substance. On touching it, the vapour parts with its heat which it had before absorbed; and on doing so, it immediately loses the proper characteristics of vapour, and becomes water. But though this is the most common and usual way in which we observe vapour to be condensed, nature certainly proceeds after another method: since we often observe the vapours most plentifully condensed when the weather is really warmer than at other times. See the articles CLOUD, EVAPORATION, &c.

CONDENSER, a pneumatic engine, or syringe, with which a greater quantity of air may be crowded into a given space; so that sometimes ten atmospheres, or ten times as much air as there is at the same time in the same space, under the usual pressure, may be thrown in by means of it, and its egress prevented by valves properly disposed.

It consists of a brass cylinder, wherein is a moveable piston; which being drawn out, the air rushes into the cylinder through a hole provided on purpose; and when the piston is again forced into the cylinder, the air is driven into the receiver through an orifice, furnished with a valve to hinder its getting out.

The receiver or vessel containing the condensed air, should be made very strong, to bear the force of the air's spring thus increased; for which reason they are generally made of brass; its orifice is fitted with a female screw to receive the male screw at the end of the condenser.

CONDENSER of Electricity, an apparatus for collecting small quantities of the electric fluid. This instrument was invented by Volta, and is described in the 72d vol. of the Phil. Transf. See ELECTRICITY.

CONDITION, in the civil law, a clause of obligation stipulated as an article of a treaty or a contract; or in a donation of a testament, legacy, &c. in which last case a donee does not lose his donative if it be charged with any dishonest or impossible conditions.

CONDITIONAL, something not absolute, but subject to conditions.

CONDITIONAL Conjunctions, in *Grammar*, are those which serve to make propositions conditional; as *if*, *unless*, *provided*, &c.

CONDITIONAL Propositions, in *Logic*, such as consist of two parts connected together by a conditional particle.

CONDITIONAL Syllogism, a syllogism where the major is a conditional proposition. Thus,

If there is a God, he ought to be worshipped.
But there is a God;
Therefore he ought to be worshipped.

CONDIVICNUM, in *Ancient Geography*, the capital of the Namnetes, in Armorica. Now Nantes in Brittany, on the Loire, from its name *Civitas Namnetum*. W. Long. 1. 30. Lat. 47. 15.

CONDOM, a town of Gascony in France; capital of the Condomois, with a bishop's see. It is but a poor place, and the trade is very small. It is seated on the river Gelisse, in E. Long. 0. 22. N. Lat. 44.

CONDOR, or CONTOR. See VULTURE, ORNITHOLOGY *Index*.

CONDORCET, JOHN-ANTONY NICHOLAS CARITAT, marquis of, a French writer, and political character of considerable eminence, descended from an ancient family from the principality of Orange, and born at Ribemont in Picardy, in 1743. He received his education at the college of Navarre, where he was distinguished at an early period of life for his strong attachment to the study of physics and mathematics. On his entrance into public life, he established a friendly intercourse with Voltaire, D'Alembert, and other literary characters, who professed opinions analogous to his own, and formed a very powerful party among the French literati, whose united efforts to propagate their ideas of religion and politics, have been applauded or condemned, according to the principles of their different judges. Condorcet first attracted the attention of the public as a mathematician, obtaining their approbation for his treatise on integral calculations, which he composed at the age of 22. In the year 1767, his solution of the problem of the Three Bodies made its appearance, and in the following year the first part of his "Essays on Analysis." In the year 1769 he was received a member of the Academy of Sciences, the memoirs of which were greatly enriched by him with different papers on the most abstruse branches of mathematical science. His justly merited reputation pointed him out as a fit person to co-operate with D'Alembert and Bossut, in assisting M. Turgot, that celebrated minister and able financier, with arithmetical calculations. In the mean time he laboured indefatigably in the study of politics and metaphysics, and defended, in an anonymous publication, the sect of philosophers to which he had attached himself, from an

an attack made upon them in the Trois Siecles; and replied to M. Necker's essay on Corn Laws. He was appointed secretary to the Academy of Sciences in the year 1773, when he employed much of his time in writing eulogies on such of its deceased members as Fontenelle had passed over in silence. Like D'Alembert and some others, Condorcet having united in himself the characters of an elegant writer and a man of profound research, was admitted into the French academy in 1703, when he pronounced an oration on the influence of philosophy, which was ordered to be printed. From the time of D'Alembert's death, which happened this year, he filled the station of secretary to that academy, rendering his name conspicuous by the publication of eulogies on different eminent characters. His panegyric on D'Alembert, to whom he was most sincerely attached, is a very elaborate performance, notwithstanding of which it is esteemed by judges as a candid account of the genuine merits of that great philosopher. His encomium bestowed on that very able mathematician Euler, furnished him with a favourable opportunity of giving a circumstantial account of the specific improvements and inventions conferred on a peculiar branch of science by the labours of an individual; a talent in a biographical writer which Condorcet appears to have possessed in an eminent degree. His eulogy on the minister Turgot was read with avidity, and admired by all those who approved of Turgot's plans of government and system of finance. In the year 1787 he gave the public his "Life of Voltaire," which was highly elaborate, and replete with lofty panegyric, on the merits of which mankind were consequently much divided, according to their sentiments of that author's philosophy. The last of his biographical works was an eulogy on the celebrated Dr Franklin, published in 1790, all of which will be read with some degree of prejudice by those who are inimical to the school of philosophy to which he belonged.

The memorable event of the French revolution, which the writings of Condorcet and his associates unquestionably accelerated, naturally interested his feelings, and called forth his exertions. But the conduct of the political parties and their leaders, during this tumultuous period, is painted in colours so diametrically opposite to each other, that a proper estimate of it is scarcely possible. In this part of Condorcet's life, therefore, we must confine ourselves to such facts as are universally acknowledged, leaving it to our readers to draw inferences for themselves.

At an early period he employed his talents to promote those reforms, (for such they appeared in his judgment) which were to pave the way to a new order of things. A work entitled *La Bibliotheque de l'Homme Public*, to contain an analysis of the writings of the most eminent politicians, was chiefly conducted by him, as was also a newspaper called *La Chronique de Paris*, filled with declamation against royalty. He had likewise a share in the *Journal de Paris*, a paper conducted on similar principles. About the time when the unfortunate king fled to Varennes he proposed a paper called *Le Republicain*, the obvious intention of which is clearly deducible from its title. He was an indefatigable member of the Jacobin club, and spoke frequently, though not forcibly, in it. He was chosen a representative for Paris when the constituent assembly was dissolved, and followed the general political course of the Brissotine party. A plan for public instruction was now to exercise his abilities, which he finished in two elaborate memoirs, allowed to contain some exalted and enlarged ideas, but perhaps rather extensive to be reduced to practice. He was likewise author of the manifesto addressed to the European powers by the people of France, on the approach of a war. He wrote a letter of expostulation to the king while he was president of the assembly, which some have considered as by far too severe, and destitute of that ceremony to which the sovereign was entitled. When the king was insulted by the populace at the Thuilleries, in being offered the red cap, it is said that he vindicated their proceedings. We are also informed, that while he was degrading royalty in this manner, he was secretly soliciting the office of tutor to the dauphin; a proposition which the king utterly rejected, on account of his avowed infidelity. Attempts have been made to fix upon his character the most abominable ingratitude, by making him accessory to the murder of the duke de la Rochefoucault, to whom he was under the strongest obligations, and from whose family he had received a most accomplished wife with a fortune; but we sincerely hope that this calumny entirely originated from the malevolence of party spirit. When the trial of the king came to be agitated, Condorcet gave it as his opinion that he could not be brought to judgment in a legal manner; yet it must be confessed that his conduct in regard to the sentence, was rather of an ambiguous nature, and betrayed that timidity and want of resolution which formed the most prominent features of his political career. The judgment of Madame Roland concerning the moral constitution of this wonderful man has all the air of impartiality. "The genius of Condorcet," says that lady, "is equal to the comprehension of the greatest truths; but he has no other characteristic besides fear. It may be said of his understanding, combined with his person, that it is a fine essence absorbed in cotton. The timidity which forms the basis of his character, and which he displays even in company, does not result from his frame alone, but seems to be inherent in his soul, and his talents furnish him with no means of subduing it. Thus, after having deduced a principle or demonstrated a fact in the assembly, he would give a vote decidedly opposite, overawed by the thunder of the tribunes, armed with insults, and lavish of menaces. The properest place for him was the secretaryship of the academy. Such men should be employed to write, but never permitted to act." The Gironde party, after the execution of the king, employed him to frame a new constitution, the plan of which was presented to the convention, and obtained their approbation. It was not thus esteemed by the people at large; and it has, perhaps not without reason, been considered as "a mass of metaphysical absurdities." During the violent struggle between the Gironde and Mountain parties, Condorcet took no decided part with either, which seems to have been owing to the native timidity of his mind, and his abhorrence of the state of public affairs. He was not comprehended among the number of those who were sacrificed with their leader Brissot; but having employed his pen against the victorious party,

ty, he fell under the invincible displeasure of that inhuman, blood-thirsty tyrant Robespierre, who issued a decree of accusation against him in July, 1793. He found means to effect his escape from the arrest, and during nine months concealed himself in Paris. Dreading at length that the tyrant would order a domiciliary visit for the purpose of discovering the place of his retreat, he passed through the barriers without being taken notice of, and went to the house of a person in whom he could confide, on the plain of Mont-Rouge, who unfortunately for Condorcet was at that time in the metropolis. He was of consequence under the necessity of passing two dreary nights in the open fields, a melancholy prey to hunger and cold. On the third day he obtained an interview with his friend, who unhappily durst not venture to afford him shelter under his roof, so that he was once more compelled to wander in the fields. Worn out at length by hunger and fatigue, and life being no longer supportable without sustenance, he applied at a public house for an omelette, which he devoured with greediness. His cadaverous appearance and uncommonly keen appetite, roused the suspicion of a municipal officer who happened to be present, and by whom he was interrogated. The ambiguity and hesitation which characterized his answers, made the officer conclude that it would be proper to apprehend him. He was accordingly consigned to a dungeon, to be next day conducted to Paris, but his melancholy fate rendered such a measure unnecessary. He was found dead in the morning; and as it was generally understood that he constantly carried with him a dose of poison, to this cause his melancholy exit was very properly ascribed. Thus terminated the career of Condorcet on the 28th of March, 1794, who for many years sustained a brilliant and honourable reputation in the republic of letters. His manners were replete with urbanity, and as well qualified to please in company as could be expected in a man who was conceived as destitute of a heart. He was certainly blessed with domestic felicity, and had one daughter by his wife. Soon after his death appeared his "Sketch of a Historical Draught of the Progress of the Human mind," a methodical performance, and evincing the profoundest research, in which he strongly recommends his favourite idea of gradually bringing human nature to a state of perfection, by considering what man has been, now is, and may be. This treatise will no doubt be viewed by some as rather fanciful; but it is clearly the effort of a very superior genius, and must be peculiarly interesting to the feeling man, when it is known that it was composed while its author was in circumstances of danger and distress. The idea of man's progressive advancement towards perfection and happiness, inspired him with consolation under his complicated misfortunes. Besides the works which we have enumerated in this sketch of his life, he published "Letters to the King of Prussia," with whom he kept up a correspondence, as well as with Catharine empress of Russia. A treatise on calculation, and an elementary treatise on arithmetic, were left behind him in manuscript. Although he was an enemy to revealed religion, he was certainly a man of virtue and integrity; yet all his philosophy could never inspire him with that heroic fortitude and contempt of death in a just cause, for which the sincere votaries of Christianity have ever been conspicuous.

CONDORMIENTES, in church history, religious sectaries, who take their name from lying all together, men and women, young and old. They arose in the 13th century, near Cologne, where they are said to have worshipped an image of Lucifer, and to have received answers and oracles from him.

CONDRIEU, a town of Lyonnois in France, remarkable for its excellent wines. It is seated at the foot of a hill near the river Rhone. E. Long. 4. 33. N. Lat. 45. 28.

CONDRUSII, in *Ancient Geography*, a people of Belgica, originally Germans, dwelling about the Maese. Their country is now called *Condrotz*, in the bishopric of Liege, between Luxemburgh and the Maese.

CONDUCTOR, in *Surgery*, an instrument which serves to conduct the knife in the operation of cutting for the stone, and in laying up sinuses and fistulas.

CONDUCTORS, in electrical experiments, as those bodies that receive and communicate electricity; and those that repel it are called *non-conductors*. See ELECTRICITY.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid.

There are several subterraneous conduits through which the waters pass that form springs. Artificial conduits for water are made of lead, stone, cast-iron, potter's earth, timber, &c.

CONDYLOID and CORONOID processes. See ANATOMY *Index*.

CONDYLONA, in *Medicine*, a tubercle, or callous eminence, which arises in the folds of the anus; or rather a swelling or hardening of the wrinkles of that part.

CONDYLUS, a name given by anatomists to a knot in any of the joints, formed by the epiphysis of a bone.

CONE, in *Geometry*, a solid figure, having a circle for its base, and its top terminated in a point or vertex. See CONIC SECTIONS.

Melting CONE, in *Chemistry*, is a hollow cone formed of copper or brass, with a handle, and with a flat bottom adjoining to the apex of the cone, upon which it is intended to rest. Its use is to receive a mass of one or more metals melted together, and cast into it. This mass, when cold, may be easily shaken out of the vessel, from its figure. Also, if a melted mass consisting of two or more metals, or other substances not combined together, be poured into this vessel, the conical figure facilitates the separation of these substances according to their respective densities. The cone ought to be well heated before the melted mass is thrown into it; that it may not contain any moisture, which would occasion a dangerous explosion. It ought also to be greased internally with tallow, to prevent the adhesion of the fluid matter.

CONE of Rays, in *Optics*, includes all the several rays which fall from any radiant point upon the surface of a glass.

CONE. See CONUS, BOTANY *Index*.

CONE-Shell. See CONUS, CONCHOLOGY *Index*.

CONESSI, a ſort of bark of a tree, which grows on the Coromandel coaſt in the Eaſt Indies. It is recommended in a letter to Dr Monro, in the Medical Eſſays, as a ſpecific in diarrhœas. It is to be finely pulverized, and made into an electuary with ſyrup of oranges. The bark ſhould be freſh, and the electuary new made every day, or ſecond day, otherwiſe it loſes its auſtere and grateful bitterneſs on the palate, and its proper effects on the inteſtines.

CONFARREATION, a ceremony among the ancient Romans, uſed in the marriage of perſons whoſe children were deſtined for the honour of the prieſthood.

Confarreation was the moſt ſacred of the three modes of contracting marriage among that people; and conſiſted, according to Servius, in this, that the *pontifex maximus* and *flamen dialis* joined and contracted the man and woman, by making them eat of the ſame cake of ſalted bread; whence the term *far*, ſignifying *meal* or *flour*.

Ulpian ſays, it conſiſted in the offering up of ſome pure wheaten bread; rehearſing withal a certain formula, in preſence of ten witneſſes. Dionyſius Halicarnaſſeus adds, that the huſband and wife did eat of the ſame wheaten bread, and threw part on the victims.

CONFECTION, in *Pharmacy*, ſignifies, in general, any thing prepared with ſugar; in particular it imports ſomething preſerved, eſpecially dry ſubſtances. It alſo ſignifies a liquid or ſoft electuary, of which there are various ſorts directed in diſpenſatories. See PHARMACY.

CONFECTOR, among the ancient Romans, a ſort of gladiator, hired to fight in the amphitheatre againſt beaſts; thence alſo denominated *beſtiarius*.

The *confectores* were thus called *à conficiendis beſtiis*, from their deſpatching and killing beaſts.

The Greeks called them παραϐολοι, q. d. *daring*, *raſh*, *deſperate*; whence the Latins borrowed the appellations *parabolani* and *parabolarii*. The Chriſtians were ſometimes condemned to this ſort of combat.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled or prepared with ſugar or honey, to diſpoſe them to keep, and render them more agreeable to the taſte.

CONFEDERACY, in *Law*, is when two or more perſons combine to do any damage to another, or to commit any unlawful act. Confederacy is puniſhable, though nothing be put in execution: but then it muſt have theſe four incidents; 1. That it be declared by ſome matter of proſecution, as by making of bonds or promiſes to one another; 2. That it be malicious, as for unjuſt revenge; 3. That it be falſe, i. e. againſt the innocent; and, laſtly, That it be out of court voluntary.

CONFERVA. See BOTANY *Index*.

CONFESSION, in a civil ſenſe, a declaration or acknowledgment of ſome truth, though againſt the intereſt of the party who makes it; whether it be in a court of juſtice or out of it. It is a maxim, that in civil matters, the confeſſion is never to be divided, but always taken entire. A criminal is never condemned on his ſimple confeſſion, without other collateral proofs; nor is a voluntary extrajudicial confeſſion admitted as any proof. A perſon is not admitted to accuſe himſelf, according to that rule in law, *Non auditur perire volens*. See ARRAIGNMENT.

CONFESSION, among divines, the verbal acknowledgment which a Chriſtian makes of his ſins.

Among the Jews it was the cuſtom, on the annual feaſt of expiation, for the high-prieſt to make confeſſion of ſins to God in the name of the whole people: beſides this general confeſſion, the Jews were enjoined, if their ſins were a breach of the firſt table of the law, to make confeſſion of them to God; but violations of the ſecond table were to be acknowledged to their brethren. The confeſſions of the primitive Chriſtians were all voluntary, and not impoſed on them by any laws of the church; yet private confeſſion was not only allowed, but encouraged.

The Romiſh church requires confeſſion not only as a duty, but has advanced it to the dignity of a ſacrament: this confeſſion is made to the prieſt, and is private and auricular; and the prieſt is not to reveal them under pain of the higheſt puniſhment.

CONFESSION of Faith, a liſt of the ſeveral articles of belief in any church.

CONFESSIONAL, or CONFESSIONARY, a place in churches under the great altar, where the bodies of deceaſed ſaints, martyrs, and confeſſors, were depoſited.

This word is alſo uſed by the Romaniſts for a deſk in the church where the confeſſor takes the confeſſions of the penitents.

CONFESSOR, a Chriſtian who has made a ſolemn and reſolute profeſſion of the faith, and has endured torments in its defence. A mere ſaint is called a confeſſor, to diſtinguiſh him from the roll of dignified ſaints; ſuch as apoſtles, martyrs, &c. In eccleſiaſtical hiſtory, we frequently find the word confeſſors uſed for martyrs: in after-times it was confined to thoſe who, after having been tormented by the tyrants, were permitted to live and die in peace. And at laſt it was alſo uſed for thoſe who, after having lived a good life, died under an opinion of ſanctity. According to St Cyprian, he who preſented himſelf to torture, or even to martyrdom, without being called to it, was not called a *confeſſor* but a *profeſſor*: and if any out of a want of courage abandoned his country, and became a voluntary exile for the ſake of the faith, he was called *exterris*.

CONFESSOR is alſo a prieſt in the Romiſh church, who has a power to hear ſinners in the ſacrament of penance, and to give them abſolution. The church calls him in Latin *confeſſarius*, to diſtinguiſh him from confeſſor, which is a name conſecrated to ſaints. The confeſſors of the kings of France, from the time of Henry IV. have been conſtantly Jeſuits: before him the Dominicans and Cordeliers ſhared the office between them. The confeſſors of the houſe of Auſtria have alſo, ordinarily, been Dominicans and Cordeliers; but the later emperors have all taken Jeſuits.

CONFIGURATION, the outward figure which bounds bodies, and gives them their external appearance; being that which, in a great meaſure conſtitutes the ſpecific difference between bodies.

CONFIRMATION, in a general ſenſe, the act of ratifying or rendering a title, claim, report, or the like, more ſure and indiſputable.

CONFIRMATION, in *Law*, a conveyance of an eſtate, or

or right in *eſſe*, from one man to another, whereby a voidable eſtate is made ſure and unavoidable, or a particular eſtate is increaſed, or a poſſeſſion made perfect.

CONFIRMATION, in *Theology*, the ceremony of laying on of hands, for the conveyance of the Holy Ghoſt.

The antiquity of this ceremony is, by all ancient writers, carried as high as the apoſtles, and founded upon their example and practice. In the primitive church, it uſed to be given the Chriſtians immediately after baptiſm, if the biſhop happened to be preſent at the ſolemnity. Among the Greeks, and throughout the Eaſt, it ſtill accompanies baptiſm; but the Romaniſts make it a diſtinct independent ſacrament. Seven years is the ſtated time for confirmation; however, they are ſometimes confirmed before, and ſometimes after, that age. The perſon to be confirmed has a godfather and godmother appointed him, as in baptiſm. The order of confirmation in the church of England does not determine the preciſe age of the perſons to be confirmed.

CONFISCATION, in *Law*, the adjudication of goods or effects to the public treaſury; as the bodies and effects of criminals, traitors, &c.

CONFLAGRATION, the general burning of a city or other conſiderable place.

This word is commonly applied to that grand period or cataſtrophe of our world, when the face of nature is to be changed by fire, as formerly it was by water. The ancient Pythagoreans, Platoniſts, Epicureans, and Stoics, appear to have had a notion of the conflagration; though whence they ſhould derive it, unleſs from the ſacred books, is difficult to conceive; except, perhaps, from the Phœnicians, who themſelves had it from the Jews. Seneca ſays expreſsly, *Tempus advenerit quo ſidera ſideribus incurrent, et omni flagrante materia uno igne, quicquid nunc ex depoſito lucet, ardebit.* This general diſſolution the Stoics call *ἐκπυρωσις, ecpyroſis.* Mention of the conflagration is alſo made in the books of the Sibyls, Sophocles, Hyſtaſpes, Ovid, Lucan, &c. Dr Burnet, after F. Tachard and others, relates that the Siameſe believe that the earth will at laſt be parched up with heat; the mountains melted down; the earth's whole ſurface reduced to a level, and then conſumed with fire. And the Bramins of Siam do not only hold that the world ſhall be deſtroyed by fire, but alſo that a new earth ſhall be made out of the cinders of the old.

Various are the ſentiments of authors on the ſubject of the conflagration; the cauſe whence it is to ariſe, and the effects it is to produce. Divines ordinarily account for it metaphyſically; and will have it take its riſe from a miracle, as a fire from heaven. Philoſophers contend for its being produced from natural cauſes; and will have it effected according to the laws of mechanics. Some think an eruption of the central fire ſufficient for the purpoſe, and add, that this may be occaſioned ſeveral ways, viz. either by having its intenſity increaſed; which again may be effected either by being driven into leſs ſpace by the encroachments of the ſuperficial cold, or by an increaſe of the inflammability of the fuel whereon it is fed; or by having the reſiſtance of the impriſoning earth weakened, which may happen either from the diminution of its matter, by the conſumption of its central parts, or by weakening the coheſion of the conſtituent part of the maſs by the exceſs or the defect of moiſture. Others look for the cauſe of the conflagration in the atmoſphere, and ſuppoſe, that ſome of the meteors there engendered in unuſual quantities, and exploded with unuſual vehemence, from the concurrence of various circumſtances, may effect it, without ſeeking any further. The aſtrologers account for it from a conjunction of all the planets in the ſign Cancer; as the deluge, ſay they, was occaſioned by their conjunction in Capricorn. Laſtly, others have recourſe to a ſtill more effectual and flaming machine, and conclude the world is to undergo its conflagration from the near approach of a comet in its return from the ſun.

CONFLUENT, among phyſicians, &c. an appellation given to that kind of SMALL-POX wherein the puſtules run into each other.

CONFLUENTES, in *Ancient Geography*, a place at the confluence of the Rhine and Moſelle, ſuppoſed to be one of the 50 forts erected by Druſus on the Rhine, in Gallia Belgica: Now *Coblentz*, a town of Triers. E. Long. 7. 15. N. Lat. 50. 30.

CONFORMATION, the particular conſiſtence and texture of the parts of any body, and their diſpoſition to compoſe a whole.

CONFORMATION, in *Medicine*, that make and conſtruction of the human body which is peculiar to every individual. Hence a *mala conformatio* ſignifies ſome fault in the firſt rudiments; whereby a perſon comes into the world crooked, or with ſome of the viſcera or cavities unduly framed or proportioned. Many are ſubject to incurable aſthmas, from a too ſmall capacity of the thorax, and the like vicious conformations.

CONFORMITY, in the ſchools, is the congruency or relation of agreement between one thing and another; as between the meaſure and the thing meaſured, the object and the underſtanding, the thing and the diviſion thereof, &c.

CONFRONTATION, the act of bringing two perſons in preſence of each other, to diſcover the truth of ſome fact which they relate differently.

The word is chiefly uſed in criminal matters, where the witneſſes are confronted with the accuſed, the accuſed with one another, or the witneſſes with one another.

CONFUCIUS, or CONG-FU-TSE, the moſt eminent, and moſt juſtly venerated of all the philoſophers of China, a deſcendant of the imperial family of the dynaſty of Chang, was born in the kingdom of Lu, now called the province of Chang-tong, about 550 years before the commencement of the Chriſtian æra. This makes him to have been cotemporary with Pythagoras and Solon, and prior to the days of Socrates. He gave ſtriking proofs of very uncommon talents at an early period of life, which were cultivated and improved with great aſſiduity under the tuition of the ableſt maſters. Scarcely had he attained to the years of maturity, when he evinced himſelf acquainted with all the literature of that period, poſſeſſing, in particular, a comprehenſive knowledge of the canonical and claſſical books, aſcribed to the legiſlators Yao and Chun, which the Chineſe emphatically denominate *the five volumes*, as-

as containing the effence of all their fcience and morality. Nature had beftowed upon him a moft amiable temper, and his moral deportment was altogether unexceptionable. He acquired a diftinguifhed reputation for humility, fincerity, the government of his appetites, a difinterefted heart, and a fovereign contempt of wealth. Thefe rare qualities pointed him out as a proper perfon to fill offices of importance and truft in the government of his country, which he did with honour to himfelf and advantage to the empire. Thefe public ftations afforded him excellent opportunities of eftimating with accuracy the true ftate of morals among his countrymen, which at this time were diffolute and vicious in the extreme. He conceived the godlike idea of attempting a general reformation both in morals and in politics, and his efforts for fome time were attended with fuch remarkable effects, that he infpired his countrymen with a juft veneration for his excellent character, and gratitude for his exertions, being raifed to a ftation of the laft importance in the kingdom of Lu. Here his counfels and advice were productive of the moft beneficial confequences, in eftablifhing good order, the due exercife of juftice, concord, and decorum through the whole kingdom. As it thus very naturally became an object of admiration, fo, likewife, neighbouring princes beheld with envy its growing happinefs and profperity; to deftroy which they contrived a fatal and effectual expedient. The king of Tfi being apprehenfive, that if the king of Lu continued to be directed by the wifdom and found policy of Confucius, he would foon become by far too powerful, fent him and his nobility a prefent of the moft beautiful young women, trained up from their infancy in all the arts of feduction, who were but too fuccefsful in plunging the whole court into voluptuoufnefs and diffipation. This demolifhed in a fhort time, the whole of that beautiful fabric which had been erected by Confucius. Finding it a hopelefs attempt to ftem the univerfal torrent of corruption and depravity, he refolved to exert his talents in fome diftant kingdom, in the philanthropic caufe of moral reformation, in hopes of better fuccefs. But he had the mortification to difcover, that vice was everywhere triumphant, while virtue, that darling of his foul, was compelled to hide her head. This induced him to adopt the more humble, although not the lefs interefting employment, of a teacher of youth, in which he made great and rapid progrefs. About 600 of his fcholars were fent into different parts of the empire, to carry on his favourite work of moral reformation. Among his difciples, 72 were remarkably diftinguifhed above the reft for their mental acquifitions, and 10 others were deemed fuperior, even to thefe, as having a thorough comprehenfion of their mafter's whole fyftem. Thefe were divided by him into four claffes: the firft being deftined to the ftudy of the moral virtues; the fecond to the arts of logic and public fpeaking; the third clafs ftudied jurifprudence and the duties of the civil magiftrate; and public fpeaking, or the delivery of popular difcourfes on moral topics. Indefatigable, however, as his labours were, the tafk was too mighty to be accomplifhed by human exertions. During his laft illnefs, he declared to his pupils, that the grief of his mind occafioned by the profligacy of human nature was become infupportable; and with a melancholy voice, he exclaimed "Immenfe mountain, how art thou fallen! The grand machine is demolifhed, and the wife and the virtuous are no more. The kings will not follow my maxims; I am no longer ufeful on earth; it is, therefore, time that I fhould quit it." On uttering thefe words he was feized with a lethargy, which brought him to the grave. He finifhed his honourable career in the 72d year of his age, in his native kingdom, to which he had returned in company with his difciples. It is frequently the fate of illuftrious characters, never to be properly valued till they are cut off by death; which was the cafe with Confucius. The whole empire of China bewailed the lofs of him, and erected innumerable edifices to perpetuate his memory, adorned with fuch honourable infcriptions as the following: "To the great mafter;" "To the chief doctor;" "To the faint;" "To the wife king of literature;" "To the inftructor of emperors and kings." All his defcendants, even to the prefent day, enjoy the honourable title and office of mandarins, and are exempted from the payment of taxes to the emperor, as well as the princes of the blood. The man who applies for the title of doctor, muft previoufly have made a prefent to a mandarin defcended in a direct line from Confucius. The writings of this great man are efteemed by the Chinefe as of the higheft authority, next to the five volumes, to which he modeftly acknowledges himfelf to have been much indebted. His works are, 1. The *Tay-hio;* "The Grand Science, or School of Adults," chiefly intended for the information of princes and magiftrates, recommending the duties of felf-government, and uniform obedience to the laws of right reafon. 2. The *Chong-yong*, or "Immutable Medium," in which he fhews its importance in the government of the paffions by a variety of examples, and points out the method of arriving at perfection in virtue. 3. *Lung-yu*, or moral and fententious difcourfes, which exhibit a lively picture of the opinions, conduct, and maxims of Confucius and his followers. 4. *Meng-tfe*, the book of Mencius, which derived its name from one of that great philofopher's difciples. Thefe are all defervedly efteemed by the Chinefe, being held next in importance to the five volumes. 5. The *Hyau-king*, or differtation on the duty and refpect which children owe their parents; and, 6. The *Syan-hyo*, or fcience for children, being a judicious collection of moral fentences from ancient and modern writers.

If a fair and impartial eftimate of the religion of Confucius be made, it cannot be viewed in any other light than as uncorrupted deifm, although he has fometimes been accufed of befriending and fecretly propagating atheiftical fentiments; but fuch an accufation is as cruel as it is unjuft, fince the purity of his moral precepts, and the acknowledged rectitude of his whole deportment, are utterly incompatible with fuch a fuppofition. He confidered the Tyen or Deity as the pureft and moft perfect effence, principle and fource of all things in the boundlefs univerfe; who is abfolutely independent, omnipotent, the governor and guardian of every thing; poffeffed of infinite wifdom which nothing can deceive; holy, without partiality, of unlimited goodnefs and juftice. We are at a lofs to form any adequate opinion of his fentiments relative to the foul of man and the doctrine of futurity, having no well authenticated data, on which to proceed. His morality is in many inftances fuperior to that of Greece and Rome, and

Confucius, Confusion.

and yields to none upon earth, except to that of divine revelation. The religion of Confucius, notwithstanding the estimation in which he is held, is adopted as a model by none of his countrymen, the literati excepted. Their prevailing system is a medley of pagan idolatry and the fabulous superstition of the Indians, introduced into China by Fo, in the first century of the Christian era.

CONFUSION, in a general sense, is opposed to *order*, in a perturbation whereof confusion consists: *e. gr.* when things prior in nature do not precede, or posterior do not follow, &c.

In a logical sense, confusion is opposed to distinctness or perspicuity: and may happen either in words, as when miscontrived or misapplied; or in ideas, as when the idea of any thing presents something along with it, which does not properly belong to that thing. See IDEA and NOTION.

In a physical sense, confusion is a sort of union or mixture by mere contiguity. Such is that between fluids of contrary nature, as oil and vinegar, &c.

CONFUSION, in *Scots Law*, is a method of suspending and extinguishing obligations. For the illustration of this, see LAW *Index*.

CONFUSION of Tongues, in the history of mankind, is a memorable event, which happened in the one hundred and first year according to the Hebrew chronology, and the four hundred and first year by the Samaritan, after the flood, at the overthrow of Babel; and which was providentially brought about in order to facilitate the dispersion of mankind and the population of the earth. Until this period there had been one common language, which formed a bond of union that prevented the separation of mankind into distinct nations; and some have supposed, that the tower of Babel was erected as a kind of fortress, by which the people intended to defend themselves against that separation which Noah had projected.

There has been a considerable difference of opinion as to the nature of this confusion, and the manner in which it was effected. Some learned men, prepossessed with the notion that all the different idioms now in the world did at first arise from one original language to which they may be reduced, and that the variety among them is no more than must naturally have happened in a long course of time by the mere separation of the builders of Babel, have maintained, that there were no new languages formed at the confusion; but, that this event was accomplished by creating a misunderstanding and variance among the builders, without any immediate influence on their language. But this opinion, advanced by Le Clerc, &c. seems to be directly contrary to the obvious meaning of the word שפה, *shapha*, "lip," used by the sacred historian.—Others have imagined, that this was brought about by a temporary confusion of their speech, or rather of their apprehensions, causing them, whilst they continued together and spoke the same language, to understand the words differently. Scaliger is of this opinion. Others, again, account for this event by the privation of all language, and by supposing that mankind were under a necessity of associating together, and of imposing new names on things by common consent. Another opinion ascribes the confusion to such an indistinct remembrance of the original language which they spoke before, as made them speak it very differently; so that by the various inflexions, terminations, and pronunciations of divers dialects, they could no more understand one another, than they who understand Latin can understand those who speak French, Italian, or Spanish, though all these languages arise out of it. This opinion is adopted by Casaubon, and by Bishop Patrick in his Commentary *in loc.* and is certainly much more probable than either of the former. And Mr Shuckford maintains, that the confusion arose from small beginnings, by the invention of new words in either of the three families of Shem, Ham, and Japhet, which might contribute to separate them from one another: and that in each family new differences of speech might gradually arise, so that each of these families went on to divide and subdivide among themselves. Others, again, as Mr Jos. Mede and Dr Wotton, &c. not satisfied with either of the foregoing methods of accounting for the diversity of languages among mankind, have recourse to an extraordinary interposition of divine power, by which new languages were framed and communicated to different families by a supernatural infusion or inspiration; which languages have been the roots and originals from which the several dialects that are, or have been, or will be spoken, as long as this earth shall last, have arisen, and to which they may with ease be reduced. As to the number of languages thus introduced, many opinions have been adopted. If there were no more than there were nations or heads of nations, then the number would be seven for Japhet, four for Ham, and five for Shem; but if there were as many as there were families, which is the more probable opinion, their number cannot be certainly assigned. However, the Hebrews fancy they were 70, because the descendants from the sons of Noah, enumerated Genesis x. were just so many. Allowing, then, the languages of the chief families to have been fundamentally different from each other, the sub-languages and dialects within each branch would probably have had a mutual affinity, greater or less as they settled nearer or farther from each other. But whichsoever of these hypotheses is adopted, the primary object of the confusion at Babel was the separation and dispersion of mankind.

Dr Bryant, in the third volume of his Analysis of Ancient Mythology, has advanced a singular hypothesis, both with respect to the confusion of tongues and the dispersion. He supposes that the confusion of language was local and partial, and limited to Babel only. By בלהארץ, Gen. xi. 1. and 8. which our translators render *the whole earth*, he understands *every region;* and by the same words in ver. 9. *the whole region* or province. This confusion was occasioned, as he supposes, by a labial failure; so that the people could not articulate. Thus their speech was confounded, but not altered; for as soon as they separated, they recovered their true tenor of pronunciation, and the language of the earth continued for some ages nearly the same. The interviews between the Hebrews and other nations, recorded in Scripture, were conducted without an interpreter; and he farther observes, that the various languages which subsist at this day retain sufficient relation to show, that they were once dialects from the same matrix, and that their variety was the effect of time. See DISPERSION.

CONFUTATION,

CONFUTATION, in *Rhetoric*, &c. a part of an oration, wherein the orator seconds his own arguments and strengthens his cause, by refelling and destroying the opposite arguments of the antagonist. This is done by denying what is apparently false, by detecting some flaw in the reasoning of the adverse party, by granting their argument, and showing its invalidity, or retorting it upon the adversary.

CONGE, in the French law, a licence or permission, granted by a superior to an inferior, which gives him a dispensation from some duty to which he was before obliged. A woman cannot obligate herself without the *congé* or license of her husband; a monk cannot go out of his convent, without the *congé* of his superiors.

CONGE' d'elire, in ecclesiastical policy, the king's permission royal to a dean and chapter in the time of a vacancy, to choose a bishop; or to an abbey, or priory, of his own foundation, to choose their abbot or prior.

The king of England, as sovereign patron of all archbishoprics, bishoprics, and other ecclesiastical benefices, had of ancient time free appointment of all ecclesiastical dignities, whensoever they chanced to be void; investing them first *per bacculum et annulum*, and afterwards by his letters patent; and in course of time he made the election over to others, under certain forms and limitations, as that they should at every vacation, before they choose, demand the king's congé d'elire, and after the election crave his royal assent, &c.

CONGE', in *Architecture*, a mould in form of a quarter round, or a cavetto, which serves to separate two members from one another; such as that which joins the shaft of the column to the cincture, called also *apophyge*.

CONGES are also rings or ferrels formerly used in the extremities of wooden pillars, to keep them from splitting, afterwards imitated in stone-work.

CONGELATION, signifies the passing of any body from a fluid to a solid state: so that the term is thus applicable to metals when they resume their solid form after being heated, to water when it freezes, to wax, spermaceti, &c. when they become solid after having been rendered fluid by heat; and in general to all processes, where the whole substance of the fluid is converted into a solid: but it differs from crystallization; because in the latter process, though the salt passes from a fluid to a solid state, a considerable quantity of liquid is always left, so that the term *congelation* is never applied in this case.

1 [Is always attended with an emission of heat.]

The process of congelation in all cases depends upon, or at least is accompanied with, the emission of heat, as has been evinced by experiments made not only on water, but on spermaceti, wax, &c.: for in all of these, though the thermometer immersed in them while fluid continued to descend gradually till a certain period, yet it was as constantly observed to remain stationary, or even to ascend while the congelation went on. See CHEMISTRY.

2 [Congelation of quicksilver.]

It is not known whether all kinds of fluids are naturally capable of congelation or not; though we are certain that there are very great differences among them in this respect. The most difficult of all those of which the congelation has been actually ascertained is quicksilver. This was long thought capable of resisting any degree of cold whatever; and it is only within a few years that its congelation by artificial means was known, and still more lately that some climates were found to be so severe as to congeal this fluid by the cold of the atmosphere.

3 Experiments of M. Braun.

The congelation of quicksilver was first ascertained by M. Joseph Adam Braun, professor of philosophy at Petersburg. He had been employed in making thermometrical experiments, not with a view to make the discovery he actually did, but to see how many degrees of cold he could produce. An excellent opportunity for this occurred on the 14th of December 1759, when the mercury stood naturally at —34, which is now known to be only five or six degrees above its point of congelation. M. Braun, having determined to avail himself of this great degree of natural cold, prepared a freezing mixture of nitric acid and pounded ice, by means of which his thermometer was reduced to —69. Part of the quicksilver had now really congealed; yet so far was M. Braun from entertaining any suspicion of the truth, that he had almost desisted from farther attempts, being satisfied with having so far exceeded all the philosophers who went before him. Animated, however, by the hopes of producing a still greater degree of cold, he renewed the experiment; but having expended all his pounded ice, he was obliged to substitute snow in its place. With this fresh mixture the mercury sunk to —100, 240, and 352°. He then supposed that the thermometer was broken; but on taking it out to observe whether it was so or not, he found the quicksilver fixed, and continuing so for 12 minutes. On repeating the same experiment with another thermometer which had been graduated no lower than —120, all the mercury sunk into the ball, and became solid as before, not beginning to reascend till after a still longer interval of time. Hence the professor concluded that the quicksilver was really frozen, and prepared for making a decisive experiment. This was accomplished on the 25th of the same month, and the bulb of the thermometer broken as soon as the metal was congealed. The mercury was now converted into a solid and shining metallic mass, which extended under the strokes of a pestle, in hardness rather inferior to lead, and yielding a dull sound like that metal. Professor Æpinus made similar experiments at the same time, employing both thermometers and tubes of a larger bore: in which last he remarked, that the quicksilver fell sensibly on being frozen, assuming a concave surface, and likewise that the congealed pieces sunk in fluid mercury.

The fact being thus established, and fluidity no longer to be considered as an essential property of quicksilver, M. Braun communicated an account of his experiments to the Petersburgh Academy, on the 6th of September 1760; of which a large extract was inserted in the Philosophical Transactions, vol. lii. p. 156. Five years afterwards he published another treatise on the same subject, under the title of Supplement to his former dissertation. In this he declared, that, since his former publication, he had never suffered any winter to elapse without repeating the experiment of congealing quicksilver, and never failed of success when the natural cold was of a sufficient strength for the purpose. This degree of natural cold he supposes to be —10 of Fahrenheit, though some

Congelation.

commencement of the congelation might be perceived when the temperature of the air was as high as + 2. The results of all his experiments were, that with the above-mentioned frigorific mixtures, and once with rectified spirits and snow, when the natural cold was at 28°, he congealed the quicksilver, and discovered that it is a real metal which melts with a very small degree of heat. Not perceiving, however, the necessary consequence of its great contraction in freezing, he, in this work, as well as in the former, confounded its point of congelation with that of its greatest contraction in freezing, and thus marked the former a great deal too low; though the point of congelation was very uncertain according to him, various difficulties having occurred to his attempts of finding the greatest point of contraction while freezing.

4 Of Mr Blumenbach.

The experiments of M. Braun were not repeated by any person till the year 1774, when Mr John Frederic Blumenbach, then a student of physic at Gottingen, performed them to more advantage than it appears M. Braun had ever done. He was encouraged to make the attempt by the excessive cold of the winter that year. "I put (says he), at five in the evening of January 11th, three drachms of quicksilver into a small sugar-glass, and covered it with a mixture of snow and Egyptian sal-ammoniac. This mixture was put loose into the glass, so that the quicksilver lay perfectly free, being only covered with it as by pieces of ice; the whole, together with the glass, weighed somewhat above an ounce. It was hung out at a window in such a posititition as to expose it freely to the north-west; and two drachms more of sal-ammoniac mixed with the snow on which it stood. The snow and sal-ammoniac, in the open air, soon froze into a mass like ice; no sensible change, however, appeared in the quicksilver that evening; but at one in the morning it was found frozen solid. It had divided into two large and four smaller pieces; one of the former was hemispherical, the other cylindrical, each seemingly rather above a drachm in weight; the four small bits might amount to half a scruple. They were all with their flat side frozen hard to the glass, and nowhere immediately touched by the mixture; their colour was a dull pale white with a bluish cast, like zinc, very different from the natural appearance of quicksilver. Next morning, about eleven o'clock, I found that the larger hemisphere began to melt, perhaps because it was most exposed to the air, and not so near as the others to the sal-ammoniac mixture which lay beneath. In this state it resembled an amalgam, sinking on that side to which the glass was inclined; but without quitting the surface of the glass, to which it was yet firmly congealed: the five other pieces had not yet undergone any alteration, but remained frozen hard. Toward eight o'clock the cylindrical piece began to soften in the same manner, and the other four soon followed. About eight they fell from the surface of the glass, and divided into many fluid shining globules, which were soon lost in the interstices of the frozen mixture, and reunited in part at the bottom, being now exactly like common quicksilver." At the time this experiment was made, the thermometer stood at —10° in the open air.

The circumstances attending this experiment are still unaccountable; for, in the first place, the natural cold was scarcely sufficient, along with that of the artificial mixture, which produces 32° more, to have congealed the quicksilver; which yet appears to have been very effectually done, by the length of time it continued solid. 2. It is not easy to account for the length of time required for congealing the quicksilver in this experiment, since other frigorific mixtures begin to act almost immediately; and, 3. There was not at last even the appearance of action, which consists in a solution of the snow, and not in its freezing into a mass. "The whole experiment (says Dr Blagden*) remains involved in such obscurity, that some persons have supposed the quicksilver itself was not frozen, but only covered over with ice; to which opinion, however, there are great objections. It is worthy of remark, that Gottingen, though situated in the same latitude as London, and enjoying a temperate climate in general, becomes subject at times to a great severity of cold. This of 11th of January 1774 is one instance: I find others there where the thermometer sunk to —12°, —16°, or —19°; and at Cattlenburg, a small town about two German miles distant, to —30°. By watching such extraordinary occasions, experiments on the freezing of quicksilver might easily be performed in many places, where the possibility of them is at present little suspected. The cold observed at Glasgow in 1780 would have been fully sufficient for that purpose."

* *Phil. Transf.* vol. iii.

In consequence of the publication of M. Braun's Experiments, the Royal Society desired their late secretary Dr Maty to make the necessary application to the Hudson's Bay Company, in order to repeat the experiment in that country. Mr Hutchins, who was then at London, and going out with a commission as governor of Albany fort, offered to undertake the experiments, and executed them very completely, freezing quicksilver twice in the months of January and February 1775. The account of his success was read before the Royal Society at the commencement of the severest winter that had been known for many years in Europe; and at this time the experiment was repeated by two gentlemen of different countries. One was Dr Lambert Bicker, secretary to the Batavian society at Rotterdam; who, on the 28th of January 1776, at eight in the morning, made an experiment to try how low he could bring the thermometer by artificial cold, the temperature of the atmosphere being then +2°. He could not, however, bring it lower than —94°, at which point it stood immoveable; and on breaking the thermometer, part of the quicksilver was found to have lost its fluidity, and was thickened to the consistence of an amalgam. It fell out of the tube in little bits, which bore to be flattened by pressure, without running into globules like the inner fluid part. The experiment was repeated next day, when the thermometer stood at +8°, but the mercury would not then descend below —80°; and as the thermometer was not broken, it could not be known whether the mercury had congealed or not. All that could be inferred from these experiments therefore was, that the congealing point of mercury was not below —94° of Fahrenheit's thermometer. The other who attempted the congelation of this fluid was the late Dr Anthony Fothergill; but it could not be determined whether

Co ela- on.

whether he ſucceeded or not. An account of his experiments is inſerted in the Philoſophical Tranſactions, vol. lxvi.

No other attempts were made to congeal quickſilver until the year 1781, when Mr Hutchins reſumed the ſubject with great ſucceſs, inſomuch that from his experiments the freezing point of mercury is now almoſt as well ſettled as that of water. Preceding philoſophers, indeed, had not been altogether inattentive to this ſubject. Profeſſor Braun himſelf had taken great pains to inveſtigate it; but for want of paying the requiſite attention to the difference betwixt the contraction of the fluid mercury by cold, and that of the congealing metal by freezing, he could determine nothing certain concerning it. Others declared it as their opinion, that nothing certain could be determined by merely freezing mercury in a thermometer filled with that fluid. Mr Cavendiſh and Dr Black firſt ſuggeſted the proper method of obviating the difficulties on this ſubject. Dr Black, in a letter to Mr Hutchins, dated October 5, 1779, gave the following directions for making the experiment with accuracy: "Provide a few wide and ſhort tubes of thin glaſs, ſealed at one end and open at the other: the wideneſs of theſe tubes may be from half to three quarters of an inch, and the length of them about three inches. Put an inch or an inch and a half depth of mercury into one of theſe tubes, and plunging the bulb of the thermometer into the mercury, ſet the tube with the mercury and the thermometer in it into a freezing mixture, which ſhould be made for this purpoſe in a common tumbler or water glaſs: and, N. B. in making a freezing mixture with ſnow and nitric acid, the quantity of the acid ſhould never be ſo great as to diſſolve the whole of the ſnow, and only enough to reduce it to the conſiſtence of panada. When the mercury in the wide tube is thus ſet in the freezing mixture, it muſt be ſtirred gently and frequently with the bulb of the thermometer; and if the cold be ſufficiently ſtrong, it will congeal by becoming thick like an amalgam. As ſoon as this is obſerved, the thermometer ſhould be examined without lifting it out of the congealing mercury; and I have no doubt that in every experiment thus made, with the ſame mercury, the inſtrument will always point to the ſame degree, provided it has been made and graduated with accuracy."

5 D. Black's di. tions fo. making th. experi- m.

The apparatus recommended by Mr Cavendiſh, and which Mr Hutchins made uſe of, conſiſted of a ſmall mercurial thermometer, the bulb of which reaches about $2\frac{1}{2}$ inches below the ſcale, and was incloſed in a glaſs cylinder ſwelled at the bottom into a ball, which when uſed was filled with quickſilver, ſo that the bulb of the thermometer was entirely covered with it. If this cylinder be immerſed in a freezing mixture till great part of the quickſilver in it is frozen, it is evident that the degree ſhown at that time by the incloſed thermometer is the preciſe point at which mercury freezes; for as in this caſe the ball of the thermometer muſt be ſurrounded for ſome time with quickſilver, part of which is actually frozen, it ſeems impoſſible that the thermometer ſhould be ſenſibly above that point; and while any of the quickſilver in the cylinder remains fluid, it is impoſſible that it ſhould ſink ſenſibly below it. The diameter of the bulb of the thermometer was rather leſs than a quarter of an inch, that of the ſwelled part of the cylinder two-thirds; and as it was eaſy to keep the thermometer conſtantly in the middle of the cylinder, the thickneſs of quickſilver betwixt it and the glaſs could never be much leſs than the ſixth part of an inch. The bulb of the thermometer was purpoſely made as ſmall as it conveniently could, in order to leave a ſufficient ſpace between it and the cylinder, without making the ſwelled part larger than neceſſary, which would have cauſed more difficulty in freezing the mercury in it.

6 A. aratus r. m- m. ded by Mr Caven- d.

Congelation.

The firſt experiment with this apparatus was made on the 15th of December 1781; the thermometer had ſtood the evening before at —18°. A bottle of ſpiritus nitri fortis was put on the houſe-top, in order to cool it to the ſame temperature. The thermometers made uſe of had been hung up in the open air for three weeks to compare their ſcales. On the morning of the experiment they were about 23° below 0.——In making it, the thermometer of the apparatus was ſuſpended in the bulb of the cylinder by means of ſome red worſted wound about the upper part of its ſtem, to a ſufficient thickneſs to fill the upper part of its orifice; and a ſpace of near half an inch was left empty between the quickſilver and worſted.

The apparatus was placed in the open air, on the top of the fort, with only a few deer ſkins ſewed together for a ſhelter; the ſnow lay 18 inches deep on the works, and the apparatus was ſtuck into the ſnow, in order to bring it the ſooner to the temperature of the air. The inſtruments were afterwards placed in three freſh freezing mixtures, in hopes of being able by their means to produce a greater degree of cold, but without effect; nor was any greater cold produced by adding more nitric acid. The mercury, however, was very completely frozen, that in the thermometer deſcending to 448°. On plunging the mercury into the freezing mixture, it deſcended in leſs than one minute to 40° below 0.

The ſecond experiment was made the day following; and the ſame quantity of quickſilver employed that had been uſed in the former. As too ſmall a quantity of the freezing mixture, however, had been originally made, it was neceſſary to add more during the operation of congelation; by which means the ſpirit of nitre, in pouring it upon the ſnow, ſometimes touched the bulb of the thermometer, and inſtantly raiſed it much higher; nor did the mercury ever deſcend below 206°, which was not half as far as it had done the day before, though the temperature of the atmoſphere had been this day at —34° before the commencement of the operation. That in the apparatus, however, ſunk to —95°. The apparatus was taken out of the mixture for half a minute, in order to examine whether the mercury was perfectly congealed or not, and, during that time, it ſhowed no ſign of liquefaction.

The third experiment was made the ſame day, and with the freezing mixture uſed in the laſt. By it the point of congelation was determined to be not below 40°.

The fourth experiment was made January 7th 1782; and

Congelation.

and in it he observed, that the mercury in the apparatus thermometer, after standing at 42 and 41½ for a considerable time, fell to 77, not gradually, but at once as a weight falls.

In the fifth experiment the weather was excessively severe, so that it ought to have frozen the metal in the open air; but this did not then happen.

At the time of making the sixth experiment, the quicksilver in the open air stood at 44 below 0; and Mr Hutchins resolved to make use of this opportunity to observe how far it was possible to make it descend by means of cold, observing the degrees at the same time with a spirit thermometer made by Nairne and Blount, with which he had been furnished by the Royal Society in 1774. In this, however, he did not succeed; for the mercury never fell below 438, nor the standard 48. It stood at 27½ at the beginning of the experiment. The reason of this was supposed to be, that the atmosphere was too cold for making this kind of experiment, by reason of its freezing the thread of quicksilver in the stem of the thermometer, so that it became incapable of contraction along with that in the bulb. In other experiments, though the metal in the bulb became solid, yet that in the stem always remained fluid; and thus was enabled to subside to a great degree by the diminution of bulk in the solid mercury. That this was really the case, appeared from the quicksilver falling at once from —86 to —434, when the cold of the freezing mixture diminished, and the temperature of the air becoming about the same time somewhat milder, melted the congealed part in the stem, which thus had liberty to descend to that point.

In this experiment, also, the mixtures were made in double quantity to those of the former; these being only in common tumblers, but the mixtures for this experiment in pint basons. It was observed that they liquefied faster than in other experiments. He had usually made them of the consistence of pap; but though he added snow at different times, it had very little effect in augmenting the cold, but rather decreased it. The congealed piece of the metal fell to the bottom, as might naturally have been expected from its great contraction in becoming solid.

From this experiment Mr Hutchins concluded, that the nearer the temperature of the atmosphere approached to the congealing point of mercury (so that a great degree of cold might be communicated to the bulb of a thermometer, and yet the quicksilver in the tube remain fluid), he might make the experiment of ascertaining the greatest contraction of mercury to more advantage. With this view he made another experiment, when the temperature of some of his thermometers stood as low as —37°: and after an hour's attendance, he perceived the mercury had fallen to 1367; but the thermometer unluckily was broken, and its bulb thrown away with the mixture. Professor Braun had likewise observed, that his thermometers were always broken when the mercury descended below 600.

The eighth experiment was made with a view to try whether quicksilver would congeal when in contact with the freezing mixture. For this purpose, he did not use the apparatus provided for other experiments, but filled a gallipot made of flint stone (as being thinner than the common sort), containing about an ounce, half full of quicksilver, into which he inserted a mercurial thermometer, employing another as an index. Thus he hoped to determine exactly when the quicksilver was congealed, as he had free access to it at all times, which was not the case when it was inclosed in the cylindrical glass, the worsted wound round the tube of the thermometer to exclude the air being equally effectual in excluding any instrument from being introduced to touch the quicksilver. He then made a kind of skewer, with a flat blunt point, of dried cedar-wood, on account of its lightness, which he found would remain in the gelatinous freezing mixture at any depth he chose; but, when inserted into the quicksilver, the great difference betwixt the specific gravity of it and that ponderous fluid, made it always rebound upward; and by the degree of resistance, he could always know whether it proceeded from fluid or solid metal. At this time, however, the experiment did not succeed; but, at another trial, having employed about ¾ths of a pound of metal, and let it remain a considerable time immersed in the same mixture which had just now been supposed to fail, he found that part of it was congealed; and, on pouring off the fluid part, no less than two-thirds remained fixed at the bottom.

7
Mr Cavendish's experiments.

The last experiment which has been published concerning the congelation of quicksilver by means of snow, is that of Mr Cavendish, and of which he gives an account in the Phil. Transact. vol. lxxiii. p. 325. Here, speaking of the cold of freezing mixtures, he says, " There is the utmost reason to think that Mr Hutchins would have obtained a greater degree of cold by using a weaker nitrous acid than he did. I found (says he) by adding snow gradually to some of this acid, that the addition of a small quantity produced heat instead of cold; and it was not until so much was added as to increase the heat from 28 to 51°, that the addition of more snow began to produce cold; the quantity of snow required for this purpose being pretty exactly one quarter of the weight of the spirit of nitre; and the heat of the snow, and air of the room, as well as of the acid, being 28°. The reason of this is, that a great deal of heat is produced by mixing water with spirit of nitre; and the stronger the spirit is, the greater is the heat produced. Now it appears, from this experiment, that before the acid was diluted, the heat produced by its union with the water formed from the melting snow, was greater than the cold produced by the same; and it was not until it was diluted by the addition of one quarter of its weight of that substance, that the cold, generated by the latter cause, began to exceed the heat generated by the former. From what has been said, it is evident, that a freezing mixture made with undiluted acid will not begin to generate cold until so much snow is dissolved as to increase its heat from 28 to 51°; so that no greater cold will be produced than would be obtained by mixing the diluted acid heated to 51° with snow of the heat of 28°. This method of adding snow gradually is much the best way I know of finding what strength it ought to be of, in order to produce the greatest effect possible. By means of this acid

acid diluted in the above-mentioned proportion, I froze quickſilver in the thermometer called G (A) by Mr Hutchins, on the 26th of February 1782. I did not indeed break the thermometer to examine the ſtate of the quickſilver therein; for, as it ſunk to —110°, it certainly muſt have been in part frozen; but immediately took it out, and put the ſpirit thermometer in its room, in order to find the cold of the mixture. It ſunk only to —30°; but by making allowance of the ſpirit in the tube being not ſo cold as that in the ball, it appears, that if it had not been for this cauſe, it would have ſunk to —35° (B); which is 6° below the point of freezing, and is within one degree of as great a cold as that produced by Mr Hutchins.

"In this experiment the thermometer G ſunk very rapidly; and, as far as I could perceive, without ſtopping at any intermediate point till it came to the abovementioned degree of —110°, where it ſtuck. The materials uſed in making the mixture were previouſly cooled, by means of ſalt and ſnow, to near 0; and the temperature of the air was between 20° and 25°; the quantity of acid uſed was 4½ oz.; and the glaſs in which the mixture was made, was ſurrounded with wool, and placed in a wooden box, to prevent its loſing its cold ſo faſt as it would otherwiſe have done. Some weeks before this I made a freezing mixture with ſome ſpirit of nitre much ſtronger than that uſed in the foregoing experiment, though not quite ſo ſtrong as the undiluted acid, in which the cold was leſs intenſe by 4½°. It is true the temper of the air was much leſs cold, namely 35°, but the ſpirit of nitre was at leaſt as cold, and the ſnow not much leſs ſo.

"The cold produced by mixing ſulphuric acid, properly diluted with ſnow, is not ſo great as that produced by ſpirit of nitre, though it does not differ from it by ſo much as 8°; for a freezing mixture, prepared with diluted ſulphuric acid, whoſe ſpecific gravity, at 60° of heat, was 1,5642, ſunk in the thermometer G to —37°, the experiment being tried at the ſame time, and with the ſame precautions, as the foregoing. It was previouſly found, by adding ſnow gradually to ſome of this acid, as was done by the nitrous acid, that it was a little, but not much ſtronger, than it ought to be, in order to produce the greateſt effect."

The experiment made by Mr Walker, in which he congealed quickſilver by means of nitric acid and Glauber's ſalt, without any ſnow, concludes the hiſtory of the artificial congelation of mercury. It now remains that we ſay ſomething of the congelation of it by the natural cold of the atmoſphere.

8
Congelation of quickſilver by natural cold.

Dr Blagden, from whoſe paper in the Philoſophical Tranſactions, vol. lxxiii. this account is taken, obſerves, that it was not till near the year 1730 that thermometers were made with any degree of accuracy; and in four or five years after this, the firſt obſervations were made which prove the freezing of quickſilver. On the acceſſion of the empreſs Anne Ivanouna to the throne of Ruſſia, three profeſſors of the Imperial academy were choſen to explore and deſcribe the different parts of her Aſiatic dominions, and to inquire into the communication betwixt Aſia and America. Theſe were Dr John George Gmelin, in the department of natural hiſtory and chemiſtry; M. Gerard Frederic Muller, as general hiſtoriographer; and M. Louis de l'Iſle de la Croyere, for the department of aſtronomy; draughtſmen and other proper aſſiſtants being appointed to attend them. They departed from Peterſburgh in 1733; and ſuch as ſurvived did not return till ten years after. The thermometrical obſervations were communicated by Profeſſor Gmelin, who firſt publiſhed them in his Flora Sibirica, and afterwards more fully in the Journal of his Travels. An abſtract of them was likewiſe inſerted in the Peterſburgh Commentaries for the years 1756 and 1765, taken, after the profeſſor's death, from his original diſpatches in poſſeſſion of the Imperial academy.

9
Exceſſive cold of Siberia.

In the winter of 1734 and 1735, Mr Gmelin being at Yeneſeiſk in 58½° N. Lat. and 92° E. Long. from Greenwich, firſt obſerved ſuch a deſcent of the mercury, as we know muſt have been attended with congelation. "Here (ſays he) we firſt experienced the truth of what various travellers have related with reſpect to the extreme cold of Siberia; for, about the middle of December, ſuch ſevere weather ſet in, as we were ſure had never been known in our time at Peterſburgh. The air ſeemed as if it were frozen, with the appearance of a fog, which did not ſuffer the ſmoke to aſcend as it iſſued from the chimneys. Birds fell down out of the air as dead, and froze immediately, unleſs they were brought into a warm room. Whenever the door was opened, a fog ſuddenly formed round it. During the day, ſhort as it was, parhelia and haloes round the ſun were frequently ſeen; and in the night mock-moons, and haloes about the moon. Finally, our thermometer, not ſubject to the ſame deception as the ſenſes, left us no doubt of the exceſſive cold; for the quickſilver in it was reduced on the 15th of January O. S. to —120° of Fahrenheit's ſcale, lower than it had ever hitherto been obſerved in nature."

The next inſtance of congelation happened at Yakutſk, in N. Lat. 62. and E. Long. 130. The weather here was unuſually mild for the climate, yet the thermometer fell to —72°; and one perſon informed the profeſſor by a note, that the mercury in his barometer was frozen. He haſtened immediately to his houſe to behold ſuch a ſurpriſing phenomenon; but though he was witneſs to the fact, the prejudice he entertained againſt the poſſibility of the congelation, would not allow him to believe it. "Not feeling (ſays he), by the way, the ſame effects of cold as I had experienced at other times in leſs diſtances, I began, before my arrival, to entertain ſuſpicions about the congelation of his quickſilver. In fact, I ſaw that it did not continue in one column, but was divided in different places as into little cylinders, which appeared frozen; and, in ſome of theſe diviſions between the quickſilver, I perceived like the appearance of frozen moiſture.

(A) This was a ſmall mercurial thermometer, made by Nairne and Blount, on an ivory ſcale, divided at every five degrees, and reaching from 215° above to 250° below the cipher.

(B) This is to be underſtood of a ſpirit thermometer, whoſe —29°=40° of Fahrenheit's mercurial.

Congelation.

moisture. It immediately occurred to me, that the mercury might have been cleaned with vinegar and salt, and not sufficiently dried. The person acknowledged it had been purified in that manner. This same quicksilver, taken out of the barometer, and well dried, would not freeze again, though exposed to a much greater degree of cold, as shown by the thermometer."

Another set of observations, in the course of which the mercury frequently congealed, were made by Professor Gmelin at Kirenga fort in 57½ N. Lat. 108. E. Long.; his thermometer, at different times, standing at —108°, —86°, —100°, —113°, and many other intermediate degrees. This happened in the winter of 1737 and 1738. On the 27th of November, after the thermometer had been standing for two days at —46°, he found it sunk at noon to 108°. Suspecting some mistake, after he had noted down the observation, he instantly ran back, and found it at 102°; but ascending with such rapidity, that in the space of half an hour it had risen to —19°. This phenomenon, which appeared so surprising, undoubtedly depended on the expansion of the mercury frozen in the bulb of the thermometer, and which now melting, forced upwards the small thread in the stem.

A similar appearance was observed at the same fort a few days after; and on the 29th of December, O. S. he found the mercury, which had been standing at —40° in the morning, sunk to —100° at four in the afternoon. At this time, he says, he "saw some air in the thermometer separating the quicksilver for the space of about six degrees." He had taken notice of a similar appearance the preceding evening, excepting that the *air*, as he supposed it to be, was not then collected into one place, but lay scattered in several.

These appearances undoubtedly proceeded from a congelation of the mercury, though the prejudice entertained against the possibility of this phenomenon would not allow the professor even to inquire into it at all. Several other observations were made; some of which were lost, and the rest contain no farther information.

The second instance where a natural congelation of mercury has certainly been observed, is recorded in the Transactions of the Royal Academy of Sciences at Stockholm. The weather, in January 1760, was remarkably cold in Lapland; so that on the 5th of that month, the thermometers fell to —76°, —128°, or lower; on the 23d and following days they fell to —58°, —79°, —92°, and below —238° entirely into the ball. This was observed at Tornea, Sombio, Jakasierf, and Utsioki, four places in Lapland, situated between the 65th and 78th degrees of N. Lat. and the 21st and 28th of E. Long. The person who observed them was M. Andrew Hellant, who makes the following remarks, of themselves sufficient to show that the quicksilver was frozen. "During the cold weather at Sombio (says he), as it was clear sunshine, though scarcely the whole body of the sun appeared above the low woods that covered our horizon, I took a thermometer which was hanging before in the shade and exposed it to the rising sun about eleven in the forenoon, to see whether when that luminary was so low, it would have any effect upon the instrument. But to my great surprise, upon looking at it about noon, I found that the mercury had entirely subsided into the ball, though it was standing as high as —61° at 11 o'clock, and the scale reached down to 238° below 0." On bringing the instrument near a fire, it presently rose to its usual height; and the reason of its subsiding before was its being somewhat warmed by the rays of the sun; which, feeble as they were, had yet sufficient power to melt the small thread of congealed mercury in the stem of the thermometer, and allow it to subside along with the rest. Mr Hellant, however, so little understood the nature of this phenomenon, that he frequently attempted to repeat it by bringing the thermometer near a fire, when the cold was only a few degrees below the freezing point of water, but could never succeed until it fell to —58°, or lower, that is, until the cold was sufficiently intense to congeal the metal. The only seeming difficulty in his whole account is, that when the mercury had subsided entirely into the ball of the thermometer, a vacuum or empty spot appeared, which run round the cavity like an air bubble, on turning the instrument; but this proceeded from a partial liquefaction of the mercury, which must necessarily melt first on the outside, and thus exhibit the appearance just mentioned.

10 Remarkable experiments of Dr Pallas.

The most remarkable congelation of mercury, which has ever yet been observed, was that related by Dr Peter Simon Pallas, who had been sent by the empress of Russia, with some other gentlemen, on an expedition similar to that of Dr Gmelin. He did not, however, spend the winters in which he was in Siberia in the coldest parts of that country; that is, about the middle of the northern part. Twice indeed he resided at Krasnoyarsk, in N. Lat. 56½°, E. Long. 93°; where, in the year 1772, he had an opportunity of observing the phenomenon we speak of. "The winter (says he) set in early this year, and was felt with uncommon severity in December. On the 6th and 7th of that month happened the greatest cold I have ever experienced in Siberia; the air was calm at the time, and seemingly thickened; so that, though the sky was in other respects clear, the sun appeared as through a fog. I had only one small thermometer left, in which the scale went no lower than —7°; and on the 6th in the morning, I remarked that the quicksilver in it sunk into the ball, except some small columns which stuck fast in the tube. When the ball of the thermometer, as it hung in the open air, was warmed by being touched with the finger, the quicksilver rose; and it could plainly be seen that the solid columns stuck and resisted a good while, and were at length pushed upward with a sort of violence. In the mean time I placed upon the gallery, on the north side of my house, about a quarter of a pound of clean and dry quicksilver in an open bowl. Within an hour I found the edges and surface of it frozen solid, and some minutes afterwards the whole was condensed by the natural cold into a soft mass very much like tin. While the inner part was still fluid, the frozen surface exhibited a great variety of branched wrinkles; but in general it remained pretty smooth in freezing, as did also a larger quantity which I afterwards exposed to the cold. The congealed mercury was more flexible than lead; but on being bent short, it was found more brittle than tin; and when hammered out thin, it seemed somewhat granulated. If the hammer had not been

been perfectly cooled, the quickſilver melted away under it in drops; and the ſame thing happened when the metal was touched with the finger, by which alſo the finger was immediately benumbed. In our warm room it thawed on its ſurface gradually, by drops, like wax on the fire, and did not melt all at once. When the frozen maſs was broken to pieces in the cold, the fragments adhered to each other and to the bowl on which they lay. Although the froſt ſeemed to abate a little towards night, yet the congealed quickſilver remained unaltered, and the experiment with the thermometer could ſtill be repeated. On the 7th of December, I had an opportunity of making the ſame obſervations all day; but ſome hours after ſunſet, a north-weſt wind ſprung up, which raiſed the thermometer to —46°, when the maſs of quickſilver began to melt."

Von Elterlein's experiment.

In the beginning of the year 1780 M. Von Elterlein, of Vytegra, a town of Ruſſia, in N. Lat. 61. E. Long. 36. froze quickſilver by natural cold; of which he gives the following account. "On the 4th of January 1780, the cold having increaſed to —34° that evening at Vytegra, I expoſed to the open air three ounces of very pure quickſilver in a china tea-cup, covered with paper pierced full of holes. Next day, at eight in the morning, I found it ſolid, and looking like a piece of caſt lead, with a conſiderable depreſſion in the middle. On attempting to looſen it in the cup, my knife raiſed ſhavings from it as if it had been lead, which remained ſticking up; and at length the metal ſeparated from the bottom of the cup in one maſs. I then took it in my hand to try if it would bend: it was ſtiff like glue, and broke into two pieces; but my fingers immediately loſt all feeling, and could ſcarcely be reſtored in an hour and a half by rubbing with ſnow. At eight o'clock a thermometer, made by Mr Lexmann of the academy, ſtood at —57°; by half after nine it was riſen to —40°; and then the two pieces of mercury which lay in the cup had loſt ſo much of their hardneſs, that they could no longer be broken, or cut into ſhavings, but reſembled a thick amalgam, which, though it became fluid when preſſed by the fingers, immediately afterwards reſumed the conſiſtence of pap. With the thermometer at —39°, the quickſilver became fluid. The cold was never leſs on the 5th than —28°, and by nine in the evening it had increaſed again to —33°."

An inſtance of the natural congelation of quickſilver alſo occurred in Jemtland, one of the provinces of Sweden, on the 1ſt of January 1782; and laſtly, on the 26th of the ſame month, Mr Hutchins obſerved the ſame effect of the cold at Hudſon's bay. "The ſubject of this curious phenomenon (ſays he), was quickſilver put into a common two-ounce phial, and corked. The phial was about a third part full, and had conſtantly been ſtanding by the thermometer for a month paſt. At eight o'clock this morning I obſerved it was frozen rather more than a quarter of an inch thick round the ſides and bottom of the phial, the middle part continuing fluid. As this was a certain method of finding the point of congelation, I introduced a mercurial and a ſpirit thermometer into the fluid part, after breaking off the top of the phial, and they roſe directly and became ſtationary; the former at 40° or 40½°, the latter at 29¾°, both below the cipher. Having taken theſe out, I put in two others, G a mercurial one formerly deſcribed, and a ſpirit thermometer; the former of which became ſtationary at 40° and the latter at 30°. I then decanted the fluid quickſilver, to examine the internal ſurface of the frozen metal, which proved very uneven, with many radii going acroſs, ſome of which reſembled pin-heads. Urgent buſineſs called me away an hour. On my return I found a ſmall portion only had liquefied in my abſence. I then broke the phial entirely, and with a hammer repeatedly ſtruck the quickſilver. It beat out flat, yielded a deadiſh ſound, and became fluid in leſs than a minute afterwards. It may be worth remarking, that the quickſilver in one of the thermometers, which had ſunk to very near 500, and was then at 444, very readily run up and down the tube by elevating either end of the inſtrument."

Experiment of Mr Hutchins.

Congelation.

Theſe are all the well authenticated accounts of the congelation of mercury by the natural cold of the atmoſphere. Some others have been publiſhed; but being either leſs important, or not ſo well authenticated, we forbear to mention them. A very conſiderable confirmation is obtained from the above hiſtory, of the theory of congelation delivered by Dr Black, and which is fully explained under the article CHEMISTRY. On Mr Hutchins's experiments, and on congelation in general, Mr Cavendiſh makes many valuable remarks; the ſubſtance of which is as follows:

21 Mr Cavendiſh's remarks on congelation.

"If a veſſel of water, with a thermometer in it, be expoſed to the cold, the thermometer will ſink ſeveral degrees below the freezing point, eſpecially if the water be covered up ſo as to be defended from the wind, and care taken not to agitate it; and then on dropping in a bit of ice, or on mere agitation, ſpiculæ of ice ſhoot ſuddenly through the water, and the incloſed thermometer riſes quickly to the freezing point, where it remains ſtationary." In a note he ſays, that though in conformity to the common opinion he has allowed that "mere agitation may ſet the water a freezing, yet ſome experiments lately made by Dr Blagden ſeem to ſhow, that it has not much, if any, effect of that kind, otherwiſe than by bringing the water in contact with ſome ſubſtance colder than itſelf. Though in general alſo the ice ſhoots rapidly, and the incloſed thermometer riſes very quick; yet he once obſerved it to riſe very ſlowly, taking up not leſs than half a minute, before it aſcended to the freezing point; but in this experiment the water was cooled not more than one or two degrees below freezing, and it ſhould ſeem, that the more the water is cooled below the freezing point, the more rapidly the ice ſhoots and the incloſed thermometer riſes."

Mr Cavendiſh then obſerves, that from the foregoing experiments we learn that water is capable of being cooled conſiderably below the freezing point, without any congelation taking place; and that, as ſoon as by any means a ſmall part of it is made to freeze, the ice ſpreads rapidly through the whole of the water. The cauſe of this riſe of the thermometer is, that all, or almoſt all bodies by changing from a fluid to a ſolid ſtate, or from the ſtate of an elaſtic to that of an unelaſtic fluid, generate heat; and that cold is produced by the contrary proceſs. Thus all the circumſtances of the phenomenon may be perfectly well explained; for, as ſoon as any part of the water freezes, heat will be generated thereby in conſequence of the

Congelation.

the above-mentioned law, so that the new formed ice and remaining water will be warmed, and must continue to receive heat by the freezing of fresh portions of water, till it is heated exactly to the freezing point, unless the water could become quite solid before a sufficient quantity of heat was generated to raise it to that point, which is not the case: and it is evident, that it cannot be heated above the freezing point: for as soon as it comes thereto, no more water will freeze, and consequently no more heat will be generated.—The reason why the ice spreads all over the water, instead of forming a solid lump in one part, is, that, as soon as any small portion of ice is formed, the water in contact with it will be so much warmed as to be prevented from freezing, but the water at a little distance from it will still be below the freezing point, and will consequently begin to freeze.

"Were it not for this generation of heat, the whole of any quantity of water would freeze as soon as the process of congelation began; and in like manner the cold is generated by the melting of ice; which is the cause of the long time required to thaw ice and snow. It was formerly found that, by adding snow to warm water, and stirring it about until all was melted, the water was as much cooled as it would have been by the addition of the same quantity of water rather more than 150° degrees colder than the snow; or, in other words, somewhat more than 150° of cold are generated by the thawing of the snow; and there is great reason to believe that just as much heat is produced by the freezing of water. The cold generated in the experiment just mentioned was the same whether ice or snow was used.

22 On metals when beginning to turn solid.

"A thermometer kept in melted tin or lead till they become solid, remains perfectly stationary from the time the metal begins to harden round the sides of the pot till it is entirely solid; but it cannot be perceived at all to sink below that point, and rise up to it when the metal begins to harden. It is not unlikely, however, that the great difference of heat between the air and melted metal might prevent this effect from taking place; so that though it was not perceived in these experiments, it is not unlikely that those metals, as well as water and quicksilver, may bear being cooled a little below the freezing or hardening point (for the hardening of melted metals, and freezing of water, seems exactly the same process), without beginning to lose their fluidity.

"The experiments of Mr Hutchins prove, that quicksilver contracts or diminishes in bulk by freezing, and that the very low degrees to which the thermometers have been made to sink, is owing to this contraction, and not to the cold having been in any degree equal to that shown by the thermometer. In the fourth experiment, one of the thermometers sunk to 450°, though it appeared, by the spirit thermometers, that the cold of the mixture was not more than five or six degrees below the point of freezing quicksilver. In the first experiment also, it sunk to 448° at a time when the cold of the mixture was only $2\frac{1}{2}$° below that point; so that it appears that the contraction of quicksilver by freezing must be at least equal to its expansion by 404 degrees of heat (c). This, however, is not the whole contraction that it suffers; for it appears by an extract from a meteorological journal kept by Mr Hutchins at Albany fort, that his thermometer once sunk to 490° below 0; though it was known by a spirit thermometer that the cold scarcely exceeded the point of freezing quicksilver. There are two experiments also of Professor Braun, in which the thermometer sunk to 544 and 556° below 0; which is the greatest descent he ever observed without the ball being cracked. It is not indeed known how cold his mixtures were; but from Mr Hutchins's experiments, there is great reason to think they could not be many degrees below 40°. If so, the contraction which quicksilver suffers in freezing, is not much less than its expansion by 500° or 510° of heat, that is, almost $\frac{1}{23}$ of its whole bulk; and in all probability is never much more than that, though it is probable that this contraction is not always determinate; for a considerable variation may frequently be observed in the specific gravity of the same piece of metal cast different times over; and almost all cast metals become heavier by hammering. Mr Cavendish observed, that on casting the same piece of tin three times over, its density varied from 7.252 to 7.294, though there was great reason to think that no hollows were left in it, and that only a small part of this difference could proceed from the error of the experiment. This variation of density is as much as is produced in quicksilver by an alteration of 66° of heat: and it is not unlikely, that the descent of a thermometer, on account of the contraction of the quicksilver in its ball by freezing, may vary as much in different trials, though the whole mass of quicksilver is frozen without any vacuities.

23 Variation of the density of metals by frequent casting.

24 Of freezing mixtures.

"The cold produced by mixing spirit of nitre with snow is entirely owing to the melting of the snow. Now, in all probability, there is a certain degree of cold, in which the spirit of nitre, so far from dissolving snow, will yield part of its own water, and suffer that to freeze, as is the case with solutions of common salt; so that if the cold of the materials before mixing is equal to this, no additional cold can be produced. If the cold of the materials is less, some increase of cold will be produced; but the total cold will be less than in the former case, since the additional cold cannot be generated without some of the snow being dissolved, and thereby weakening the acid, and making it less able to dissolve more snow; but yet the less the cold of the materials is, the greater will be the additional cold produced. This is conformable to Mr Hutchins's experiments; for in the fifth experiment, in

(c) The numbers here given are those shown by the thermometer without any correction; but if a proper allowance is made for the error of that instrument, it will appear, that the true contraction was 25° less than here set down; and from the manner in which thermometers have been usually adjusted, it is likely that in the 5th experiment of Mr Hutchins, as well as in those of Professor Braun, the true contraction might equally fall short of that by observation.

in which the cold of the materials was —40°, the additional cold produced was only 5°. In the firſt experiment, in which the cold of the materials was only —23°, an addition of at leaſt 19° of cold was obtained; and by mixing ſome of the ſame ſpirit of nitre with ſnow in this climate, when the heat of the materials was +26°, Mr Cavendiſh was able to ſink the thermometer to —29°, ſo that an addition of 55 degrees of cold was produced.

"It is remarkable that in none of Mr Hutchins's experiments the cold of the mixture was more than 6° of the ſpirit thermometer below the freezing point of quickſilver; which is ſo little, that it might incline one to think that the ſpirit of nitre uſed by him was weak. This, however, was not the caſe; as its ſpecific gravity at 58° of heat was 1,4923. It was able to diſſolve $\frac{1}{1.42}$ its weight of marble, and contained very little mixture of ſulphuric or muriatic acid; as well as could be judged from an examination of it, it was as little phlogiſticated as acid of that ſtrength uſually is."

Congelation of ſulphuric acid.

Acids, eſpecially thoſe of the mineral kind, powerfully reſiſt congelation. There is, however, a peculiarity with regard to that of vitriol. M. Chaptal, a foreign chemiſt, obſerved, that it condenſed by the cold of the atmoſphere, and the cryſtals began to melt only at +70° of his thermometer; which, if Reaumur's, correſponds to about 47° of Fahrenheit. The cryſtals were unctuous from the melting acid, and they felt warmer than the neighbouring bodies: the form was that of a priſm of ſix ſides, flatted and terminated by a pyramid of ſix ſides; but the pyramid appeared on one end only; on the other, the cryſtal was loſt in the general maſs. The pyramid reſulted from an aſſemblage of ſix iſoſceles triangles; the oil, when the cryſtal was melted was of a yellowiſh black; on rediſtilling it in a proper apparatus, no peculiar gas came over. M. Chaptal repeated his experiments with the highly concentrated acid, but found that it did not freeze: that the denſity of the acid which he thought froze moſt eaſily was to the oil, of the uſual ſtrength for ſale, as from 63 and 65 to 66; and the neceſſary degree of cold about 19° of Fahrenheit. Sulphuric acid once melted will not cryſtallize again with the ſame degree of cold.

Mr Keir's experiments.

In the experiments which had been made on the freezing of ſulphuric acid, Mr Cavendiſh found ſome uncertainty in determining the point at which it freezes moſt readily; neither could he determine whether the cold neceſſary for congelation does not increaſe without any limitation in proportion to the ſtrength of the acid. A new ſet of experiments were therefore made by Mr Keir to determine this point. He had obſerved, after a ſevere froſt at the end of the year 1784 and beginning of 1785, that ſome ſulphuric acid, contained in a corked phial, had congealed, while other bottles containing the ſame, ſome ſtronger and ſome weaker, retained their fluidity. As the congelation was naturally imputed to the extremity of the cold, he was afterwards ſurpriſed to find, when the froſt ceaſed, that the acid remained congealed for many days, when the temperature of the atmoſphere was ſometimes above 40° of Fahrenheit; and when the congealed acid was brought into a warm room on purpoſe to thaw it, a thermometer placed in contact with it during its thawing continued ſtationary at 45°. Hence he concluded, that the freezing and thawing point of this acid was nearly at 45°; and accordingly, on expoſing the liquor which had been thawed to the air at the temperature of 30°, the congelation again took place in a few hours. From the circumſtance of other parcels of the ſame acid, but of different ſtrengths, remaining fluid, though they had been expoſed to a much greater degree of cold, he was led to believe that there muſt be ſome certain ſtrength at which the acid is more diſpoſed to congeal than at any other. The ſpecific gravity of the acid which had frozen was to that of water nearly as 1800 to 1000, and that of the ſtronger acid which had not frozen was as 1846 to 1000, which is the common denſity of that uſually ſold in England; and there was not the leaſt difference, excepting in point of ſtrength, between the acid which had frozen and that which had not; Mr Keir having taken the acid ſome weeks before with his own hands from the bottle which contained the latter, and diluted it with water, till it became of the ſpecific gravity of 1800.

To render the experiment complete, Mr Keir immerſed ſeveral acids of different ſtrengths in melting ſnow, inſtead of expoſing them to the air; the temperature of which was variable, whereas that of melting ſnow was certain and invariable. Thoſe which would not freeze in melting ſnow were afterwards immerſed in a mixture of common ſalt, ſnow, and water; the temperature of which, though not ſo conſtant and determinate as that of melting ſnow, generally remained for ſeveral hours at 18°, and was ſometimes ſeveral degrees lower. The intention of adding water to the ſnow and ſalt was to leſſen the intenſity of the cold of this mixture, and to render it more permanent than if the ſnow and ſalt alone were mixed. The acids which had frozen in melting ſnow were five in number; which being thawed and brought to the temperature of 60°, were found on examination to have the following ſpecific gravities, viz. 1786, 1784, 1780, 1778, 1775. Thoſe which had not congealed with the melting ſnow, but which did ſo with the mixture of ſnow, ſalt, and water, were found, when brought to the temperature of 60°, to be of the following ſpecific gravities, viz. 1814, 1810, 1804, 1794, 1790, 1770, 1759, 1750. Thoſe which remained, and would freeze neither in melting ſnow nor in the mixture of ſnow, ſalt, and water, were of the gravities 1864, 1839, 1815, 1745, 1720, 1700, 1610, 1551. From the firſt of theſe it appears, that the medium denſity of the acids which froze with the natural cold was 1780; and from the ſecond, that at the denſities of 1790 and 1770 the acid had been incapable of freezing with that degree of cold. Hence it follows, that 1780 is nearly the degree of ſtrength of eaſieſt freezing, and that an increaſe or diminution of that denſity equal to $\frac{1}{178}$th of the whole, renders the acid incapable of freezing with the cold of melting ſnow, though this cold is ſomething above the freezing point of the moſt congealable acid. From the ſecond it appears, that by applying a more intenſe cold, viz. that produced by a mixture of ſnow, ſalt, and water, the limits of the denſities of acids capable of congelation were extended to about $\frac{1}{178}$th above or below the point

Congelation.

point of easiest freezing: and there seems little reason to doubt, that, by greater augmentations of cold, these limits may be further extended; but in what ratio these augmentations and extensions proceed, cannot be determined, without many observations made in different temperatures.

"But (says Mr Keir) though it is probable that the most concentrated acids may be frozen, provided the cold be sufficiently intense, yet there seems reason to believe, that some of the congelations which have been observed in highly concentrated acids, have been effected in consequence of the density of these acids being reduced nearly to the point of easy freezing by their having absorbed moisture from the air: for the Duke d'Ayen and M. de Morveau exposed their acids to the air in cups or open vessels; and the latter even acquaints us, that on examining the specific gravity of the acid which had frozen, he found it to that of water as 129 to 74; which density being less than that of easiest freezing, proves that the acid he employed, and which he had previously concentrated, had been actually weakened during the experiment. I have several times exposed concentrated sulphuric acid in open vessels in frosty weather; and I have sometimes, but not always, observed a congelation to take place. Upon separating the congealed part, and on examining the specific gravity of the latter after it had thawed, I found that it had been reduced to the point of easiest freezing. When the congealed acid was kept longer exposed it gradually thawed, even when the cold of the air increased; the reason of which is not to be imputed to the heat produced by the moisture of the air mixing with the acid, but principally to the diminution below the point of easiest freezing, which was occasioned by the continued absorption of moisture from the air, and which rendered the acid incapable of continuing frozen without a great increase of cold.

"It appears, then, that the concentration of M. de Morveau's acid, at the time of its congelation, from which circumstance Mr Cavendish infers generally that sulphuric acid freezes more easily as it is more dense, is not a true premise: and that therefore the inference, though justly deduced, is invalid. On the contrary, there seems every reason to believe, that as the density of the acids increases beyond the point of easiest freezing, the facility of the congelation diminishes; at least to as great density as we have ever been able to obtain sulphuric acid: for if it were possible to divest it entirely of water, it would probably assume a solid form in any temperature of the air.

"The crystallization of sulphuric acid is more or less distinct, according to the slowness of the formation of the crystals and other favourable circumstances. Sometimes they are very large, distinctly shaped, and hard. Their shape is like those of the common mineral alkali and selenite spar, but with angles different in dimensions from either of these. They are solid, consisting of ten faces; of which the two largest are equal, parallel, and opposite to each other; and are oblique-angled parallelograms or rhomboids, whose angles are, as near as could be measured, of 105 and 75 degrees. Between these rhomboidal faces are placed eight of the form of trapeziums; and thus each crystal may be supposed to be compounded of two equal and similar frustums of pyramids joined together by their rhomboidal bases. They always sunk in the fluid acid to the bottom of the vessel, which showed that their density was increased by congelation. It was attempted to determine their specific gravity by adding to this fluid some concentrated acid, which should make them float in the liquor, the examination of whose specific gravity should ascertain that of the floating crystals; but they were found to sink even in the most concentrated acid, and were consequently denser. Some of the congealable acid previously brought to the freezing temperature was then poured into a graduated narrow cylindrical glass, up to a certain mark, which indicated a space equal to that occupied by 200 grains of water. The glass was placed in a mixture of snow, salt, and water; and when the acid was frozen, a mark was made on the part of the glass to which it had sunk. Having thawed the acid and emptied the glass, it was filled with water to the mark to which it had sunk by freezing; and it was then found that 15 grains more of water were required to raise it to the mark expressing 200 grains; which shows, that the diminution of bulk sustained by the acid in freezing had been equal to $\frac{1}{13,3}$ of the whole. Computing from this datum, we should estimate the specific gravity of the congealed acid to have been 1924; but as it evidently contained a great number of bubbles, its real specific gravity must have been considerably greater than the above calculation, and cannot easily be determined on account of these bubbles. By way of comparison, Mr Keir observed the alteration of bulk which water contained in the same cylindrical vessel would suffer by freezing; and found that its expansion was equal to about $\frac{1}{10}$th of its bulk. The water had been previously boiled, but nevertheless contained a great number of air bubbles; so that in this respect there is a considerable difference between the congelations of water and sulphuric acid; though perhaps it may arise principally from the bubbles of elastic fluid being in greater proportion in the one than the other.

"Greater cold is produced by mixing snow or pounded ice with the congealed than with the fluid sulphuric acid, though the quantity is not yet determined. The greatest cold produced by Mr M'Nab at Hudson's Bay, was effected by mixing snow with a sulphuric acid which had been previously congealed; and to this circumstance Mr Cavendish imputes the intensity of the cold, as the liquefaction both of the acid and the snow had concurred in producing the same effect; while in mixing fluid acids with snow, the thawing of the snow is probably the only productive cause.

"To compare the times requisite for the liquefactions of ice and of congealed sulphuric acid, two equal and similar glasses were filled, one with the congealable sulphuric acid, the other with water; and after having immersed them in a freezing mixture, till both were congealed and reduced to the temperature of 28°, the glasses were withdrawn, wiped dry, and placed in a room where the thermometer stood at 62°. The ice thawed in 40 minutes, and the acid in 95; at the end

end of which time the thermometer, which ſtood near the glaſſes, had riſen to 64°. Hence it appears that the congealed acid requires more than twice the time for its liquefaction that ice does, though it cannot thence be fairly inferred, that the cold generated by the liquefaction of the ice and of congealed acid are in the above proportions of the times, from the following conſiderations, viz. that as, during the liquefaction of the ice, its temperature remains ſtationary at 32°, and during the liquefaction of the acid, its temperature remains about 44 or 45°, it appears, that the ice being conſiderably colder than the acid, will take the heat from the contiguous air much faſter. By this experiment, however, we know that a conſiderable quantity of cold is generated by the liquefaction of the acid; and hence it appears probable, that in producing cold artificially, by mixing ſnow with acids in very cold temperatures, it would probably be uſeful to employ a ſulphuric acid of the proper denſity for congelation, and to freeze it previouſly to its mixture with ſnow. It muſt not, however, be imagined, that the cold generated by the mixture of theſe two frozen ſubſtances is nearly equal to the ſums of the colds generated by the ſeparate liquefactions of the congealed acid and ice, when ſingly expoſed to a thawing temperature; for the mixture reſulting from the liquefaction, conſiſting of ſulphuric acid and the water of the ſnow, appears from the generation of heat which occurs from the mixture of theſe ingredients in a fluid ſtate, to be ſubject to different laws than thoſe which rule either of the ingredients ſeparately.

"The ſulphuric acid, like water and other fluids, is capable of retaining its fluidity when cooled conſiderably below its freezing point. A phial containing ſome congealable ſulphuric acid being placed in a mixture of ſalt, ſnow, and water, a thermometer was ſoon afterwards immerſed in it while the acid was yet fluid, on which it quickly ſunk from 50 to 29°. On moving the thermometer in the fluid, to make it acquire the exact temperature, the mercury was obſerved ſuddenly to riſe; and on looking at the acid, numberleſs ſmall cryſtals were obſerved floating in it, which had been ſuddenly formed. The degree to which the mercury then roſe was 46½°; and at another time, while the acid was freezing, it ſtood at 45°."

From theſe experiments our author infers, "1. That ſulphuric acid has a point of eaſieſt freezing, and that this is when the ſpecific gravity is to that of water as 1780 to 1000. 2. That the greater or leſs diſpoſition to congelation does not depend on any other circumſtance than the ſtrength of the acid. 3. That the freezing and thawing degree of the moſt congealable acid is about 45° of Fahrenheit's ſcale. It is, however, to be obſerved, that this degree is inferred from the temperature indicated by the thermometers immerſed in the freezing and thawing acids; but the congelation of the fluid acid could never be accompliſhed without expoſing it to a greater degree of cold, either by expoſing it to the air in froſty weather or to the cold of melting ſnow. 4. Like water, this acid poſſeſſes the property of retaining its fluidity when cooled ſeveral degrees below the freezing point; and of riſing ſuddenly to it when its congelation is promoted by agitation, or by contact even with a warmer thermometer. 5. That, like water and other congealable fluids, ſulphuric acid generates cold by its liquefaction, and heat during its congelation, though the quantity of this heat and cold remains to be determined by future experiments. 6. That the acid, by congelation, when the circumſtances for diſtinct cryſtallization are favourable, aſſumes a regular cryſtalline form, a conſiderable ſolidity and hardneſs, and a denſity much greater than it poſſeſſed in its fluid ſtate."

Beſides this ſpecies of congelation, ſulphuric acid is ſubject to another, probably the ſame deſcribed by Baſil Valentine and ſome of the older chemiſts. This is effected in the ordinary temperature of the air, even in ſummer; and according to Mr Keir *, is peculiar to that ſpecies of ſulphuric acid which is diſtilled from green vitriol, and which is poſſeſſed of a ſmoking quality in a high degree; "for not only the authors (ſays Mr Keir) by whom this congelation has been obſerved, have given this deſcription of the acid employed, but alſo the late experiments of Mr Delfuſs, ſeem to ſhow that this ſmoking quality is eſſential to the phenomenon: for neither the acid obtained from vitriol, when deprived by rectification of its ſmoking quality, nor the Engliſh ſulphuric acid, which is known to be obtained by burning ſulphur, and which does not ſmoke, were found by his trials to be ſuſceptible of this ſpecies of congelation. It may, however, be worth the attention of thoſe chemiſts who have an opportunity of ſeeing this *icy ſulphuric acid*, as it is called, to obſerve more accurately than has yet been done, the freezing temperature and the denſity of the congealable acids; and to examine whether the denſity of this ſmoking acid alſo is connected with the glacial property. It ſeems alſo further deſerving of inveſtigation, whether there be not ſome analogy between the congelation of the ſmoking ſulphuric acid and the very curious cryſtallization which Dr Prieſtley obſerved in a concentrated ſulphuric acid ſaturated with nitrous acid vapours; and whether this ſmoking quality does not proceed from ſome marine or other volatile acid, which may be contained in the martial vitriol whence the ſulphuric acid is obtained."

* *Phil. Tranſ.* vol. lxxvii. p. 267.

Mr Keir alſo obſerves, that M. Cornatter has effected the cryſtallization of ſulphuric acid, by diſtilling it with nitrous acid and charcoal; and we can add from our own experience, that a cryſtallization inſtantly takes place on allowing the fumes of the nitrous and ſulphuric acids to mix together; and this, whether the former be procured from martial vitriol or ſulphur, and whether it be in a phlogiſticated ſtate or not, concentration in both acids is here the only requiſite.

CONGER, in *Zoology*. See MURÆNA, ICHTHYOLOGY *Index*.

CONGERIES, a Latin word, ſometimes uſed in our language for a collection or heap of ſeveral particles of bodies united into one maſs or aggregate.

CONGESTION, in *Medicine*, a maſs or collection of humours, crowded together and hardened in any part of the body, and there forming a preternatural tumour.

Congeſtion is effected by little and little; in which it differs from *defluction*, which is more ſudden.

CONGIARIUM,

Congiarium || Congo.

CONGIARIUM, Congiary, among medalists, a gift or donative represented on a medal. The word comes from the Latin *congius;* because the first presents made to the people of Rome consisted in wine and oil, which were measured out to them in *congii.* The congiary was properly a present made by the emperors to the people of Rome. Those made to the soldiers were not called *congiaries*, but *donatives*. The legend on medals representing *congiaries*, is, *Congiarium* or *Liberalitas.* Tiberius gave a congiary of three hundred pieces of money to each citizen: Caligula twice gave three hundred sesterces a head: Nero, whose congiaries are the first that we find represented on medals, gave four hundred.

CONGIUS, a liquid measure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or six sextarii. The congius in English measure contains 2,070,676 solid inches; that is, seven pints, 4,942 solid inches.

CONGLOBATE gland. See Anatomy *Index.*

CONGLOMERATE gland. See Anatomy *Index.*

Conglomerate Flowers, are those growing on a branching foot-stalk, to which they are irregularly but closely connected. This mode of inflorescence, as Linnæus terms it, is opposed to that in which the flowers are irregularly and loosely supported on their foot-stalks, hence termed a *diffuse panicle**. The term is exemplified in several of the grasses, particularly in some species of the *poa*, fescue grass, and agrostis.

* See *Panicle.*

CONGLUTINATION, the glueing or fastening any two bodies together by the intromission of a third, whose parts are unctuous and tenacious, in the nature of glue. See Glue.

CONGO, a kingdom of Africa, bounded on the north by the river Zair, or Zarah, which divides it from Loanga; on the south by the river Danda, which separates it from Angola; on the east by the kingdoms of Fungono and Metamba, and the burnt mountains of the sun, those of crystal or salt-petre, and silver, or (according to Anthony Cavazzi, a traveller into those parts) by the mountains of Coanza, Berbela, and the great mountains of Chilandria or Aquilonda; and on the west by that part of the Atlantic ocean called the *Ethiopic sea*, or the *sea of Congo*. According to these limits, Congo Proper extends about three degrees from north to south; lying between the line and 18° S. Lat.; but widens in its breadth inland, by the course of the river Zair, which runs winding above two degrees more to the north. Its length from east to west is very uncertain, as no observations have been taken of the exact situation of those mountains which bound it.

1 Extent.

2 History uncertain and fabulous.

The history of this kingdom affords but few interesting particulars. Before its discovery by the Portuguese, the history is altogether uncertain and fabulous, as the inhabitants were totally unacquainted with letters and learning. So little were they acquainted with chronology, that it is said they did not even distinguish between day and night; much less could they compute their time by moons or years; and therefore could remember past transactions only by saying they happened in such a king's reign.

3 The country discovered by the Portuguese.

The country was discovered by the Portuguese in 1484. The discoverer was named *Diego Cam*, an expert and bold soldier. He was very well received by the natives, and sent some of his men with presents to the king; but they being detained by unexpected accidents beyond the promised time of their return, Cam was obliged to sail away without them, and took with him four young Congoese, as hostages for the safety of his countrymen. These he taught the Portuguese language, in which they made such progress that King John was highly pleased, and sent them back next year to Congo with rich presents; charging them to exhort their monarch, in his name, to become a convert to the Christian religion, and to permit it to be propagated through his dominions. A firm alliance was concluded between the two monarchs, which continues to this day, though not without some interruptions, to which the Portuguese themselves have given occasion more than the natives.

4 Cavazzi's account of Congo.

Any particular account we have of this kingdom, rests almost entirely on the credit of Anthony Cavazzi, the traveller above mentioned. He was a capuchin friar, a native of the duchy of Modena, and was sent missionary into those parts *de propaganda fide*, in the year 1654, and arrived at Congo the same year. During his stay there, his zeal to make converts made him travel through all these different kingdoms; and the credit he gained, as well as the great employments he was entrusted with, gave him an opportunity of informing himself of every thing relating to them with great exactness. The extent and situation, however, he could not possibly ascertain, for want of instruments; nor hath this defect been since supplied. According to him the dominions of Congo extended a great deal further eastward and southwards before the introduction of Christianity than afterwards; a great number of the states that were under the Congoese monarchs, either as subjects, or tributary, having withdrawn their allegiance out of dislike to them on that account. Not content with opposing the officers and troops that came annually to raise the tribute imposed by the king, they made such frequent and powerful incursions into his dominions, that they obliged him to draw his forces nearer the centre of Congo to prevent an invasion; by which means the kingdom, from an extent of 600 leagues, was reduced to less than one half.

5 Extent lessened since the introduction of Christianity.

6 Account of the climate and seasons.

Congo Proper being situated within the torrid zone, is liable to excessive heats: as it lies on the southern side of the equinoctial, the seasons are of course opposite to ours. They reckon only two principal seasons, the summer and winter; the former begins in October, and continues till February or March; during which time the sun's rays dart with such force, that the atmosphere appears to an European to be in a flame. The excessive heat, however, is mitigated by the equal length of the days and nights, as well as by the winds, breezes, rains, and dews. The winter takes up the other part of the year; and is said by the natives to be proportionally cold, though to an European it would appear hot. These two seasons they divide into six lesser ones, viz. Massanza, Neasu, Ecundi, Quitombo, Quibiso, and Quibangala.

Massanza begins with the month of October, which is the beginning of their spring. The rains begin to fall at that time, and continue during the next two, and

and ſometimes three, months. When this happens, the low lands are commonly overflowed with extraordinary floods, and all their corn carried off. A diſaſter of this kind is commonly followed by a famine; for the lazy inhabitants take no care to lay up any proviſions, although ſuch misfortunes happen very frequently. This firſt ſeaſon they reckon commences at the time the plants begin to ſpring.

The ſecond ſeaſon, Neaſu, begins about the end of January, when the produce of their lands has arrived at its full height, and wants but a few days of being ripened for harveſt. This firſt crop is no ſooner gathered in, than they ſow their fields afreſh, their land commonly yielding them two harveſts.

The third and fourth ſeaſons, called *Ecundi* and *Quitombo*, are frequently blended together towards the middle of March, when the more gentle rains begin to fall, and continue till the month of May. Theſe two ſeaſons are diſtinguiſhed by the greater or leſſer quantity of rain that falls during that interval. During the reſt of the time, the air is either very clear, hot, and dry; or the clouds being overcharged with electric matter, burſt out into the moſt terrible thunders and lightnings, without yielding the leaſt drop of rain, though they ſeem loaded with it.

The two laſt, viz. the Quibiſo and Quibangala, make up their ſhort winter, which conſiſts not in froſt or ſnow, but in dry, blaſting winds, which ſtrip the earth of all its verdure, till the next Maſſanza begins to reſtore them to their former bloom.

They now divide their year into twelve lunar months, and begin it in September. They have alſo weeks conſiſting of four days only, the laſt of which is their ſabbath; and on it they religiouſly abſtain from every kind of work. This practice, the compilers of the Univerſal Hiſtory conjecture to have ariſen from the extreme lazineſs for which this people, and indeed all the African nations, are ſo remarkable. To this ſhameful indolence alſo is to be aſcribed the little produce they reap from their lands, while the Portugueſe ſettled among them, who are at more pains in the cultivation of theirs, enjoy all manner of plenty. The natives, however, had rather run the riſk of the moſt terrible famines, than be at the tenth part of the labour they ſee the Portugueſe take. They ſeem to think it below them to uſe any other exerciſes than thoſe of dancing, leaping, hunting, ſhooting, &c.; the reſt of their time they ſpend in ſmoking, and downright idleneſs, committing the laborious part of their houſehold affairs to their ſlaves, or, in want of them, to their wives. Nothing is more common than to ſee theſe poor creatures toiling in the fields and woods with a child tied to their backs, and fainting under their exceſſive labour and heavy burdens, or (which is ſtill worſe) hunger and thirſt. What is yet more ſurpriſingly ſhameful is, that though they have plenty of domeſtic animals which they might eaſily make uſe of for cultivating their grounds, and for other laborious ſervices, and though they ſee the Portugueſe do it every day to great advantage; yet they will rather ſee their tender females ſink under their toil and labour, than be at the trouble of breeding up any of theſe uſeful creatures to their aſſiſtance.

The ground produces variety of grain, but no corn or rice except what is cultivated by the Portugueſe. Their maize, or Indian wheat, grows very ſtrong, and is well laden. This being well ground, they make into bread, or boil with water into a kind of pap. Of this they have four kinds; one of which, reſembling what we call French wheat, is produced in plenty, and makes ſome amends for the want of induſtry in the people. They cultivate alſo a variety of the peaſe and bean kind: but what they chiefly live upon, as moſt ſuitable to their lazy diſpoſition, is a kind of nut, like our filberts, which fall to the ground of themſelves, and are to be found everywhere; every nut that falls to the ground producing a new ſhrub next year. They have ſcarcely any fruit-trees but what have been brought hither by the Portugueſe. They have various ſorts of palm-trees, uſeful both by their fruit, leaves, and their juice, which is eaſily converted into wine; alſo by affording a kind of oil with which they dreſs their victuals, though the Europeans uſe it only to burn in their lamps. They have alſo a vaſt number of plants and ſhrubs, which it would be impoſſible to deſcribe or enumerate. Wheat is the only thing that the ground will not produce. It puſhes forth, indeed, the ſtraw and the ear; the former of which grows high enough, we are told, to hide a man on horſeback, but the latter is empty, without one grain fit for uſe. Father Labat, however, who had lived a conſiderable time in ſome of the American iſlands, where he had obſerved the ſame thing, tells us, that he had the curioſity to examine thoſe ears more carefully, and had found ſome few grains; and that, having ſowed them afreſh, they produced very long ears full of large heavy grain. Whence he conjectures, that if the Portugueſe had tried the ſame experiment in their African ſettlements, it might perhaps have been attended with the ſame ſucceſs.

Congo. 8 Vegetables produced in Congo.

In the low lands the graſs grows ſo high, rank, and thick, that it becomes one of the moſt dangerous receptacles for wild beaſts, ſerpents, and other venomous inſects: on this account travelling is exceedingly hazardous, as there are few beaten roads in the whole country, and travellers are obliged to march over it, through vaſt plains, in continual danger of being devoured or ſtung to death; to ſay nothing of the manifold diſeaſes produced by the unwholeſome dews with which the graſs is covered during ſome part of the day. The only method of guarding againſt all theſe evils effectually, is by ſetting fire to the graſs in the hot weather, when it is quite parched by the heat of the ſun: but even this cannot be done without the greateſt danger; becauſe both the wild beaſts and venomous reptiles, being rouſed out of their places of retirement, will fly furiouſly at thoſe who happen to be in the way. In this caſe there is no poſſibility of eſcaping, but by climbing up the higheſt trees, or defending one's ſelf with fire arms or other weapons. In ſuch emergencies, the natives have a much better chance than the Europeans; the former being able to climb trees with ſurpriſing ſwiftneſs; while the latter muſt be aſſiſted with rope-ladders, which they commonly cauſe their blacks to carry about with them, and to go up and faſten to one of the branches.

9 Hazardous travelling.

The flowers are here exceedingly beautiful and numerous. Almoſt every field and grove yields a much nobler

10 Great variety of flowers.

Congo.

nobler prospect than the European gardens can boast of, notwithstanding the pains bestowed on their cultivation. The flowers are remarkable, not only for the prodigious variety of their colours, but the vast quantity of heads which grow upon one stalk. In the day-time, indeed, they seem to have lost their natural fragrancy; that being in some measure exhaled by the heat of the sun: but this is amply compensated after its setting, and more especially a little before its rising, when their sweetness is again condensed, and revived by the coldness and dews of the night, after which they exhale their various refreshing scents in a much higher degree than ours. The lilies, which there grow naturally in the fields, valleys, and woods, excel those of our gardens, not only in their extreme whiteness, but much more in a delightful fragrancy, without offending the head, as the European lilies do by their faintish sweetness. The tulips which there grow wild, though generally called *Persic*, have something so surprisingly charming in the variety and combination of their colours, that they dazzle the eyes of an intense beholder: neither do their flowers grow singly as with us, but ten or twelve upon one stalk; and with this double advantage, that they diffuse a very reviving and agreeable sweetness, and continue much longer in their full bloom. Of the same nature are their tuberoses, hyacinths, and other native flowers; which spring up in vast groups of 100 and 200 from one root, though somewhat smaller than ours; some of them finely variegated, and all of them yielding an agreeable smell. The roses, jessamines, and other exotics brought hither from Europe or America, come up likewise in great perfection, but require a constant supply of water, and diligent attendance, to prevent them from degenerating. The American jessamine, in particular, instead of single flowers, will grow up by dozens in a bunch; some of them of an exquisite white, and others of the colour of the most vivid fire.

11 Animals of different kinds.

A vast variety of animals of different kinds are found in the kingdom of Congo; the chief of which is the elephant. This creature is mostly found in the province of Bamba, which abounds with woods, pasture, and plenty of water; the elephants delighting much to bathe themselves during the heat of the day. They commonly go in troops of an hundred or more; and some of them are of such a monstrous size, that we are told the print of their hoof hath measured four, nay seven, spans in diameter. From the hair of their tails, and that of some other animals, the natives, especially the women, weave themselves collars, bracelets, girdles, &c. with variety of devices and figures, which denote their quality; and are in such esteem, that the hair of two elephants tails is sufficient to buy a slave. The reason of this is, that the natives have not the art of taming them, but are obliged to send some of the bravest and stoutest men to hunt them in the woods; which is not done without great labour and danger, they being here exceedingly fierce. The most common way of hunting them is by digging deep holes in the ground, the top of which they cover with branches and leaves, as is practised in most parts of Asia.

Lions, leopards, tigers, wolves, and other beasts of prey, abound here in great plenty, and do much damage. Here are also a vast variety of monkeys of all sizes and shapes. The zebra, well known for its extreme beauty and swiftness, is also met with in this country. They have also a variety of buffaloes and wild asses; but the *dante* seems to be an animal peculiar to this kingdom. It is shaped and coloured much like an ox, though not so large. Its skin is commonly bought by the Portuguese, and sent into Germany to be tanned and made into targets, which are then called *dantes*. The natives make use of their raw hides dried to make their shields; which are so tough that no arrow or dart can pierce them; and they are also large enough to cover the whole body. The creature is vastly swift; and when wounded, will follow the scent or smoke of the gunpowder with such fury, that the hunter is obliged to climb up a tree with all possible speed; and this retreat he always takes care to secure before he ventures to fire. The wounded beast finding its enemy out of its reach, stays for him at the foot of the tree, and will not stir from it; of which the hunter taking the advantage, dispatches it with repeated shots. The forests of Congo also swarm with wild dogs, who, like the wolves, prey upon the tame cattle, and are so fierce that they will attack armed men. Their teeth are exceeding keen and sharp; they never bark, but make a dreadful howling when famished or in pursuit of their prey.

12 Birds.

This country also abounds with all the different kinds of birds that are to be found in other warm climates. One sort, which they call *birds of music*, is greatly esteemed, insomuch that persons of the highest rank have from time immemorial taken the greatest delight in keeping them in cages and aviaries for the sake of their surprising melody. On the other hand, as the Congoese are superstitious to the last degree, there are several kinds of birds which they look upon as ominous, and are so terrified at the sight or hearing of them, that if they were going to enter upon ever so momentous an expedition, if they were met in council, or going to engage an enemy with ever so great an advantage, the flight or cry of such birds would throw them into a general panic, and disperse them in the utmost haste and confusion. The most dreadful of the ominous kind are the crows, ravens, bats, and owls. The great owl is the most terrible of all, and to him they give the name of *kariam pemba*, by which words they likewise denote the devil.

Fish of different kinds abound on the coasts of Congo in great numbers; but the inland parts are infested with such numbers of serpents, scorpions, and other venomous insects, as are perhaps sufficient to overbalance every natural advantage we have yet mentioned.

13 Ants very dangerous.

The most pernicious and dangerous kind are the ants; of which they reckon no less than six several species of different colours and sizes; all of them formidable on account of their prodigious numbers, and the mischief they do not only to the fruits of the earth, but to men and beasts; whom they will surround in the night-time, and devour even to the very bone. It is a common practice, we are told, to condemn persons guilty of some atrocious crimes to be stripped naked, tied hand and foot, and thrown into a hole where these insects swarm; where they are sure to be devoured by them in less than 24 hours to the very bones. But criminals are not the only persons who are in danger from the

the jaws of these little devouring insects. People may be attacked by them, as we have already hinted, in the night-time, and while they are sleeping in their beds. This obliges the natives to be careful where they lie down, and to kindle a small fire, or at least to have a circle of burning hot embers round their beds. This caution is still more necessary in the country villages and hamlets, where persons are otherwise in danger of being attacked by millions of them in the dead of the night. In such a case the only expedient to save one's self is to jump up as soon as one feels the bite, to brush them off with all possible speed, and then at once to set the house on fire. The danger is still greater in travelling through the country, where a person is often obliged to take up his lodging on the bare ground; and may be overtaken during the heat of the day with such profound sleep, as not to be awakened by these diminutive animals till they have made their way through the skin; and in such a case nothing will prevent their devouring a man alive, though there were ever so many hands to assist him: in such incredible quantities do these creatures abound, notwithstanding the great numbers of monkeys who are continually ferreting the ants out of their retreats, and feed upon them with the utmost avidity. This can only be ascribed to the natural laziness and indolence of the inhabitants; which is such, that they not only neglect to rid their land of them by proper cultivation, but will suffer their houses, nay, even their very churches, to be undermined by them. Another kind of these destructive vermin lie so thick upon the paths and highways, that a person cannot walk without treading upon, and having his legs and thighs almost devoured by them. A third sort of a white and red colour, but very small, will gnaw their way through the hardest wood, penetrate into a strong chest, and in a little while devour all the clothes, linen, and every thing that is in it. A fourth sort, small and black, leave a most intolerable stench upon every thing they touch or crawl over, whether clothes or household-stuff, which are not easily sweetened again; or if they pass over victuals, they are entirely spoiled. A fifth sort harbour chiefly on the leaves and branches of trees; and if a man chance to climb up thither to save himself from a wild beast, he is so tormented by them, that nothing but the fear of the jaws of the one could make him endure the stings of the other. A sixth sort is of the flying kind; and is probably one of the former kinds, that live wholly under ground, till nature furnishes them with wings. After this, they rise in such swarms as darken the air, and would make terrible havock among all kinds of vegetables, did not the natives come out against them in whole companies, and by dint of flaps, and other flat weapons, knock them down by myriads, and then laying them in heaps, set fire to their wings, which half broils them for food. Amidst all this variety of pernicious insects, however, they have one species of a more friendly and profitable kind, viz. the industrious bee, which furnishes the inhabitants with honey and wax in such plenty, that there is scarce a hollow tree, cleft of a rock, or chop of the earth, in which their combs are not found in great quantities.

Con very pop us.

With respect to the populousness of the kingdom of Congo, some authors, writing either from mere conjecture, or at best precarious inferences, have represented it as thinly peopled. The accounts of the missionaries and Portuguese, however, are directly opposite to these. They found the country for the most part covered with towns and villages, and these swarming with inhabitants; the cities well filled with people, particularly the metropolis, which is said to contain above 50,000 souls. The provinces, though not equally populous, yet in the whole make up such an amount as plainly proves, that what is wanting in the one is amply made up by the other. We are told that the duchy of Bamba is still able to raise 200,000 fighting men, and was formerly in a condition to raise double that number; and that the army of the king of Congo, in the year 1665, consisted of 900,000 fighting men, who were attended by an infinite number of women, children, and slaves. The numbers of the Congoese will appear the more credible, when we consider the extreme fecundity of their women, the hardiness with which they bring up their children, and the stoutness and healthiness of their men. In some villages, if the missionaries are to be credited, the number of children is so great, that a father will part with one or two, for any commodity he wants, or even for some trifling bauble he fancies; so that the number of slaves they sell abroad seldom amounts, *communibus annis*, to less than 15,000 or 16,000.

15
Congoese have a high opinion of themselves.

There is scarcely a nation on earth that have a higher opinion of themselves or their country than the Congoese, or that is more hardened against all conviction to the contrary, from reason, experience, or the most impartial comparison with other countries in Europe or Asia. Indeed it is impossible they should think otherwise, when it is one of the fundamentals of their belief, that the rest of the world was the work of angels, but that the kingdom of Congo, in its full and ancient extent, was the handywork of the Supreme Architect; and must of course have vast prerogatives and advantages over all others. When told of the magnificence of the European and Asiatic courts, their immense revenues, the grandeur of their palaces and edifices, the richness and happiness of their subjects, the great progress they have made in the arts and sciences to which their country is wholly a stranger, they coolly answer, that all this comes vastly short of the dignity and splendor of the kings and kingdom of Congo; and that there can be but one Congo in the world, to the happiness of whose monarch and people all the rest were created to contribute, and to whose treasury the sea and rivers pay their constant tribute of zimbis (or shells, which are their current coin); whilst other princes must condescend to enrich themselves by digging through rocks and mountains, to come at the excrements of the earth, so they style gold and silver which are in such request among other nations. Accordingly, they imagine, that the nations which come to traffic with them, are forced to that servile employment by their poverty and the badness of their country, rather than induced to it by luxury or avarice; whilst they themselves can indulge their natural indolence or sloth, though attended with the most pinching poverty, rather than disgrace the dignity of their blood by the least effort of industry, which, how laudable and beneficial soever, is looked upon by them as only a lesser degree of slavery. But though they generally esteem it so much below their dignity to apply to any useful

16
Their sloth, pride, &c.

Congo.

useful work, they think it no disgrace to beg or steal. With respect to the first, they are said to be the most shameless and importunate beggars in the world. They will take no denial, spare no crouching, lying, prayers, to obtain what they want, nor curses and ill language when sent away without it. With regard to the last, they deem no theft unlawful or scandalous, except it be committed in a private manner, without the knowledge of the person wronged. It is esteemed a piece of bravery and gallantry to wrench any thing from another by violence; and this kind of theft is so common, not only among the vulgar, but also among the great ones, that they make no scruple, in their travels from place to place, to seize not only upon all the provisions they meet with in towns and villages, but upon every thing else that falls in their way. These violences oblige the poor people to conceal the few valuables they have, in some secret place out of the knowledge and reach of those harpies; and they think themselves well off if they can escape a severe bastinading, or other cruel usage, frequently inflicted upon them, in order to make them discover the place of their concealment.

17
Complexion, character, customs, &c.

The complexion of the natives, both men and women, is black, though not in the same degree; some being of a much deeper black than others. Their hair is black and finely curled; some have it also of a dark sandy colour: their eyes are mostly of a fine lively black; but some are of a dark sea-colour. They have neither flat noses nor thick lips like the Nubians and other negroes. Their stature is mostly of the middle size; and, excepting their black complexion, they much resemble the Portuguese. In their temper they are mistrustful, envious, jealous, and treacherous; and where they once take a distaste or affront, will spare no pains, and stick at no means, however base, to be avenged of, and crush their enemy under their feet. There is no such thing among them as natural affection. A husband, if a Heathen, may take as many wives as he pleases; and if a Christian, may have any number of concubines, whom he may divorce at pleasure, and even sell them though with child. So little regard have they for their children, that there is scarce one among them who will not sell a son or a daughter, or perhaps both, for a piece of cloth, a collar or girdle of coral or beads, and often for a bottle of wine or brandy.

18
Religion.

The religion of the Congoese in many parts is downright idolatry, accompanied with the most ridiculous superstitions, and the most absurd and detestable rites invented by their gangas or priests; and even in those parts where Christianity is professed, it is so darkened by superstitions of one kind or other, that we may justly question whether the people are any gainers by the exchange.

19
Government.

The government of this kingdom is monarchical, and as despotic as any in Asia or Africa. The kings are the sole proprietors of all the lands within their dominions; and these they can dispose of to whom they please, upon condition they pay a certain tribute out of them: upon failure of the payment of which, or any other neglect, they turn them out. Even the princes of the blood are subjected to the same law; so that there is no person of any rank or quality whatever that can bequeath a foot of land to his heirs or successors; and when these owners under the crown die, the lands immediately return to it again, whether they were in their possession, or had been left to ever so many tenants under them; so that it entirely depends on the prince whether these lands shall be continued in the same, or be disposed into other hands. The Portuguese, however, since their settling in these parts, have prevailed upon the monarchs to permit the heirs and successors to continue in the quiet possession of such lands, in order to avoid the confusions, or even rebellions, which the alienation and deprival of them frequently occasioned, and to oblige the tenants of them to pay their tribute more exactly and readily than they did before.

Congo, Congregation.

20
Commerce.

St Salvador is the chief place of trade in this country belonging to the Portuguese and other Europeans. There are thought to be about 4000 of them settled here, who trade with most parts of the kingdom. The chief commodities they bring hither are either the product of Brazil or European manufactures. The former consist chiefly of grains, fruits, plants, &c.; the latter of Turkey carpets, English cloth, and other stuffs; copper, brass vessels, some kinds of blue earthen ware, rings, and ornaments of gold, silver, and other baser metals; coral, glass-beads, bugles, and other trinkets; light stuffs made of cotton, woollen, and linen, for clothing; and a great variety of tools and other utensils. In return for these they carry off a great number of slaves, amounting to 15,000 or 16,000 annually, as we have already observed. Formerly they used also to carry away elephants teeth, furs, and other commodities of the country; but these branches of commerce are now greatly decayed, and the slave-trade is what the Portuguese merchants principally depend on.

Congo, a term applied to tea of the second quality.

CONGREGATION, an assembly of several ecclesiastics, united so as to constitute a body.

The term is principally used for assemblies of cardinals appointed by the pope, and distributed into several chambers, for the discharge of certain functions and jurisdictions, after the manner of our offices and courts. The first is the congregation of the holy office, or the inquisition: the second, that of jurisdiction over bishops and regulars; the third, that of councils; this has power to interpret the council of Trent: the fourth, that of customs, ceremonies, precedencies, canonizations, called *the congregation of rites*: the fifth, that of St Peter's fabric, which takes cognizance of all causes relating to piety and charity, part whereof is due to the church of St Peter: the sixth, that of waters, rivers, roads: the seventh, of fountains and streets: the eighth, that of the index, which examines the books to be printed or corrected: the ninth, that of the council of state, for the management of the territories belonging to the pope and church (see Camerlingo): the tenth, *de bono regimine*; of which two last the cardinal-nephew is chief: the eleventh, that of money: the twelfth, that of bishops, wherein those who are to be promoted to bishoprics in Italy are examined; this is held before the pope: the thirteenth, that of consistorial matters; the chief whereof is the cardinal-dean: the fourteenth, a congregation for propagating the faith (see College): and the fifteenth, that of ecclesiastical immunity, for settling suits against churchmen. There is also a congregation

tion of alms, which takes care of every thing that relates to the subsistence of Rome and the state of the church.

CONGREGATION is also used for a company or society of religious cantoned out of this or that order; and making, as it were, an inferior order, or a subdivision of the order itself. Such are the congregations of the oratory, and those of Cluny, &c. among the Benedictines.

The word is also used for assemblies of pious persons in manner of fraternities, frequent among the Jesuits, in honour of the Virgin, &c. It is likewise applied to the audience in a church, particularly as consisting of the inhabitants of the same parish.

CONGREGATIONALISTS, in church-history, a sect of Protestants who reject all church-government, except that of a single congregation under the direction of one pastor.

CONGRESS, in political affairs, an assembly of commissioners, envoys, deputies, &c. from several courts meeting to concert matters for their common good.

CONGRESS, in America, is the assembly of delegates from the United States. See AMERICA.

CONGRESS, in a judicial sense, the trial made by appointment of a judge before surgeons and matrons, in order to prove whether or not a man be impotent, before sentence is passed for the dissolution of a marriage solicited upon such a complaint.

Neither the civil nor canon law makes any mention of the trial of virility by congress. It had its origin in France from the boldness of a young fellow, who, in open court, having been hard pressed by his wife, demanded the congress. The judge, surprised with the novelty of the demand, found it could not be denied, as being the surest evidence that the case could admit of. In time it became a branch in the French jurisprudence, and was authorized by decreets and arrets. It obtained for about 120 years; and was annulled by an arret of parliament in 1677, as being found precarious; some having failed under the experiment out of mere modesty and shame, which is found to have the same effect with actual impotency.

CONGREVE, WILLIAM, a younger brother of an ancient family in Staffordshire. His father was employed in the stewardship of the great estate of the earl of Burlington in Ireland, where he resided many years; and our author was born there in 1672. Mr Congreve entered into the Middle-Temple when he came to England, and began to study the law; but his bias was toward polite literature and poetry. His first performance was a novel entitled, *Incognita*, or *Love and Duty reconciled*. He soon after began his comedy of the *Old Bachelor*; which was the amusement of some leisure hours during a slow recovery from a fit of illness soon after his return to England; yet was in itself so perfect, that Mr Dryden, on its being shown to him, declared he had never in his life seen such a first play. When brought on the stage in 1693, it met with such universal approbation, that Mr Congreve, though he was but 19 years old at the time of his writing it, became now considered as a prop to the declining stage, and a rising genius in dramatic poetry. The next year he produced the *Double Dealer*; which, for what reason is not obvious, did not meet with so much success as the former. The merit of his first play, however, had obtained him the favour and patronage of Lord Halifax, and some peculiar mark of distinction from Queen Mary; on whose death, which happened in the close of this year, he wrote a very elegant elegiac pastoral. In 1695, when Betterton opened the new house in Lincoln's Inn fields, Mr Congreve joining with him, gave him his comedy of *Love for Love*; with which the company opened their campaign, and which met with such success, that they immediately offered the author a share in the management of the house, on condition of his furnishing them with one play yearly. This offer he accepted; but whether through indolence, or that correctness which he looked upon as necessary to his works, his *Mourning Bride* did not come out till 1697, nor his *Way of the World* till two years after that. The indifferent success this last mentioned play, though an exceeding good one, met with from the public, completed that disgust to the theatre, which a long contest with Jeremy Collier, who had attacked the immoralities of the English stage, and more especially some of his pieces, had begun, and he determined never more to write for the stage. However, though he quitted dramatic writing, he did not lay down the pen entirely; but occasionally wrote many little pieces both in prose and verse, all of which stand on the records of literary fame. It is very possible, however, that he might not so soon have given way to this disgust, had not the easiness of his circumstances rendered any subservience to the opinions and caprice of the town absolutely unnecessary to him. For his abilities having very early in life raised him to the acquaintance of the earl of Halifax, who was then the Mecænas of the age; that nobleman, desirous of raising so promising a genius above the necessity of too hasty productions, made him one of the commissioners for licensing hackney-coaches; or, according to Coxeter, a commissioner of the wine-license. He soon after bestowed on him a place in the pipe-office; and not long after gave him a post in the customs worth 600l. per annum. In the year 1718, he was appointed secretary of Jamaica; so that the whole of his income towards the latter part of his life was upwards of 1200l. a-year.

The greatest part of the last 20 years of his life was spent in ease and retirement; and he either did not, or affected not to give himself any trouble about reputation. Yet some part of that conduct might proceed from a degree of pride; to which purpose, T. Cibber, in his Lives of the Poets, vol. iv. p. 93. relates the following anecdote of him: "When the celebrated Voltaire was in England, he waited upon Mr Congreve, and passed some compliments upon the merit and reputation of his works. Congreve thanked him; but at the same time told that ingenious foreigner, that he did not choose to be considered as an author, but only as a private gentleman, and in that light expected to be visited. Voltaire answered, that if he had never been any thing but a private gentleman, in all probability he had never been troubled with that visit." He observes, in his own account of the transaction, that he was not a little disgusted with so unseasonable a piece of vanity.

Towards the close of his life he was much afflicted with the gout; and making a tour to Bath for the benefit

nefit of the waters, was unfortunately overturned in his chariot: by which, it is supposed, he got some inward bruise, as he ever after complained of a pain in his side; and, on his return to London, continued gradually declining in his health, till the 19th of January 1729, when he died, aged 57; and, on the 26th following, was buried in Westminster Abbey, the pall being supported by persons of the first distinction.

CONGRUITY, a suitableness or relation of agreement between things.

The terms *congruity* and *propriety* are not applieable to any single object: they imply a plurality, and obviously signify a particular relation between different objects. Thus we currently say, that a decent garb is suitable or proper for a judge; modest behaviour for a young woman; and a lofty style for an epic poem: and on the other hand, that it is unsuitable or incongruous to see a little woman sunk in an overgrown farthingale, a coat richly embroidered covering coarse and dirty linen, a mean subject in an elevated style, an elevated subject in a mean style, a first minister darning his wife's stocking, or a reverend prelate in lawn sleeves dancing a hornpipe.

The perception we have of this relation, which seems peculiar to man, cannot proceed from any other cause, but from a *sense* of congruity or propriety; for, supposing us destitute of that sense, the terms would be to us unintelligible.

It is a matter of experience, that congruity or propriety, wherever perceived, is agreeable; and that incongruity, or impropriety, wherever perceived, is disagreeable. The only difficulty is, to ascertain what are the particular objects that in conjunction suggest these relations; for there are many objects that do not: the sea, for example, viewed in conjunction with a picture, or a man viewed in conjunction with a mountain, suggest not either congruity or incongruity. It seems natural to infer, what will be found true by induction, that we never perceive congruity or incongruity but among things that are connected together by some relation; such as a man and his actions, a principal and his accessories, a subject and its ornaments. We are indeed so framed by nature, as, among things so connected, to require a certain suitableness or correspondence, termed *congruity* or *propriety*; and to be displeased when we find the opposite relation of *incongruity* or *impropriety*.

If things connected be the subject of congruity, it is reasonable before hand to expect, that a degree of congruity should be required proportioned to the degree of the connexion. And upon examination we find this to hold in fact: where the relation is intimate, as between a cause and its effect, a whole and its parts, we require the strictest congruity; but where the relation is slight, or accidental, as among things jumbled together in the same place, we require little or no congruity: the strictest propriety is required in behaviour and manner of living; because a man is connected with these by the relation of cause and effect: the relation between an edifice and the ground it stands upon, is of the most intimate kind: and therefore the situation of a great house ought to be lofty; its relation to neighbouring hills, rivers, plains, being that of propinquity only, demands but a small share of congruity; among members of the same club, the congruity ought to be considerable, as well as among things placed for show in the same niche: among passengers in a stage coach, we require very little congruity; and less still at a public spectacle.

Congruity is so nearly allied to beauty, as commonly to be held a species of it; and yet they differ so essentially as never to coincide: beauty, like colour, is placed upon a single subject; congruity upon a plurality: further, a thing beautiful in itself, may, with relation to other things, produce the strongest sense of incongruity.

Congruity and propriety are commonly reckoned synonymous terms; but they are distinguishable, and the precise meaning of each must be ascertained. Congruity is the genus of which propriety is a species; for we call nothing *propriety*, but that congruity or suitableness which ought to subsist between sensible beings and their thoughts, words, and actions.

In order to give a full view of these secondary relations, we shall trace them through some of the most considerable primary relations. The relation of a part to the whole, being extremely intimate, demands the utmost degree of congruity; even the slightest deviation is disgustful.

Examples of congruity and incongruity are furnished in plenty by the relation between a subject and its ornaments. A literary performance intended merely for amusement, is susceptible of much ornament, as well as a music-room or a play-house; for in gaiety, the mind hath a peculiar relish for show and decoration. The most gorgeous apparel, however improper in tragedy, is not unsuitable to opera-actors; the truth is, an opera, in its present form, is a mighty fine thing; but as it deviates from nature in its capital circumstances, we look not for nature or propriety in those which are accessory. On the other hand, a serious and important subject admits not much ornament: nor a subject that of itself is extremely beautiful: and a subject that fills the mind with its loftiness and grandeur, appears best in a dress altogether plain.

To a person of a mean appearance, gorgeous apparel is unsuitable; which, besides the incongruity, has a bad effect; for by contrast it shows the meanness of appearance in the strongest light. Sweetness of look and manner requires simplicity of dress, joined with the greatest elegance. A stately and majestic air requires sumptuous apparel, which ought not to be gaudy, nor crowded with little ornaments. A woman of consummate beauty can bear to be highly adorned, and yet shows best in a plain dress:

————————For loveliness
Needs not the foreign aid of ornament,
But is, when unadorn'd, adorn'd the most.

Thomson's Autumn, 208.

Congruity regulates not only the quantity of ornament, but also the kind. The ornaments that embellish a dancing room ought to be all of them gay. No picture is proper for a church but what has religion for its subject. All the ornaments upon a shield ought to relate to war; and Virgil, with great judgment, confines the carvings upon the shield of Æneas to the military history of the Romans: but this beauty is overlooked by Homer; for the bulk of the sculpture

ture upon the shield of Achilles, is of the arts of peace in general, and of joy and festivity in particular: the author of Telemachus betrays the same inattention, in describing that young hero.

In judging of propriety with regard to ornaments, we must attend, not only to the nature of the subject that is to be adorned, but also to the circumstances in which it is placed; the ornaments that are proper for a ball, will appear not altogether so decent at public worship; and the same person ought to dress differently for a marriage feast and for a burial.

Nothing is more intimately related to a man, than his sentiments, words, and actions; and therefore we require here the strictest conformity. When we find what we thus require, we have a lively sense of propriety: when we find the contrary, our sense of impropriety is not less lively. Hence the universal distaste of affectation, which consists in making a show of greater delicacy and refinement than is suited either to the character or circumstance of the person.

Congruity and propriety, wherever perceived, appear agreeable; and every agreeable object produces in the mind a pleasant emotion: incongruity and impropriety, on the other hand, are disagreeable; and of course produce painful emotions. These emotions, whether pleasant or painful, sometimes vanish without any consequence; but more frequently occasion other emotions, which we proceed to exemplify.

When any slight incongruity is perceived in an accidental combination of persons or things, as of passengers in a stage-coach, or of individuals dining at an ordinary; the painful emotion of incongruity, after a momentary existence, vanisheth without producing any effect. But this is not the case of propriety and impropriety: voluntary acts, whether words or deeds, are imputed to the author; when proper, we reward him with our esteem; when improper, we punish him with our contempt. Let us suppose, for example, a generous action suited to the character of the author, which raises in him and in every spectator the pleasant emotion of propriety; this emotion generates in the author both self-esteem and joy, the former when he considers his relation to the action, and the latter when he considers the good opinion that others will entertain of him: the same emotion of propriety produceth in the spectators esteem for the author of the action: and when they think of themselves, it also produceth, by means of contrast, an emotion of humility. To discover the effects of an unsuitable action, we must invert each of these circumstances: the painful emotion of impropriety generates in the author of the action both humility and shame; the former when he considers his relation to the action, and the latter when he considers what others will think of him: the same emotion of impropriety produceth in the spectators contempt for the author of the action; and it also produceth, by means of contrast, when they think of themselves, an emotion of self-esteem. Here then are many different emotions, derived from the same action, considered in different views by different persons; a machine provided with many springs, and not a little complicated. Propriety of action, it would seem, is a chief favourite of nature, when such care and solicitude is bestowed upon it. It is not left to our own choice; but, like justice, is required at our hands; and, like justice, is enforced by natural rewards and punishments: a man cannot, with impunity, do any thing unbecoming or improper; he suffers the chastisement of contempt inflicted by others, and of shame inflicted by himself. An apparatus so complicated, and so singular, ought to rouse our attention: for nature doth nothing in vain; and we may conclude with great certainty, that this curious branch of the human constitution is intended for some valuable purpose.

A gross impropriety is punished with contempt and indignation, which are vented against the offender by corresponding external expressions; nor is even the slightest impropriety suffered to pass without some degree of contempt. But there are improprieties, of the slighter kind, that provoke laughter: of which we have examples without end, in the blunders and absurdities of our own species: such improprieties receive a different punishment, as will appear by what follows. The emotions of contempt and of laughter occasioned by an impropriety of this kind, uniting intimately in the mind of the spectator, are expressed externally by a peculiar sort of laugh, termed *a laugh of derision* or *scorn*. An impropriety that thus moves not only contempt, but laughter, is distinguished by the epithet of *ridiculous;* and a laugh of derision or scorn is the punishment provided for it by nature. Nor ought it to escape observation, that we are so fond of inflicting this punishment, as sometimes to exert it even against creatures of an inferior species; witness a turkey-cock swelling with pride, and strutting with displayed feathers; a ridiculous object, which in a gay mood is apt to provoke a laugh of derision.

We must not expect, that these different improprieties are separated by distinct boundaries; for of improprieties, from the slightest to the most gross, from the most risible to the most serious, there are degrees without end. Hence it is, that in viewing some unbecoming actions, too risible for anger, and too serious for derision, the spectator feels a sort of mixt emotion, partaking both of derision and of anger; which accounts for an expression, common with respect to the impropriety of some actions, that we know not whether to laugh or be angry.

It cannot fail to be observed, that in the case of a risible impropriety, which is always slight, the contempt we have for the offender is extremely faint, though derision, its gratification, is extremely pleasant. This disproportion between a passion and its gratification, seems not conformable to the analogy of nature. In looking about for a solution, we must reflect upon what is laid down above, that an improper action not only moves our contempt for the author, but also, by means of contrast, swells the good opinion we have of ourselves. This contributes, more than any other article, to the pleasure we have in ridiculing follies and absurdities; and accordingly, it is well known, that they who put the greatest value upon themselves are the most prone to laugh at others. Pride, which is a vivid passion, pleasant in itself, and not less so in its gratification, would singly be sufficient to account for the pleasure of ridicule, without borrowing any aid from contempt. Hence appears the reason of a noted observation, That we are the most disposed to ridicule the

the blunders and abſurdities of others, when we are in high ſpirits; for in high ſpirits, ſelf-conceit diſplays itſelf with more than ordinary vigour.

With regard to the final cauſes of congruity and impropriety; one regarding congruity, is pretty obvious, that the ſenſe of congruity, as one principle of the fine arts, contributes in a remarkable degree to our entertainment. Congruity, indeed, with reſpect to quantity coincides with proportion: when the parts of a building are nicely adjuſted to each other, it may be ſaid indifferently, that it is agreeable by the congruity of its parts, or by the proportion of its parts. But propriety, which regards voluntary agents only, can never be the ſame with proportion, a very long noſe is diſproportioned, but cannot be termed *improper*. In ſome inſtances, it is true, impropriety coincides with diſproportion in the ſame ſubject, but never in the ſame reſpect; for example, a very little man buckled to a long toledo: conſidering the man and the ſword with reſpect to ſize, we perceive a diſproportion; conſidering the ſword as the choice of the man, we perceive an impropriety.

The ſenſe of impropriety with reſpect to miſtakes, blunders, and abſurdities, is happily contrived for the good of mankind. In the ſpectators, it is productive of mirth and laughter, excellent recreation in an interval from buſineſs. But this is a trifle in reſpect of what follows. It is painful to be the ſubject of ridicule; and to puniſh with ridicule the man who is guilty of an abſurdity, tends to put him more upon his guard in time coming. Thus even the moſt innocent blunder is not committed with impunity; becauſe, were errors licenſed where they do not hurt, inattention would grow into a habit, and be the occaſion of much hurt.

The final cauſe of propriety as to moral duties, is of all the moſt illuſtrious. To have a juſt notion of it, the moral duties that reſpect others muſt be diſtinguiſhed from thoſe that reſpect ourſelves. Fidelity, gratitude, and the forbearing injury, are examples of the firſt ſort; temperance, modeſty, firmneſs of mind, are examples of the other: the former are made duties by the ſenſe of juſtice; the latter by the ſenſe of propriety. Here is a final cauſe of the ſenſe of propriety, that muſt rouſe our attention. It is undoubtedly the intereſt of every man, to ſuit his behaviour to the dignity of his nature, and to the ſtation allotted him by Providence; for ſuch rational conduct contributes in every reſpect to happineſs, by preſerving health, by procuring plenty, by gaining the eſteem of others, and, which of all is the greateſt bleſſing, by gaining a juſtly-founded ſelf-eſteem. But in a matter ſo eſſential to our well-being, even ſelf-intereſt is not relied on: the powerful authority of duty is ſuperadded to the motive of intereſt. The God of nature, in all things eſſential to our happineſs, hath obſerved one uniform method; to keep us ſteady in our conduct, he hath fortified us with natural laws and principles, which prevent many aberrations, that would daily happen were we totally ſurrendered to ſo fallible a guide as human reaſon. Propriety cannot rightly be conſidered in another light, than as the natural law that regulates our conduct with reſpect to ourſelves; as juſtice is the natural law that regulates our conduct with reſpect to others. We call propriety a law, not leſs than juſtice; becauſe both are equally rules of conduct that ought to be obeyed: propriety includes this obligation; for to ſay an action is proper, is, in other words, to ſay, that it *ought* to be performed; and to ſay it is improper, is, in other words, to ſay that it ought to be forborne. It is this very character of *ought* and *ſhould* that makes juſtice a law to us; and the ſame character is applicable to propriety, though perhaps more faintly than to juſtice: but the difference is in degree only, not in kind; and we ought, without heſitation or reluctance, to ſubmit equally to the government of both.

But it muſt, in the next place, be obſerved, that to the ſenſe of propriety, as well as of juſtice, are annexed the ſanctions of rewards and puniſhments; which evidently prove the one to be a law as well as the other. The ſatisfaction a man hath in doing his duty, joined with the eſteem and good will of others, is the reward that belongs to both equally. The puniſhments alſo, though not the ſame, are nearly allied; and differ in degree more than in quality. Diſobedience to the law of juſtice, is puniſhed with remorſe; diſobedience to the law of propriety, with ſhame, which is remorſe in a lower degree. Every tranſgreſſion of the law of juſtice raiſes indignation in the beholder; and ſo doth every flagrant tranſgreſſion of the law of propriety. Slighter improprieties receive a milder puniſhment: they are always rebuked with ſome degree of contempt, and frequently with deriſion. In general, it is true, that the rewards and puniſhments annexed to the ſenſe of propriety, are ſlighter in degree than thoſe annexed to the ſenſe of juſtice: which is wiſely ordered, becauſe duty to others is ſtill more eſſential to ſociety than duty to ourſelves; for ſociety could not ſubſiſt a moment were individuals not protected from the headſtrong and turbulent paſſion of their neighbours.

CONI, a ſtrong town of Italy in Piedmont, and capital of a territory of that name, with a good citadel. The town being divided into two factions, it ſurrendered to the French in 1641; but was reſtored to the duke of Savoy ſoon after. It is ſeated at the confluence of the rivers Greſſe and Sture. Its trade is conſiderable, being the repoſitory of all merchandiſe from Turin and Nice, deſigned for Lombardy, Switzerland, and Germany. It contains about 10,000 people beſides the garriſon. It was taken by the French in April 1796. E. Long. 7. 45. N. Lat. 44. 30.

CONIC SECTIONS.

INTRODUCTION.

IN treating of ſo conſiderable a branch of the mathematical ſciences as the Conic Sections, it would be improper to paſs over in total ſilence the hiſtory of thoſe remarkable curves. But this topic will not require any long detail. None of the works of the more early Greek geometers have reached our time; nor have we any work of antiquity profeſſedly written on the ſubject of our inquiry. Our curioſity muſt therefore reſt ſatisfied with the knowledge of a few incidental notices and facts, gleaned from different authors.

The diſcovery of the conic ſections ſeems to have originated in the ſchool of *Plato*, in which geometry was highly reſpected, and much cultivated. It is probable that the followers of that philoſopher were led to the diſcovery of theſe curves, and to the inveſtigation of many of their properties, in ſeeking to reſolve the two famous problems of the duplication of the cube, and the triſection of an angle, for which the artifices of the ordinary or plane geometry were inſufficient. Two ſolutions of the former problem, by the help of the conic ſections, are preſerved by *Eutocias* *, and are attributed by him to *Menæchmus*, the ſcholar of *Eudoxus*, who lived not much poſterior to the time of Plato: and this circumſtance, added to a few words in an epigram of *Eratoſthenes* †, has been thought ſufficient authority, by ſome authors, to aſcribe the honour of the diſcovery of the conic ſections to *Menæchmus*. We may at leaſt infer that, at this epoch, geometers had made ſome progreſs in developing the properties of theſe curves.

The writings of *Archimedes* that have reached us explicitly ſhew, that the geometers before his time had advanced a great length in inveſtigating the properties of the conic ſections. This author expreſsly mentions many principal propoſitions to have been demonſtrated by preceding writers; and he often refers to properties of the conic ſections, as truths commonly divulged, and known to mathematicians. His own diſcoveries in this branch of ſcience are worthy of the moſt profound and inventive genius of antiquity. In the quadrature of the parabola he gave the firſt, and the moſt remarkable inſtance that has yet been diſcovered, of the exact equality of a curvilineal to a rectilineal ſpace. He determined the proportion of the elliptic ſpaces to the circle; and he invented many propoſitions reſpecting the menſuration of the ſolids formed by the revolution of the conic ſections about their axes.

It is chiefly from the writings of *Apollonius* of Perga, a town in Pamphylia, on the ſubject of the conic ſections, that we know how far the ancient mathematicians carried their ſpeculations concerning theſe curves. *Apollonius* flouriſhed under *Ptolemy Philopator*, about forty years later than *Archimedes*. He formed his taſte for geometry, and acquired that ſuperior ſkill in the ſcience to which he is indebted for his fame, in the ſchool of Alexandria, under the ſucceſſors of *Euclid*. Beſides his great work on the conic ſections, he was the author of many ſmaller treatiſes, relating chiefly to the geometrical analyſis, the originals of which have all periſhed, and are only known to modern mathematicians by the account given of them by *Pappus* of Alexandria, in the ſeventh book of his *Mathematical Collections*.

The work of *Apollonius* on the conic ſections, written in eight books, was held in ſuch high eſtimation by the ancients, as to procure for him the name of the Great Geometer. The firſt four books of this treatiſe only have come down to us in the original Greek. It is the purpoſe of theſe four books, as we are informed in the prefatory epiſtle to *Eudemus*, to deliver the elements of the ſcience; and in this part of his labour, the author claims no farther merit than that of having collected, amplified, and reduced to order, the diſcoveries of preceding mathematicians. One improvement introduced by Apollonius is too remarkable to be paſſed over without notice. The geometers who preceded him derived each curve from a *right cone*, which they conceived to be cut by a plane perpendicular to its ſlant ſide. It will readily be perceived, from what is ſhewn in the firſt ſection of the fourth part of the following treatiſe, that the ſection would be a parabola when the vertical angle of the cone was a right angle; an ellipſe when it was acute; and a hyperbola when it was obtuſe. Thus each curve was derived from a different ſort of cone. *Apollonius* was the firſt to ſhew that all the curves are produced from any ſort of cone, whether right or oblique, according to the different inclinations of the cutting plane. This fact is one remarkable inſtance of the adherence of the mind to its firſt conceptions, and of the ſlowneſs and difficulty with which it generalizes.

The original of the firſt four books of the treatiſe of *Apollonius* is loſt; nor is it eaſy to aſcertain in what age it diſappeared. In the year 1658 *Borelli* diſcovered at Florence an Arabic manuſcript, entitled *Apollonii Pergæi Conicorum Libri Octo*. By the liberality of the *Duke of Tuſcany* he was permitted to carry the manuſcript to Rome, and, with the aid of an Arabic ſcholar, *Abraham Ecchellenſis*, he publiſhed in 1661 a Latin tranſlation of it. The manuſcript, although from its title it was expected to be a complete tranſlation of all the eight books, was yet found to contain only the firſt ſeven books: and it is remarkable, that another manuſcript, brought from the eaſt by *Golius*, the learned profeſſor of Leyden, ſo early as 1664, as well as a third, of which *Ravius* publiſhed a tranſlation in 1669, have the ſame defect: all the three manuſcripts agreeing in the want of the eighth book, we may now conſider that part of the work of *Apollonius* as irrecoverably loſt. Fortunately, in the *Collectiones Mathematicæ* of *Pappus*, in whoſe time the entire treatiſe of *Apollonius* was extant, there is preſerved

* In [illegible]ch. lib. le Sph. Cyl.

† Ibi[illegible]

served some account of the subjects treated in each book, and all the *Lemmata* required in the investigations of the propositions they contain. *Dr Halley*, who in 1710 gave a correct edition of the Conics of *Apollonius*, guided in his researches by the lights derived from *Pappus*, has restored the eighth book with so much ability as to leave little room to regret the original.

The four last books of the Conics of *Apollonius*, containing the higher or more recondite parts of the science, are generally supposed to be the fruit of the author's own researches; and they do much honour to the geometrical skill and invention of the Great Geometer. Even in our times the whole treatise must be regarded as a very extensive, if not a complete work on the conic sections. Modern mathematicians make important applications of these curves, with which the ancients were unacquainted; and they have been thus led to consider the subject in particular points of view, suited to their purposes; but they have made few discoveries, of which there are not some traces to be found in the work of the illustrious ancient.

The geometers who followed *Apollonius* seem to have contented themselves with the humble task of commenting on his treatise, and of rendering it of more easy access to the bulk of mathematicians. Till about the middle of the 16th century, the history of this branch of mathematical science presents nothing remarkable. The study of it was then revived; and since that time this part of mathematics has been more cultivated, or has been illustrated by a greater variety of ingenious writings.

Among the ancients, the study of the conic sections was a subject of pure intellectual speculation. The applications of the properties of these curves in natural philosophy have, in modern times, given to this part of the mathematics a degree of importance that it did not formerly possess. That which, in former times, might be considered as interesting only to the learned theorist and profound mathematician, is now a necessary attainment to him who would not be ignorant of those discoveries in nature, that do the greatest honour to the present age.

It is curious to remark the progress of discovery, and the connexion that subsists between the different branches of human knowledge; and it excites some degree of admiration to reflect, that the astronomical discoveries of *Kepler*, and the sublime theory of *Newton*, depend on the seemingly barren speculations of Greek geometers concerning the sections of the cone.

Apollonius, and all the writers on conic sections before *Dr Wallis*, derived the elementary properties of the curves from the nature of the cone. In the second part of his treatise *De Sectionibus Conicis*, published in 1665, Dr Wallis laid aside the consideration of the cone, deriving the properties of the curves from a description *in plano*. Since his time authors have been much divided as to the best method of defining those curves, and demonstrating their elementary properties; many of them preferring that of the ancient geometers, while others, and some of great note, have followed the example of *Dr Wallis*.

In support of the innovation made by *Dr Wallis*, it is urged, that in the ancient manner of treating the conic sections, young students are perplexed, and discouraged by the previous matter to be learnt respecting the generation and properties of the cone; and that they find it no easy matter to conceive steadily, and to understand diagrams rendered confused by lines drawn in different planes: all which difficulties are avoided by defining the curves *in plano* from one of their essential properties. It is not our intention particularly to discuss this point; and we have only to add, that, in the following treatise, we have chosen to deduce the properties of the conic sections from their description *in plano*, as better adapted to the nature of a work designed for general readers.

A geometrical treatise on the conic sections must necessarily be founded upon the elements of geometry. As *Euclid's* Elements of Geometry are generally studied, and in every one's hands, we have chosen to refer to it in the demonstrations. The edition we have used is that published by Professor Playfair of Edinburgh. Although the references are made to Euclid's Elements, yet they will also apply to the treatise on GEOMETRY given in this Work; for a table is there given, indicating the particular proposition of our treatise that corresponds to each of the most material propositions in Euclid's Elements.

The references are to be thus understood: (20. 1. E.) means the 20th prop. of the 1st book of *Euclid's* Elements: (2 cor. 20. 6. E.) means the 2d corollary to the 20th prop. of the sixth book of the same work; and so of others. Again, (7.) means the seventh proposition of that PART of the following treatise in which such reference happens to occur: (cor. 1.) means the corollary to the first proposition: (2 cor. 3.) means the 2d corollary to the third proposition, &c.—such references being all made to the propositions in the division of the treatise in which they are found.

PART I. OF THE PARABOLA.

DEFINITIONS.

Plate CLVI. Fig. 1.

I. If a straight line BC, and a point without it F, be given by position in a plane, and a point D be supposed to move in such a manner that DF, its distance from the given point, is equal to DB, its distance from the given line, the point D will describe a line DAD, called a *Parabola*.

COROLLARY. The lines DF, DB, may become greater than any given line; therefore the parabola extends to a greater distance from the point F, and the line BC, than any that can be assigned.

II. The straight line BC, which is given by position, is called the *Directrix of the Parabola*.

III. The given point F is called the *Focus*.

IV. A straight line perpendicular to the directrix, terminated at one extremity by the parabola, and produced indefinitely within it, is called a *Diameter*.

V. The point in which a diameter meets the parabola is called its *Vertex*.

VI. The

VI. The diameter which passes through the focus is called the *Axis of the parabola;* and the vertex of the axis is called the *Principal Vertex.*

Cor. A perpendicular drawn from the focus to the directrix is bisected at the vertex of the axis.

VII. A straight line terminated both ways by the parabola, and bisected by a diameter, is called an *Ordinate to that diameter.*

VIII. The segment of a diameter between its vertex, and an ordinate, is called an *Abscis.*

IX. A straight line quadruple the distance between the vertex of a diameter and the directrix, is called the *Parameter*, also the *Latus Rectum of that diameter.*

X. A straight line meeting the parabola only in one point, and which everywhere else falls without it, is said to *touch* the parabola at that point, and is called a *Tangent to the parabola.*

Proposition I.

The distance of any point without the parabola from the focus is greater than its distance from the directrix; and the distance of any point within the parabola from the focus is less than its distance from the directrix.

Fig. 2. Let DA*d* be a parabola, of which F is the focus, GC the directrix, and P a point without the curve, that is, on the same side of the curve with the directrix; PF, a line drawn to the focus, will be greater than PG, a perpendicular to the directrix. For, as PF must necessarily cut the curve, let D be the point of intersection; draw DB perpendicular to the directrix, and join PB. Because D is a point in the parabola, DB=DF (Definition 1.), therefore PF=PD+DB; but PD+DB is greater than PB (20. 1. E.), and therefore still greater than PG (19. 1. E.), therefore PF is greater than PG.

Again, let Q be a point within the parabola, QF, a line drawn to the focus, is less than QB, a perpendicular to the directrix. The perpendicular QB necessarily cuts the curve; let D be the point of intersection; join DF. Then DF=DB (Def. 1.), and QD+DF=QB; but QF is less than QD+DF, therefore QF is less than QB.

Corollary. A point is without or within the parabola, according as its distance from the focus is greater or less than its distance from the directrix.

Prop. II.

Every straight line perpendicular to the directrix meets the parabola, and every diameter falls wholly within it.

Fig. 2. Let the straight line BQ be perpendicular to the directrix at B, BQ shall meet the parabola. Draw BF to the focus, and make the angle BFP equal to FBQ; then, because QBC is a right angle, QBF and PFB are each less than a right angle, therefore QB and PF intersect each other; let D be the point of intersection, then DB=DF (5. 1. E.); therefore, D is a point in the parabola. Again, the diameter DQ falls wholly within the parabola; for take Q any point in the diameter, and draw FQ to the focus, then QB or QD+DF is greater than QF, therefore Q is within the parabola (Cor. 1.).

Cor. The parabola continually recedes from the axis, and a point may be found in the curve that shall be at a greater distance from the axis than any assigned line.

Prop. III.

The straight line which bisects the angle contained by two straight lines drawn from any point in the parabola, the one to the focus, and the other perpendicular to the directrix, is a tangent to the curve in that point.

Fig. 3. Let D be any point in the curve; let DF be drawn to the focus, and DB perpendicular to the directrix; the straight line DE, which bisects the angle FDB, is a tangent to the curve. Join BF meeting DE in I, take H any other point in DE, join HF, HB, and draw HG perpendicular to the directrix. Because DF=DB, and DI is common to the triangles DFI, DBI, and the angles FDI, BDI, are equal, these triangles are equal, and FI=IB, and hence FH=HB (4. 1. E.): but HB is greater than HG (19. 1. E.); therefore the distance of the point H from the focus is greater than its distance from the directrix, hence that point is without the parabola (Cor. 1.), and therefore HDI is a tangent to the curve at D (Def. 10.).

Fig. 4. Cor. 1. There cannot be more than one tangent to the parabola at the same point. For let any other line DK, except a diameter, be drawn through D; draw FK perpendicular to DK; on D for a centre, with a radius equal to DB, or DF, describe a circle, cutting FK in N; draw NL parallel to the axis, meeting DK in L, and join FL. Then FK=KN (3. 3. E.) and therefore FL=LN. Now BD being perpendicular to the directrix, the circle FBN touches the directrix at B (16. 3. E.); and hence N, any other point in the circumference, is without the directrix, and on the same side of it as the parabola, therefore the point L is nearer to the focus than to the directrix, and consequently is within the parabola.

Fig. 3. Cor. 2. A perpendicular to the axis at its vertex is a tangent to the curve. Let AM be perpendicular to the axis at the vertex A, then RS, the distance of any point in AM from the directrix, is equal to CA, that is to AF, and therefore is less than RF, the distance of the same point from the focus.

Cor. 3. A straight line drawn from the focus of a parabola perpendicular to a tangent, and produced to meet the directrix, is bisected by the tangent. For it has been shewn that FB, which is perpendicular to the tangent DI, is bisected at I.

Fig. 3. Cor. 4. A tangent to the parabola makes equal angles with the diameter which passes through the point of contact, and a straight line drawn from that point to the focus. For BD being produced to Q, DQ is a diameter, and the angle HDQ is equal to BDE, that is, to EDF.

Cor. 5. The axis is the only diameter which is perpendicular to a tangent at its vertex. For the angle HDQ, or BDE, is the half of BDF, and therefore less than a right angle, except when BD and DF lie in

Of the Parabola.

in a ſtraight line, which happens when D falls at the vertex.

Scholium.

From the property of tangents to the parabola demonſtrated in Cor. 4. the point F takes the name of the *Focus*. For rays of light proceeding parallel to the axis of a parabola, and falling upon a poliſhed ſurface whoſe figure is that produced by the revolution of the parabola about its axis, are reflected to the focus.

Prop. IV.

A ſtraight line drawn from the focus of a parabola to the interſection of two tangents to the curve, will make equal angles with ſtraight lines drawn from the focus to the points of contact.

Fig. 5.

Let HP, Hp be tangents to a parabola at the points P, p; let a ſtraight line be drawn from H, their interſection, to F the focus, and let FP, Fp be drawn to the points of contact, the lines PF and pF make equal angles with HF.

Draw PK, pk perpendicular to the directrix; join HK, Hk, join alſo FK, Fk, meeting the tangents in G and g. The triangles FPH, KPH have PF equal to PK, and PH common to both, alſo the angle FPH equal to KPH (3.), therefore FH is equal to KH, and the angle HFP is equal to the angle HKP. In like manner it may be ſhewn that FH is equal to kH, and that the angle HFp is equal to the angle Hkp; therefore HK is equal to Hk, and hence the angle HKk is equal to HkK: now the angles PKk, pkK are right angles, therefore the angle HKP is equal to Hkp; but theſe angles have been ſhewn to be equal to HFP and HFp reſpectively, therefore the lines PF and pF make equal angles with HF.

Prop. V.

Two tangents to a parabola, which are limited by their mutual interſection and the points in which they touch the curve, are to each other reciprocally as the ſines of the angles they contain with ſtraight lines drawn from the points of contact to the focus.

Fig. 6.

Let HP, Hp, which interſect each other at H, be tangents to a parabola at the points P, p; and let PF, pF be drawn to the focus: then

HP : Hp :: ſine HpF : ſine HPF.

Join HF; and in FP take FQ equal to Fp, and join HQ; then, the angles at F being equal (4.), the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to HpF. Now, in the triangle HPQ,

HP : HQ :: ſine HQP or ſine HQF : ſine HPF (by Trigon.)

therefore HP : Hp :: ſine HpF : ſine HPF.

Prop. VI.

Any ſtraight line terminated both ways by a parabola, and parallel to a tangent, is biſected by the diameter that paſſes through the point of contact; or is an ordinate to that diameter.

Of the Parabola. Fig. 7.

The ſtraight line Dd, terminated by the parabola, and parallel to the tangent HPh, is biſected at E by PE the diameter that paſſes through P the point of contact.

Let KD, Kd, tangents at the points D, d, meet the tangent at the vertex in H and h; draw DL, dl, parallel to EP, meeting Hh in L and l, and draw DF, dF, PF to the focus.

Becauſe Hh is parallel to Dd,

HD : hd :: KD : Kd.

But KD, Kd being tangents to the parabola,

Sine hdF : ſine HDF :: KD : Kd (5.),

Therefore, ſine hdF : ſine HDF :: HD : hd;

Now ſine hPF : ſine hdF :: hd : hP (5.),

Therefore, (23. 5. E.) ſine hPF : ſine HDF :: HD : hP; but ſine HPF, or ſine hPF : ſine HDF :: HD : HP, therefore the ratio of HD to hP is the ſame as that of HD to HP, wherefore HP = Ph.

Again, becauſe the angles HDF and hdF are reſpectively equal to HDL and hdl, (3.)

DH : dh :: ſine hdl : ſine HDL,

Now HL : DH :: ſine HDL : ſine HLD, or ſine hld (by Trigon.)

therefore (23. 5. E.) HL : dh :: ſine hdl : ſine hld :: hl : dh, wherefore HL, and hl, have the ſame ratio to dh, hence HL = hl; and ſince it has been ſhewn that HP = Ph, it follows that LP = Pl, and therefore DE = Ed.

Cor. 1. Straight lines which touch a parabola at the extremities of an ordinate to a diameter interſect each other in that diameter. For Dd and Hh being ſimilarly divided at E and P, the ſtraight line which joins the points E, P, will paſs through K the vertex of the triangle DKd.

Cor. 2. Every ordinate to a diameter is parallel to a tangent at its vertex. For, if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would biſect the ordinate, and thus the ſame line would be biſected in two different points, which is abſurd.

Cor. 3. All the ordinates to the ſame diameter are parallel to each other.

Cor. 4. A ſtraight line that biſects two parallel chords, and terminates in the curve, is a diameter.

Cor. 5. The ordinates to the axis are perpendicular to it, and no other diameter is perpendicular to its ordinates. This is evident from 2 cor. and 5 cor. to Prop. III.

Cor. 6. Hence the axis divides the parabola into two parts which are ſimilar to each other.

Prop. VII.

If a tangent to any point in a parabola meet a diameter, and from the point of contact an ordinate be drawn to that diameter, the ſegment of the diameter between the vertex and the tangent is equal to the ſegment between the vertex and the ordinate.

Fig. 7.

Let DK, a tangent to the curve at D, meet the diameter EP in K, and let DEd be an ordinate to that diameter, PK is equal to PE.

Through P, the vertex of the diameter, draw the tangent PH, meeting KD in H; draw DL parallel to EP, meeting PH in L, and draw DF, PF to the focus: then

PH

PH : HD :: sine HDF : sine HPF (5.)
But the angle HDF is equal to HDL, and HPF is equal to HPK (3.), that is (because of the parallel lines DL, PK) to HLD, therefore

PH : HD :: sine HDL : sine HLD :: HL : HD, wherefore PH=HL, and consequently PK=DL; but PL is parallel to DE, by last proposition, and therefore DL=PE, therefore PK=PE.

PROP. VIII.

If an ordinate to any diameter pass through the focus, the abscis is equal to one-fourth of the parameter of that diameter, and the ordinate is equal to the whole parameter.

LET DE*d*, a straight line passing through the focus, be an ordinate to the diameter PE; the abscis PE is equal to $\frac{1}{4}$ the parameter, and the ordinate D*d* is equal to the whole parameter of the diameter PE.

Let DK, PI be tangents at D and P; let DK meet the diameter in K; draw PF to the focus, and DL parallel to EP. The angles KPI, IPF being equal (3.), and PI parallel to EF (2 cor. 6.), the angles PEF, PFE are also equal (29. 1. E.), and PE=PF=$\frac{1}{4}$ the parameter (Def. 9. and Def. 1.). Again, the angle KDE is equal to LDK (3.), and therefore equal to DKE; consequently ED is equal to EK, or to twice EP (7.): therefore D *d* is equal to 4 EP, or to 4 PF, that is, to the parameter of the diameter.

PROP. IX.

If any two diameters of a parabola be produced to meet a tangent to the curve, the segments of the diameters between their vertices and the tangent are to one another as the squares of the segments of the tangent intercepted between each diameter and the point of contact.

LET QH, RK, any two diameters, be produced to meet PI, a tangent to the curve at P, in the points G, I; then

HG : KI :: $PG^2 : PI^2$.

Let PN, a semi-ordinate to the diameter HQ, meet KR in O, and let PR, a semi-ordinate to the diameter KO, meet HN in R; from H draw parallels to NO and QR, meeting KR in L and M, thus HL is a tangent to the curve, and HM a semi-ordinate to KR.

Now KI=KR, and KL=KM (7.)
Therefore, by subtraction, LI=MR=HQ,
But LO=HN=HG (7.)
Therefore by addition, IO=GQ.

The triangles PGN, PIO, are similar, as also PGQ, PIR,

Therefore GN : IO, or 2 GH : IO :: PG : PI,
And GQ : IR, or IO : 2 IK :: PG : PI,

Hence, taking the rectangles of the corresponding terms,

2 GH · IO : 2IO · IK :: $PG^2 : PI^2$
Therefore GH : IK :: PG^2 PI^2.

COR. The squares of semi-ordinates, and of ordinates to any diameter, are to one another as their corresponding abscisses. Let HE*h*, KN*k* be ordinates to the diameter PN; draw PG a tangent to the ourve at the vertex of the diameter, and complete the parallelograms PEHG, PNKI; then PG, PI are equal to EH, NK, and GH, IK to PE, PN, respectively; therefore $HE^2 : KN^2$ :: PE :: PN.

PROP. X.

If an ordinate be drawn to any diameter of a parabola, the rectangle under the abscis and the parameter of the diameter is equal to the square of the semi-ordinate.

LET HB *h* be an ordinate to the diameter PK, the rectangle contained by PB and the parameter of the diameter is equal to the square of HB, the semi-ordinate.

Let DE*d* be that ordinate to the diameter which passes through the focus. The semi-ordinates DE, E*d* are each half of the parameter, and the abscis EP is one-fourth of the parameter (8.),

Therefore D *d* : DE :: DE : PE,
and D *d* · PE=DE^2,
But D*d*·PE : D*d*·PB, or PE : PB :: $DE^2 : HB^2$ (cor. 9.),
Therefore D*d*· PB=HB^2.

SCHOLIUM.

It was on account of the equality of the square of the semi-ordinate to a rectangle contained by the parameter of the diameter and the abscis, that Apollonius called the curve line to which the property belonged a *Parabola*.

PROP. XI.

A straight line drawn from the focus of a parabola, perpendicular to a tangent, is a mean proportional between the straight line drawn from the focus to the point of contact, and one-fourth the parameter of the axis.

Let FB be a perpendicular from the focus upon the tangent PB, and FP a straight line drawn to the point of contact; let A be the principal vertex, and therefore FA equal to one-fourth of the parameter of the axis; FB is a mean proportional between FP and FA.

Produce FB and FA to meet the directrix in D and C, and join AB. The lines FC, FD are bisected at A and B (3 cor. 3.), therefore (2. 6. E.) AB is parallel to CD, or perpendicular to CF, and consequently a tangent to the curve at A (2 cor. 3.); now BP is a tangent at P, therefore the angle AFB is equal to BFP (4.), and since the angles FAB, FBP are right angles, the triangles FAB, FBP are equiangular; hence

FP : FB :: FB : FA.

COR. 1. The common intersection of a tangent, and a perpendicular from the focus to the tangent, is in a straight line touching the parabola at its vertex.

COR. 2. If PH be drawn perpendicular to the tangent meeting the axis in H, and HK be drawn perpendicular to PF, PK shall be equal to half the parameter of the axis. For the triangles HPK, FBP are manifestly equiangular, therefore

HP : PK :: PF : FB :: FB : FA :: FD : FC,

But

Of the Parabola.

But if PD be joined, the line PD is evidently perpendicular to the directrix (3.), therefore the figure HPDF is a parallelogram, and HP=FD, therefore PK=FC=half the parameter of the axis.

Prop. XII.

If any ordinate and abscis of a parabola be completed into a parallelogram, the area of the parabola, included between the ordinate and the curve, is two thirds of the parallelogram.

Fig. 12.

Let AN be any diameter of a parabola, and PQ an ordinate to that diameter. Let BC be drawn through A, parallel to PQ, and let PB, QC be drawn parallel to NA; the area comprehended by the curve line PAQ and ordinate PQ is two thirds of the parallelogram PBCQ. Join PA, QA, and draw the tangents PT, QT, meeting the diameter NA in T, and BC in E and G; through E and G draw the diameters EFD, GHK, which will bisect PA, QA in D and K, (1 cor. 6.) and through F and H, the vertices, draw the tangents RL, MV; join PF, AF, also QH, AH. Because NA=AT (7.) and therefore PQ=2 EG, the triangle PAQ is double the triangle ETG. For the same reason the triangles PFA, QHA are double the triangles REL, VGM respectively, therefore the inscribed figure PFAHQ is double the external figure TRLMV. If diameters were drawn through the points R, L, M, V, and straight lines were drawn joining the vertices of every two adjacent diameters, also tangents at the vertices of the diameters which pass through the points R, L, M, V, there would thus be inscribed in the parabola a new figure which would have the same base PQ, as the former, but the number of the remaining sides double that of the former; and corresponding to it there would be a new external figure formed by the tangents at the vertices of the diameters, but still the same proportion between the two figures would hold, or the former would be double the latter, and this would evidently be the case, if the operation of inscribing and circumscribing a new figure were repeated continually. Now it is evident that by thus increasing continually the number of sides of the inscribed figure, it approaches nearer and nearer to the area of the parabola, which is its limit; also that the external figure approaches to the area contained by the two tangents TP, TQ and the parabolic arch PAQ, which space is its limit; and since the limits of any two quantities which have a constant ratio must have the same proportion to each other as the quantities themselves, the area contained by the parabolic arch PAQ and the ordinate PQ must be double the area contained by the same arch and the two tangents TP, TQ, and therefore must be two thirds of the area of the triangle TPQ, which triangle is evidently equal to the parallelogram PBCQ.

Prop. XIII. Problem.

The directrix and focus of a parabola being given by position, to describe the parabola.

First Method. By Mechanical Description.

Fig. 13.

Let AB be the given directrix, and F the focus. Place the edge of the ruler ABKH along the directrix AB, and keep it fixed in that position. Let LCG be another ruler of such a form that the part LC may slide along AB the edge of the fixed ruler ABKH, and the part CG may have its edge CD constantly perpendicular to AB. Let GDF be a string of the same length as GC the edge of the moveable ruler; let one end of the string be fixed at F, and the other fastened to G, a point in the moveable ruler. By means of the pin D let the string be stretched, so that the part of it between G and D may be applied close to the edge of the moveable ruler, while, at the same time, the ruler slides along AB the edge of the fixed ruler; the pin D will thus be constrained to move along CG the edge of the ruler, and its point will trace upon the plane in which the directrix and focus are situated a curve line DE, which is the parabola required. For the string GDF being equal in length to GDC, if GD be taken from both, there remains DF equal to DC; that is, the distance of the moving point D from the focus is equal to its distance from the directrix, therefore the point D describes a parabola.

Second Method. By finding any number of points in the curve.

Fig. 14.

Through the focus F draw EFC perpendicular to the directrix, and EC will be the axis. Draw any straight line HE*h* parallel to the directrix, meeting the axis in E any point below the vertex; and on F as a centre, with a radius equal to CE, describe a circle cutting H*h* in D and *d*; these will be points in the parabola required, as is sufficiently evident.

Prop. XIV. Problem.

A parabola being given by position, to find its directrix and focus.

Fig. 15.

Let DP*d* be the given parabola; draw any two parallel chords D*d*, E*e*, and bisect them at H and K; join KH, meeting the parabola in P, the straight line PHK is the diameter (4 cor. 6.) the point P is its vertex, and D*d*, E*e* are ordinates to it. In HP produced take PL equal to one fourth part of a third proportional to PH and HD, and draw LN perpendicular to PL, the line LN will evidently be the directrix (10. & Def. 9.). Draw PM parallel to the ordinates to the diameter PK, then PM will be a tangent to the curve at P (2 cor. 6.). Draw LM perpendicular to PM, and take MF=ML, and the point F will be the focus of the parabola (3 cor. 3.).

PART

PART II. OF THE ELLIPSE.

Definitions.

I. If two points F and f be given in a plane, and a point D be conceived to move around them in such a manner that $Df+DF$, the sum of its distances from them, is always the same, the point D will describe upon the plane a line ABab, which is called an *Ellipse*.

II. The given points F, f are called the *Foci* of the ellipse.

III. The point C, which bisects the straight line between the foci, is called the *Centre*.

IV. The distance of either focus from the centre is called the *Excentricity*.

V. A straight line passing through the centre, and terminated both ways by the ellipse, is called a *Diameter*.

VI. The extremities of a diameter are called its *Vertices*.

VII. The diameter which passes through the foci is called the *Transverse Axis*, also the *Greater Axis*.

VIII. The diameter which is perpendicular to the transverse axis is called the *Conjugate Axis*, also the *Lesser Axis*.

IX. Any straight line not passing through the centre, but terminated both ways by the ellipse, and bisected by a diameter, is called an *Ordinate* to that diameter.

X. Each of the segments of a diameter intercepted between its vertices and an ordinate, is called an *Absciss*.

XI. A straight line which meets the ellipse in one point only, and everywhere else falls without it, is said to *touch* the ellipse in that point, and is called a *Tangent to the ellipse*.

Prop. I.

If from any point in an ellipse two straight lines be drawn to the foci, their sum is equal to the transverse axis.

Let ABab be an ellipse, of which F, f are the foci, and Aa the transverse axis; let D be any point in the curve, and DF, Df lines drawn to the foci, $Df+DF=Aa$,

Because A, a are points in the ellipse,

$$Af+AF=aF+af \text{ (Def. 1.)}$$

therefore $Ff+2AF=Ff+2af$;

$$\text{Hence } 2AF=2af, \text{ and } AF=af,$$
$$\text{and } Af+AF=Af\times af=Aa.$$

But D and A being points in the ellipse,

$$Df+DF=Af+AF,$$
$$\text{therefore } Df+DF=Aa.$$

Cor. 1. The sum of two straight lines drawn from a point without the ellipse to the foci is greater than the transverse axis. And the sum of two straight lines drawn from a point within the ellipse to the foci is less than the transverse axis.

Let PF, Pf be drawn from a point without the ellipse to the foci; let Pf meet the ellipse in D; join FD; then $Pf+PF$ is greater than $Df+DF$ (21. 1. E.), that is, than Aa. Again, let QF, Qf be drawn from a point within the ellipse, let Qf meet the curve in D, and join FD; $Qf+QF$ is less than $Df+DF$ (21. 1. E.), that is, than Aa. Fig. 17.

Cor. 2. A point is without or within the ellipse, according as the sum of two lines drawn from it to the foci is greater or less than the transverse axis.

Cor. 3. The transverse axis is bisected in the centre. Let C be the centre, then $CF=Cf$ (Def. 3.), and $FA=fa$, therefore $CA=Ca$.

Cor. 4. The distance of either extremity of the conjugate axis from either of the foci is equal to half the transverse axis. Let Bb be the conjugate axis; join Fb, fb. Because $CF=Cf$, and Cb is common to the triangles CFb, Cfb, also the angles at C are right angles, these triangles are equal; hence $Fb=fb$, and since $Fb+bf=Aa$, $Fb=AC$.

Cor. 5. The conjugate axis is bisected in the centre. Join fb, fB. By the last corollary $Bf=bf$, therefore the angles fBC, fbC are equal; now fC is common to the triangles fCB, fCb, and the angles at C are right angles, therefore (26. 1. E.) $CB=Cb$.

Prop. II.

Every diameter of an ellipse is bisected in the centre.

Let Pp be a diameter, it is bisected in C. For if Cp be not equal to CP, take CQ equal to CP, and from the points P, p, Q draw lines to F, f the foci. The triangles FCP, fCQ, having $FC=Cf$, $PC=CQ$, and the angles at C equal, are in all respects equal, therefore $FP=fQ$; in like manner it appears that $fP=FQ$, therefore $FQ+fQ$ is equal to $FP+fP$, or, (Def. 1.), to $Fp+fp$, which is absurd (21. 1. E.), therefore $CP=Cp$. Fig. 18.

Cor. 1. Every diameter meets the ellipse in two points only.

Cor. 2. Every diameter divides the ellipse into two parts which are equal and similar, the like parts of the curve being at opposite extremities of the diameter.

Prop. II.

The square of half the conjugate axis of an ellipse is equal to the rectangle contained by the segments into which the transverse axis is divided by either focus.

Draw a straight line from f, either of the foci, to B, either of the extremities of the conjugate axis. Fig 17.

Then $BC^2+Cf^2=Bf^2=Ca^2$ (4 cor. 1.),

But because Aa is bisected at C,

$$Ca^2=Af\cdot fa+Cf^2,$$
$$\text{therefore } BC^2+Cf^2=Af\cdot fa+Cf^2,$$
$$\text{and } BC^2=Af\cdot fa.$$

Prop.

Of the Ellipse.

Prop. IV.

The ſtraight line which biſects the angle adjacent to that which is contained by two ſtraight lines drawn from any point in the ellipſe to the foci is a tangent to the curve in that point.

Fig. 19.

Let D be any point in the curve; let DF, D*f* be ſtraight lines drawn to the foci, the ſtraight line DE which biſects the angle *f*DG adjacent to *f*DF, is a tangent to the curve at D.

Take H any other point in DE, take DG=D*f*, and join H*f*, HF, HG, *f*G; let *f*G meet DE in I. Becauſe D*f*=DG, and DI is common to the triangles D*f*I, DGI and the angles *f*DI, GDI are equal, theſe triangles are equal, and *f*I=IG, and hence *f*H=HG (4. 1. E.), ſo that FH+*f*H=FH+HG; but FH+HG is greater than FG, that is, greater than FD+*f*D or A*a*, therefore FH+*f*H is greater than A*a*, hence the point H is without the ellipſe (2 cor. 1.), and therefore DHI is a tangent to the curve at D (Def. 11.).

Cor. 1. There cannot be more than one tangent at the ſame point. For D is ſuch a point in the line DE that the ſum of DF, D*f*, the diſtances of that point from the foci, is evidently leſs than the ſum of HF, H*f*, the diſtances of H any other point in that line; and if another line KDL be drawn through D, there is in like manner a point K in that line, which will be different from D, ſuch that the ſum of FK, *f*K is leſs than the ſum of the diſtances of any other point in KL, and therefore leſs than FD+*f*D; therefore the point K will be within the ellipſe (2 cor. 1), and the line KL will cut the curve.

Cor. 2. A perpendicular to the tranſverſe axis at either of its extremities is a tangent to the curve. The demonſtration is the ſame as for the propoſition, if it be conſidered that when D falls at either extremity of the axis, the point I falls alſo at the extremity of the axis, and thus the tangent DE, which is always perpendicular to *f*I, is perpendicular to the axis.

Cor. 3. A perpendicular to the conjugate axis at either of its extremities is a tangent to the curve. For the perpendicular evidently biſects the angle adjacent to that which is contained by lines drawn from the extremity to the foci.

Cor. 4. A tangent to the ellipſe makes equal angles with ſtraight lines drawn from the point of contact to the foci. For the angle *f*DE being equal to GDE, is alſo equal to FDM, which is vertical to GDE.

Scholium.

From the property of the ellipſe, which forms this laſt corollary, the points F and *f* take the name of *Foci*. For writers on optics ſhew that if a poliſhed ſurface be formed, whoſe figure is that produced by the revolution of an ellipſe about its tranſverſe axis, rays of light which flow from one focus, and fall upon that ſurface, are reflected to the other focus, ſo that if a luminous point be placed in one focus, there is formed by reflection an image of it in the other focus.

Prop. V.

The tangents at the vertices of any diameter of an ellipſe are parallel.

Fig. 18.

Let P*p* be a diameter, HPK, *hpk* tangents at its vertices; draw ſtraight lines from P and *p* to F and *f* the foci. The triangles FCP, *f*C*p*, having FC=*fc*, CP=C*p* (2), and the angles at C equal, are in all reſpects equal; and becauſe the angle FPC is equal to C*pf*, FP is parallel to *fp* (27. 1. E.); therefore P*f* is equal and parallel to *p*F (33. 1. E.), thus FP*fp* is a parallelogram, of which the oppoſite angles P and *p* are equal (34. 1. E.). Now the angles FPH, *fph* are evidently half the ſupplements of theſe angles (4 cor. 4.), therefore the angles FPH, *fph*, and hence CPH, C*ph* are alſo equal, and conſequently HP is parallel to *hp*.

Cor. 1. If tangents be drawn to an ellipſe at the vertices of a diameter, ſtraight lines drawn from either focus to the points of contact make equal angles with theſe tangents. For the angle F*pk* is equal to FPH.

Cor. 2. The axes of an ellipſe are the only diameters which are perpendicular to tangents at their vertices. For let P*p* be any other diameter, then PF and *p*F are neceſſarily unequal, and therefore the angles F*p*P, FP*p* are alſo unequal; to theſe add the equal angles F*pk*, FPH, and the angles C*pk*, CPH are unequal, therefore neither of them can be a right angle (29. 1. E.).

Prop. VI.

A ſtraight line drawn from either focus of an ellipſe to the interſection of two tangents to the curve, will make equal angles with ſtraight lines drawn from the ſame focus to the points of contact.

Fig. 20

Let HP, H*p* be tangents to an ellipſe at the points P, *p*; let a ſtraight line be drawn from H, their interſection, to F, either of the foci, and let FP, F*p* be drawn to the points of contact, the lines PF and *p*F make equal angles with HF.

Draw P*f*, *pf* to the other focus; in FP, F*p* produced take PK=P*f*, and *pk*=*pf*; join HK, H*k*, and let *f*K, *fk* be drawn, meeting the tangents at G and *g*. The triangles *f*PH, KPH, have P*f*=PK, by conſtruction, and PH common to both, alſo the angle *f*PH equal to KPH (4.), therefore *f*H is equal to KH. In like manner it may be ſhewn that *f*H is equal to *k*H, therefore HK is equal to H*k*; now FK is equal to F*k*, for each is equal to FP+P*f*, or F*p*+*pf*, that is, to the tranſverſe axis; therefore the triangles FKH, F*k*H are in all reſpects equal, and hence the angle KFH is equal to *k*FH; therefore PF and *p*F make equal angles with HF.

Prop. VII.

Two tangents to an ellipſe, which are limited by their mutual interſection, and the points in which

which they touch the curve, are to each other reciprocally as the fines of the angles they contain with ftraight lines drawn from the points of contact to either focus.

Fig. 21. Let the ftraight lines HP, Hp, which interfect each other at H, be tangents to an ellipfe at the points Pp, and let PF, pF be drawn to either focus; then

HP : Hp : : fine HpF : fine HPF.

Join HF, and in FP take FQ equal to Fp, and join HQ; then the angles at F being equal (6.) the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to HpF. Now, in the triangle HPQ,

HP : HQ : : fine HQP or fine HQF : fine HPF (Trigon.)
therefore HP : Hp : : fine HpF : fine HPF.

Lemma.

Let KLl be a triangle, having its bafe Ll bifected at p, and let Hh, any ftraight line parallel to the bafe, and terminated by the fides, be bifected at P; then P, p, the points of bifection, and K, the vertex of the triangle, are in the fame ftraight line, and that line bifects Dd, any other line parallel to the bafe.

Fig. 22. Complete the parallelograms KHPM, KLpN. The triangles KHh, KLl being fimilar, and Hh, Ll fimilarly divided at P and p,

KH : KL :: Hh : Ll :: HP : Lp,

hence the parallelograms KHPM, KLpN are fimilar. Now they have a common angle at K, therefore they are about the fame diameter, that is, the points K, P, p, are in the fame ftraight line (26. 6. E.).

Next, let Dd meet Kp in E, then

HP : DE (: : KP : KE) : : Ph : Ed,
therefore DE is equal to Dd.

Prop. VIII.

Any ftraight line not paffing through the centre, but terminated both ways by an ellipfe, and parallel to a tangent, is bifected by the diameter that paffes through the point of contact; or is an ordinate to that diameter.

Fig. 23. The ftraight line Dd, terminated by the ellipfe, and and parallel to the tangent HPh, is bifected at E, by Pp the diameter that paffes through the point of contact.

Let L$p$$l$ be a tangent at the other extremity of the diameter, and let KD, Kd, tangents at the points D, d, meet the parallel tangents HPh, L$p$$l$ in the points H, L, h, l, and draw DF, dF, PF, pF to either focus. Becaufe Hh is parallel to Dd,

HD : $h$$d$ :: KD : Kd.

But, KD, Kd being tangents to the ellipfe,

Sine h d F : fine HDF : : KD : Kd (7.)
therefore fine $h$$d$F : fine HDF : : HD : $h$$d$.
Now, fine hPF : fine $h$$d$F :: $h$$d$: hP (7.)
therefore (23. 5. K.) fine hPF : HDF : : HD : HP;
but fine HPF or fine hPF : fine HDF : : HD : HP,

therefore the ratio of HD to hP is the fame as that of HD to HP, wherefore PH=Ph. In the fame manner it may be demonftrated that pL=$p$$l$, therefore (Lemma) the diameter pP when produced paffes through K, and bifects Dd, which is parallel to Hh or Ll, at E.

Cor. 1. Straight lines which touch an ellipfe at the extremities of an ordinate to any diameter interfect each other in that diameter.

Cor. 2. Every ordinate to a diameter is parallel to a tangent at its vertex. For if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would bifect the ordinate, and thus the fame line would be bifected in two different points, which is abfurd.

Cor. 3. All the ordinates to the fame diameter are parallel to each other.

Cor. 4. A ftraight line that bifects two parallel chords and terminates in the curve is a diameter.

Cor. 5. The ordinates to either axis are perpendicular to that axis; and no other diameter is perpendicular to its ordinates. This follows evidently from 2 and 3 cor. to prop. 4. and 2 cor. to prop. 5.

Cor. 6. Hence each axis divides the ellipfe into two parts which are fimilar and equal.

Prop. IX.

If a tangent to an ellipfe meet a diameter, and from the point of contact an ordinate be drawn to that diameter, the femi-diameter will be a mean proportional between the fegments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

Fig. 23. Let DK, a tangent to the curve at D, meet the diameter pP, produced in K, and let DEd be an ordinate to that diameter.

Then CE : CP : : CP : CK.

Through P and p, the vertices of the diameter, draw the tangents PH and pL, meeting KD in H and L; thefe tangents are parallel to each other (5.) and to DE, the ordinate, by the laft propofition. Draw PF, pF, DF to either of the foci, Then

DH : PH : : fine HPF : fine HDF }
and DL : p L : : fine LpF : fine LDF } (7.)

Now the angles HPF, LpF are equal (cor. 5.) and the fine of HDF is the fame as that of LDF, therefore

DH : PH : : DL : pL,

and by alternation,

DH : DL :: PH : pL;

therefore, becaufe of the parallel lines PH, ED, pL,

EP : Ep : : PK : p K.

Take

Of the Ellipse.

Take CG=CE, then by division

EG : EP :: Pp : PK,

and taking the halves of the antecedents,

CE : EP :: CP : PK;

hence, by composition, CE : CP :: CP : CK.

Cor. 1. The rectangle contained by PE and Ep is equal to the rectangle contained by KE and CE.

For $PC^2 = KC \cdot CE = KE \cdot EC + EC^2$ (3. 2. E.)
also $PC^2 = PE \cdot Ep + EC^2$ (5. 2. E.)
therefore $KE \cdot EC + EC^2 = PE \cdot Ep + EC^2$,
and $KE \cdot EC = PE \cdot Ep$.

Cor. 2. The rectangle contained by PK and Kp is equal to the rectangle contained by KE and KC.

For $KC^2 = PK \cdot Kp + CP^2$ (6. 2. E.)
also $KC^2 = EK \cdot KC + EC \cdot KC = EK \cdot KC + CP^2$ (1. 2. E. and by the prop.)
therefore $PK \cdot Kp + CP^2 = EK \cdot KC + CP^2$,
and $PK \cdot Kp = EK \cdot KC$.

Prop. X.

If a diameter of an ellipse be parallel to the ordinates to another diameter, the latter diameter shall be parallel to the ordinates to the former.

Fig. 24.

Let Pp, a diameter of an ellipse, be parallel to DEd any ordinate to the diameter Qq, the diameter Qq shall be parallel to the ordinates to the diameter Pp.

Draw the diameter dCG through one extremity of the ordinate dD, and join G and D, the other extremity, meeting Pp in H. Because dG is bisected at C, and CH is parallel to dD, the line DG is bisected at H, therefore DG is an ordinate to the diameter Pp. And because dG and dD are bisected at C and E, the diameter Qq is parallel to DG (2. 6. E.) therefore Qq is parallel to any ordinate to the diameter Pp.

Definitions.

XII. Two diameters are said to be *conjugate* to one another when each is parallel to the ordinates to the other diameter.

Cor. Diameters which are conjugate to one another are parallel to tangents at the vertices of each other.

XIII. A third proportional to any diameter and its conjugate is called the *Parameter*, also the *Latus rectum of that diameter.*

Prop. XI.

If an ordinate be drawn to any diameter of an ellipse, the rectangle under the abscisses of the diameter will be to the square of the semi-ordinate as the square of the diameter to the square of its conjugate.

Fig 25.

Let DEd be an ordinate to the diameter Pp, and let Qq be its conjugate, then

$$PE \cdot Ep : DE^2 :: Pp^2 : Qq^2.$$

Let KDL a tangent at D meet the diameter in K, and its conjugate in L; draw DG parallel to Pp, meeting Qq in G. Because CP is a mean proportional between CE and CK (9.)

$CP^2 : CE^2 :: CK : CE$ (2 cor. 20. 6. E.)
and by division $CP^2 : PE \cdot Ep :: CK : KE$.

But, because ED is parallel to CL,

CK : KE :: CL : DE or CG,

and because CQ is a mean proportional between CG and CL (9.)

$CL : CG :: CQ^2 : CG^2$ or ED^2;
therefore $CP^2 : PE \cdot Ep :: CQ^2 : DE^2$,

and by inversion and alternation,

$$PE \cdot Ep : DE^2 :: CP^2 : CQ^2 :: Pp^2 : Qq^2.$$

Cor. 1. The squares of semi-ordinates and of ordinates to any diameter of an ellipse are to one another as the rectangles contained by the corresponding abscisses.

Cor. 2. The ordinates to any diameter, which intercept equal segments of that diameter from the centre, are equal to one another, and, conversely, equal ordinates intercept equal segments of the diameter from the centre.

Cor. 3. If a circle be described upon Aa, either of the axes of an ellipse, as a diameter, and DE, de, any two semi-ordinates to the axes meet the circle in H and h, DE shall be to de as HE to he. For

Fig 26.

$DE^2 : de^2 :: AE \cdot Ea : Ae.ea$ $HE^2 : he^2$,
therefore $DE : de :: HE : he$.

Cor. 4. If a circle be described on Aa the transverse axis as a diameter, and DE, any ordinate to the axis, be produced to meet the circle in H, HE shall be to DE as the transverse axis Aa to the conjugate axis Bb. For, produce the conjugate axis to meet the circle in K, then, by last corollary,

HE : DE :: KC, or AC : BC :: Aa : Bb.

Cor. 5. And if HE be divided at D, so that HE is to DE, as the transverse axis to the conjugate axis, D is a point in the ellipse, and DE a semi-ordinate to the axis Aa.

Prop. XII.

The transverse axis of an ellipse is the greatest of all its diameters, and the conjugate axis is the least of all its diameters.

Fig. 26.

Let Aa be the transverse axis, Bb the conjugate axis, and CD any semidiameter. Draw DE perpendicular to Aa, and DL perpendicular to Bb.

Because $Aa^2 : Bb^2 :: AE \cdot Ea : DE^2$ (11.)
and Aa^2 is greater than Bb^2,
therefore $AE \cdot E a$ is greater than DE^2;
and $AE \cdot Ea + EC^2$ is greater than $DE^2 + EC^2$,
that is, AC^2 is greater than DC^2,
therefore, AC is greater than DC.

By

Of the Ellipse.

By the same manner of reasoning it may be shewn that because Bb^2 is less than Aa^2,

$$BL \cdot Lb + CL^2 \text{ is less than } DL^2 + CL^2;$$
$$\text{that is, } BC^2 \text{ is less than } DC^2,$$
$$\text{and } BC \text{ less than } DC.$$

PROP. XIII.

If an ordinate be drawn to any diameter of an ellipse, the rectangle under the abscisses of the diameter is to the square of the semi-ordinate as the diameter to its parameter.

LET DE be a semi-ordinate to the diameter Pp, let PG be the parameter of the diameter, and Qq the conjugate diameter. By the definition of the parameter (Def. 13.)

$$Pp : Qq :: Qq : PG,$$
$$\text{therefore } Pp : PG :: Pp^2 : Qq^2 \text{ (2 cor. 20. 6. E.)}$$
$$\text{But } Pp^2 : Qq^2 :: PE \cdot Ep : DE^2, \text{ (11.)}$$
$$\text{therefore } PE \cdot Ep : DE^2 :: Pp : PG.$$

COR. Let the parameter PG be perpendicular to the diameter Pp; join pG, and from E draw EM parallel to PG, meeting pG in M. The square of DE, the semi-ordinate, is equal to the rectangle contained by PE and EM.

$$\text{For } PE \cdot Ep : DE^2 :: Pp : PG,$$
$$\text{and } Pp : PG :: Ep : EM :: PE \cdot Ep : PE \cdot EM,$$
$$\text{therefore } DE^2 = PE \cdot EM.$$

SCHOLIUM.

If the rectangles $PGLp$, HGKM be completed, it will appear that the square of ED is equal to the rectangle MP, which rectangle is less than the rectangle KP, contained by the abscis PE and parameter PG, by a rectangle KH similar and similarly situated to LP, the rectangle contained by the diameter and parameter. It was on account of the deficiency of the square of the ordinate from the rectangle contained by the abscis and parameter that Apollonius called the curve line to which the property belonged an Ellipse.

PROP. XIV.

If from the vertices of two conjugate diameters of an ellipse there be drawn ordinates to any third diameter, the square of the segment of that diameter intercepted between either ordinate and the centre is equal to the rectangle contained by the segments between the other ordinate and the vertices of the same diameter.

Fig. 28.

LET Pp, Qq be two conjugate diameters, and PE, QG semi-ordinates to any third diameter Rr, then $CG^2 = RE \cdot Er$, and $CE^2 = RG \cdot Gr$.

Draw the tangents PH, QK meeting Rr in H and K. The rectangles $HC \cdot CE$ and $KC \cdot CG$ are equal, for each is equal CR^2 (9.), therefore

$$HC : CK :: CG : CE,$$

But the triangles HPC, CQK are evidently similar (cor. def. 12.); and PE being parallel to QG, their bases CH, KC are similarly divided at E and G, therefore

$$HC : CK :: HE : CG$$
$$\text{wherefore } CG : CE :: HE : CG,$$
$$\text{consequently } CG^2 = CE \cdot EH = \text{(1 cor. 9.) } RE \cdot Er.$$

In like manner it may be shewn that $CE^2 = RG \cdot Gr$.

COR. 1. Let Ss be the diameter that is conjugate to Rr, then Rr is to Ss as CG to PE, or as CE to QG.

$$\text{For } Rr^2 : Ss^2 :: RE \cdot Er, \text{ or } CG^2 : PE^2,$$
$$\text{therefore } Rr : Ss :: CG : PE.$$

In like manner $Rr : Ss :: CE : QG$.

COR. 2. The sum of the squares of CE, CG, the segments of the diameter to which the semi-ordinates PE, QG are drawn, is equal to the square of CR the semi-diameter.

$$\text{For } CE^2 + CG^2 = CE^2 + RE \cdot EG = CR^2.$$

COR. 3. The sum of the squares of any two conjugate diameters is equal to the sum of the squares of the axes.

Let Rr, Ss be the axes, and Pp, Qq any two conjugate diameters; draw PE, QG perpendicular to Rr, and PL, QM perpendicular to Ss. Then

$$CE^2 + CG^2 = CR^2, \text{ and } CM^2 + CL^2, \text{ or } GQ^2 + PE^2 = CS^2;$$
$$\text{therefore } CE^2 + PE^2 + CG^2 + GQ^2 = CR^2 + CS^2,$$
$$\text{that is (47. 1. E.), } CP^2 + CQ^2 = CR^2 + CS^2,$$
$$\text{therefore } Pp^2 + Qq^2 = Rr^2 + Ss^2.$$

PROP. XV.

If four straight lines be drawn touching an ellipse at the vertices of any two conjugate diameters, the parallelogram formed by these lines is equal to the rectangle contained by the transverse and conjugate axis.

LET Pp, Qq be any two conjugate diameters, a parallelogram DEGH formed by tangents to the curve at their vertices is equal to the rectangle contained by Aa, Bb the two axes.

Produce Aa, one of the axes, to meet the tangent PE in K, join QK, and draw PL, QM perpendicular to Aa.

$$\text{Because } CK : CA :: CA : CL \text{ (9.)}$$
$$\text{and } CA : CB :: CL : QM \text{ (1 cor. 14.)}$$
$$\text{ex aeq. } CK : CB :: CA : QM.$$
$$\text{therefore } CK \cdot QM = CB \cdot CA.$$

But $CK \cdot QM$ = twice trian. CKQ = paral. CPEQ, therefore the parallelogram $CPEQ = CB \cdot CA$, and taking the quadruples of these, the parallelogram DEGH is equal to the rectangle contained by Aa and Bb.

PROP. XVI.

Plate CLVIII.

If two tangents at the vertices of any diameter of an ellipse meet a third tangent, the rectangle contained by their segments between the points of

Of the Ellipse.

of contact and the points of intersection is equal to the square of the semi-diameter to which they are parallel. And the rectangle contained by the segments of the third tangent between its point of contact and the parallel tangents is equal to the square of the semi-diameter to which it is parallel.

Fig. 30.

LET PH, ph tangents at the vertices of a diameter Pp meet HDh, a tangent to a curve at any point D, in H and h; let CQ be the semi-diameter to which the tangents PH, ph are parallel, and CR that to which Hh is parallel, then,

$$PH \cdot ph = CQ^2, \text{ and } DH \cdot Dh = CR^2.$$

If the tangent HDh be parallel to Pp the proposition is manifest. If it is not parallel, let it meet the semi-diameters CP, CQ, in L and K. Draw DE, RM parallel to CQ, and DG parallel to CP.

$$\text{Because } LP \cdot Lp = LE \cdot LC \text{ (2 cor. 9.)},$$
$$LP : LE :: LC : Lp,$$

hence, and because of the parallels PH, ED, CK, ph,

$$PH : ED :: CK : ph,$$
$$\text{wherefore } PH \cdot ph = ED \cdot CK,$$
$$\text{but } ED \cdot CK = CG \cdot CK = CQ^2 \text{ (9.)}$$
$$\text{therefore } PH \cdot ph = CQ^2.$$

Again the triangles LED, CMR are evidently similar, and LE, LD similarly divided at H and P, also at h and p,

$$\text{therefore } PE : HD :: (LE : LD ::)\ CM : CR,$$
$$\text{also } pE : hD :: (LE : LD ::)\ CM : CR,$$

hence, taking the rectangles of the corresponding terms,

$$PE \cdot pE : HD \cdot hD :: CM^2 : CR^2.$$

But if CD be joined, the points D and R are evidently the vertices of two conjugate diameters (cor. Def. 12.) and therefore $PE \cdot pE = CM^2$ (14.)

$$\text{therefore } HD \cdot hD = CR^2.$$

COR. The rectangle contained by LD and DK, the segments of a tangent intercepted between D the point of contact and Pp, Qq, any two conjugate diameters, is equal to the square of CR, the semi diameter to which the tangent is parallel.

Let the parallel tangents PH, ph meet LK in H and h, and draw DE a semi-ordinate to Pp. Because of the parallels PH, ED, CK, ph,

$$LE : LD :: EP : DH,$$
$$\text{and } EC : DK :: Ep : Dh,$$
$$\text{therefore } LE \cdot EC :: LD \cdot DK :: EP \cdot Ep : DH \cdot Dh.$$
$$\text{But } LE \cdot EC = EP \cdot Ep \text{ (1 cor. 9.)}$$
$$\text{therefore } LD \cdot DK = DH \cdot Dh = \text{(by this prop.) } CR^2.$$

PROP. XVII.

If two straight lines be drawn from the foci of an ellipse perpendicular to a tangent, straight lines drawn from the centre to the points in which they meet the tangent will each be equal to half the transverse axis.

Fig. 31.

LET DPd be a tangent to the curve at P, and FD, fd perpendiculars to the tangent from the foci, the straight lines joining the points C, D, and C, d, are each equal to AC half the transverse axis.

Join FPfP, and produce FD, fP till they intersect in E. The triangles FDP, EDP, have the angles at D right angles, and the angles FPD, EPD equal (4.) and the side DP common to both, they are therefore equal, and consequently have ED=DF, and EP=PF, wherefore $Ef = FP + Pf = Aa$. Now the straight lines FE, Ff, being bisected at D and C, the line DC is parallel to Ef, and thus the triangles FfE, FCD are similar,

$$\text{therefore } Ff : fE \text{ or } Aa :: FC : CD,$$

but FC is half of Ff, therefore CD is half of Aa. In like manner it may be shewn that Cd is half of Aa.

COR. If the diameter Qq be drawn parallel to the tangent Dd, it will cut off from PF, Pf the segments PG, Pg, each equal to AC half the transverse axis. For CdPG, CD Pg are parallelograms, therefore $PG = dC = AC$, and $Pg = DC = AC$.

PROP. XVIII.

The rectangle contained by perpendiculars drawn from the foci of an ellipse to a tangent is equal to the square of half the conjugate axis.

Fig. 31.

LET DPd be a tangent, and FD, fd perpendiculars from the foci, the rectangle contained by FD and fd is equal to the square of CB half the conjugate axis.

It is evident from the last proposition that the points D, d are in the circumference of a circle whose centre is the centre of the ellipse, and radius CA, half the transverse axis; now FDd being a right angle, if dC be joined, the lines DF, dC when produced will meet at H, a point in the circumference; and since FC=fC, and CH=Cd, and the angles FCH, fCd are equal, FH is equal to fd, therefore

$$DF \cdot df = DF \cdot FH = AF \cdot Fa \text{ (35. 3. E)} = CB^2 \text{ (3.)}.$$

COR. If PF, Pf be drawn from the point of contact to the foci, the square of FD is a fourth proportional to fP, FP and BC². For the lines fP, FP make equal angles with the tangent (4 cor. 4.) and fdP, FDP are right angles, therefore the triangles fPd, FPD are similar, and

$$fP : FP :: fd : FD : fd \cdot FD \text{ or } CB^2 : FD^2.$$

PROP. XIX.

Fig. 31.

If from C the centre of an ellipse a straight line CL be drawn perpendicular to a tangent LD, and from D the point of contact a perpendicular be drawn to the tangent, meeting the transverse axis in H and the conjugate axis in h, the rectangle contained by CL and DH is equal to the square of CB, the semi-conjugate axis; and the rectangle contained by CL and Dh is equal to the square of CA, the semi-transverse axis.

PRODUCE the axes to meet the tangent in M and m, and from D draw the semi-ordinates DE, De, which will be perpendicular to the axes.

The

The triangles DEH, CL m are evidently equi-angular, therefore

$$DH : DE :: Cm : CL,$$
$$\text{hence } CL \cdot DH = DE \cdot Cm;$$
$$\text{but } DE \cdot Cm, \text{ or } Ce \cdot Cm = BC^2,$$
$$\text{therefore } CL \cdot DH = BC^2.$$

In the same way it is shewn that $CL \cdot Dh = AC^2$.

COR. 1. If a perpendicular be drawn to a tangent at the point of contact, the segments intercepted between the points of contact, and the axes, are to each other reciprocally as the squares of the axes by which they are terminated.

For $AC^2 : BC^2 :: CL \cdot Dh : CL \cdot DH :: Dh : DH$.

COR. 2. If DF be drawn to either focus, and HK be drawn perpendicular to DF, the straight line DK shall be equal to half the parameter of the transverse axis.

Draw CG parallel to the tangent at D, meeting DH in N, and DF in G. The triangles GDN, HDK are similar, therefore

$$GD : DN :: HD : DK, \text{ and hence } GD \cdot DK = HD \cdot DN.$$
$$\text{But } GD = AC \text{ (cor. 17.) and } ND = CL,$$
$$\text{therefore } AC \cdot DK = HD \cdot CL = \text{(by the prop.) } CB^2,$$
$$\text{wherefore } AC : BC :: BC : DK, \text{ hence DK is half the parameter of } Aa \text{ (Def. 13.)}.$$

DEFINITIONS.

Fig. 3.

XIV. If a point G be taken in the transverse axis of an ellipse produced, so that the distance of G from the centre may be a third proportional to CF the excentricity, and CA the semi-transverse axis, a straight line GH h, drawn through G perpendicular to the axis, is called the *Directrix of the ellipse*.

COR. 1. If MF m, an ordinate to the axis, be drawn through the focus, tangents to the ellipse at the extremities of the ordinate will meet the axis at the point G. (9.)

COR. 2 The ellipse has two directrices, for the point G may be taken on either side of the centre.

PROP. XX.

The distance of any point in an ellipse from either directrix is to its distance from the focus nearest that directrix in the constant ratio of the semi-transverse axis to the excentricity.

Fig. 33.

LET D be any point in the ellipse, let DK be drawn perpendicular to the directrix, and let DF be drawn to the focus nearest the directrix; DK is to DF as CA, half the transverse axis, to CF, the excentricity.

Draw D f to the other focus, and DE perpendicular to A a, take L a point in the axis, so that AL = FD, and consequently L a = D f, then CL is evidently half the difference between AL and a L, or FD and fD, and CE half the difference between fE and FE, and because

$$Df + DF : fF :: fE - FE : Df - DF \text{ (Trigon.)}$$

By taking the halves of the terms of the proportion

$$CA : CF :: CE : CL,$$
$$\text{But } CA : CF :: CG : CA \text{ (Def. 14.)}$$
$$\text{therefore } CG : CA :: CE : CL,$$
$$\text{hence (20. 5. E.) } EG : AL :: CG : CA :: CA : CF,$$
$$\text{that is, } DK : DF :: CA : CF.$$

COR. 1. If the tangent GMN be drawn through M, the extremity of the ordinate passing through the focus, and ED be produced to meet GM in N, EN shall be equal to DF. For draw MO perpendicular to the directrix, then, because M and D are points in the ellipse, and from similar triangles,

$$FM : FD :: MO : DK :: GF : GE :: FM : EN,$$
$$\text{therefore } FD = EN.$$

COR. 2. If AI and $a\,i$ be drawn perpendicular to the transverse axis at its extremities, meeting the tangent GM in I, and i, then AI = AF and $a\,i = a$ F. This follows evidently from last corollary.

PROP. XXI.

Fig. 34.

Let A a, B b be the transverse and conjugate axes of an ellipse; from K any point in the conjugate axis let a straight line KH, which is equal to the sum or difference of the semi-axes CA, CB, be placed so as to meet the transverse axis in H, and in KH, produced beyond H when KH is the difference of the semi-axes, let HD be taken equal to CB; the point D is in the ellipse.

DRAW DE perpendicular to A a, and through C draw CG parallel to KD, meeting ED in G, then CG = KD = AC by construction, hence G is in the circumference of a circle of which C is the centre, and CA the radius; and because the triangles CEG, HED are similar,

$$GE : DE :: CG : HD :: CA : CB,$$

therefore DE is a semi-ordinate, and D a point in the ellipse (5 cor. 11.)

SCHOLIUM.

The instrument called the *trammels*, also the *elliptic compasses*, which workmen use for describing elliptic curves, is constructed on the property of the curve demonstrated in this proposition. (See COMPASSES.) Upon the same principle lathes are constructed for turning picture frames, &c. of an oval form.

PROP. XXII.

If a circle be described on the transverse axis of an ellipse as a diameter, the area of the circle will be to the area of the ellipse as the transverse axis to the conjugate axis.

Fig. 35.

LET A a be the transverse axis of the ellipse, which is also the diameter of the circle. Draw DE, D′E′, D″E″ any number of perpendiculars to the axis, meeting the ellipse in D, D′, D″, and the circle in d, d', d'', and join AD, DD′, D′D″, D″a; also A d, $d\,d'$, $d'\,d''$,

Of the Hyperbola.

$d'd''$, $d''a$, and draw DG, dg parallel to A a, meeting d' E′ in G and g.

The triangle A d E is to the triangle ADE as d E to DE, that is (4 cor. 11.) as the transverse axis to the conjugate axis. Again, because d'E′ and d E are similarly divided at D′ and D (3 cor. 11.)

d E : DE :: (d'E′—d E : D′E′—DE ::) $d'g$: D′G,

But, triangle $d g d'$: triangle DGD′ :: $d'g$: D′G,

therefore the triangles $d g d'$, DGD′ as well as the rectangles d E′, DE′ are to each other as d E to DE, or as the transverse axis to the conjugate axis, and consequently the trapezoids dEE′d', DEE′D′ are to each other in the same ratio. In like manner it may be shewn, that the trapezoids d'E′E″d'', D′E′E″D″, also the triangles d''E″ a, D″E″ a are to each other as the transverse to the conjugate axis, and therefore the whole rectilineal figure A d d' d'' a inscribed in the semicircle to the whole figure ADD′D″ a inscribed in the semiellipse in the same ratio, which ratio is constant, and altogether independent of the number of the sides of each figure. But, the base A a remaining common to both figures, if we suppose the number of perpendiculars d DE, d'D′E′, &c. indefinitely increased, it is evident that the polygons A d d' d'' a, ADD′D″ a will approach nearer and nearer to the semicircle and semiellipse, which are their respective limits, therefore, the semicircle is to the semiellipse, and consequently the circle is to the ellipse, as the transverse to the conjugate axis.

COR. The area of an ellipse is equal to the area of a circle, whose diameter is a mean proportional between the axes.

PROP. XXIII. PROBLEM.

Two unequal straight lines which bisect each other at right angles being given by position, to describe an ellipse of which these may be the two axes.

FIRST METHOD. By a Mechanical Description.

Fig. 36. LET A a, B b be the transverse and conjugate axes, and C the centre. On B, one extremity of the conjugate axis, as a centre, with a radius equal to AC, half the transverse axis, let a circle be described, cutting the transverse axis in F and f; these points will be the foci of the ellipse (4 cor. 1.).

Let the ends of a string, equal in length to A a, be fastened at the points F, f, and let the string be stretched by a pin D, and while it is kept uniformly tense, let the point of the pin be carried round in the plane in which the lines A a, B b are situated, till it return to the place from which it set out; by this motion the point of the pin will trace upon the plane a curve line which is the ellipse required, as is evident from the definition of the Ellipse.

SECOND METHOD. By Finding any Number of Points in the Curve.

Fig. 37. Find F either of the foci as before; draw HAK $h a k$, perpendicular to the transverse axis at its extremities, and take AH and AK on each side of the vertex equal to AF, also $a h$ and $a k$ each equal to a F, join H h and K k, take E any point in A a, and through E draw NE n parallel to HK, meeting H h and K k in N and n. On F as a centre with a radius equal to EN or E n let a circle be described, meeting N n in D and d, these will be two points in the ellipse, and in the same way may any number of points be found. The reason of this construction is obvious from cor. 1. and 2. to prop. 20.

PROP. XXIV. PROBLEM.

An ellipse being given by position, to find its axes.

Fig. 38. LET AB $a b$ be the given ellipse. Draw two parallel chords H h, K k, and bisect them at L and M; join LM, and produce it to meet the ellipse in P and p, then, P p is a diameter (4 cor. 8.). Bisect Pp in C, the point C is the centre of the ellipse (2.).

Take D any point in the ellipse, and on C as a centre with the distance CD describe a circle. If this circle fall wholly without the curve, then CD must be half the transverse axis; and if it fall wholly within the curve, then CD must be half the conjugate axis (12.). If the circle neither falls wholly without the curve, nor wholly within it, let the circle meet it again in d, join D d, and bisect D d in E, join CE, which produce to meet the ellipse in A and a, then Aa will be one of the axes (5 cor. 8.), for it is perpendicular to Dd (3. 3. E) which is an ordinate to A a. The other axis B b will be found by drawing a straight line through the centre perpendicular to A a.

PART III. OF THE HYPERBOLA.

DEFINITIONS.

Fig. 39. I. IF two points F, f be given in a plane, and a point D be conceived to move in such a manner that Df—DF, the difference of its distances from them is always the same, the point D will describe upon the plane a line DAD′ called an *Hyperbola*. By assuming first one of the given points F, and then the other f as that to which the moving point is nearest, the difference of the lines DF and Df in both cases being the same, there will be two hyperbolas DAD′, $d a d'$, described, opposite to one another, which are therefore called *Opposite Hyperbolas*.

COR. The lines DF, Df may become greater than any given line, therefore the hyperbolas extend to a greater distance from the given points F, f than any which can be assigned.

II. The given points F, f are called the *Foci of the hyperbola*.

III. The point C, which bisects the straight line between the foci, is called the *Centre*.

IV. A straight line passing through the centre, and terminated

terminated by the opposite hyberbolas, is called a *Transverse Diameter*. It is also sometimes called, simply, a *Diameter*.

V. The extremities of a diameter are called its *Vertices*.

VI. The diameter which passes through the foci, is called the *Transverse Axis*.

Cor. The vertices of the transverse axis lie between the foci. Let A be either of the vertices, then, because any side of a triangle is greater than the difference between the other two sides, Ff is greater than fD—DF which is equal to fA—FA (Def. 1.). Now this can only take place when A is between F and f.

VII. A straight line Bb passing through the centre, perpendicular to the transverse axis, and limited at B and b by a circle described on one extremity of that axis, with a radius equal to the distance of either focus from the centre, is called the *Conjugate Axis*. It is also called the *Second Axis*.

Cor. The conjugate axis is bisected in the centre. This appears from 3. 3. E.

VIII. Any straight line terminated both ways by the hyperbola, and bisected by a transverse diameter produced, is called an *Ordinate* to that diameter.

IX. Each of the segments of a transverse diameter produced, intercepted by its vertices, and an ordinate, is called an *Abscifs*.

X. A straight line which meets the hyperbola in one point only, and which everywhere else falls without the opposite hyperbolas, is said to *touch* the hyperbola in that point, and is called a *Tangent to the hyperbola*.

Prop. I.

If from any point in an hyperbola two straight lines be drawn to the foci, their difference is equal to the transverse axis.

Fig. 39.

Let DAD′, $dad′$ be opposite hyperbolas, of which F, f are the foci, and Aa the transverse axis; let D be any point in the curve, and DF, Df lines drawn to the foci, Df—DF=Aa.

Because A and a are points in the hyperbola,

$$Af-AF=aF-af \text{ (Def. 1.)}$$
$$\text{therefore } Ff-2AF=Ff-2af;$$
$$\text{Hence } 2AF=2af \text{ and } AF=af,$$
$$\text{and } Af-AF=Af-af=Aa.$$

But D and A being points in the hyberbola,

Df—DF=Af—AF, therefore Df—DF=Aa.

Cor. 1. The difference of two straight lines drawn from a point without the opposite hyperbolas to the foci is less than the transverse axis, and the difference of two straight lines drawn from a point within either of them to the foci is greater than the transverse axis.

Fig. 40.

Let Pf, PF be lines drawn from a point without the hyperbolas, that is, between the curve and its conjugate axis. The line PF must necessarily meet the curve, let D be the point of intersection; Pf is less than PD+Df (20. 1. E.), therefore Pf—PF is less than (PD+Df)—PF, that is, less than Df—DF, or Aa. Again, let Qf, QF be lines drawn from a point within either of the hyperbolas, Qf must necessarily meet the curve; let D be the point of intersection, join FD QF is greater than QD+DF, and therefore Qf—CF is greater than Qf—(QD+DF), that is, greater than Df—DF or Aa.

Cor. 2. A point is without, or within the hyperbolas, according as the difference of two lines drawn from that point to the foci is less or greater than the transverse axis.

Cor. 3. The transverse axis is bisected in the centre. Let C be the centre; then CF=Cf (Def. 3.), and FA=fa, therefore CA=Ca.

Lemma I.

Fig. 41.

Two triangles ABC, ADC on the same base, and on the same side of it, having AB, AD, the greater of the two sides of each ending in the same extremity of the base, and having their vertical angles B, D without each other, cannot have the difference of the sides of the one equal to the difference of the sides of the other.

Let AD meet BC in E. Because AE+EB is greater than AB, (AE+EB)—BC=AE—EC is greater than AB—BC. Again, because DC is less than DE+EC, AD—DC is greater than AD—(DE+EC)=AE—EC; much more therefore is AD—DC greater than AB—BC. Therefore AD—DC cannot be equal to AB—BC.

Prop. II.

Plate CLIX.

Every transverse diameter of an hyperbola is bisected in the centre.

Fig. 42.

Let Pp be a transverse diameter, it is bisected in C; for if Cp be not equal to CP, take CQ equal to CP; from the points P, p, Q draw straight lines to F and f the foci; draw fD perpendicular to Cp, and FE parallel to PD, meeting fD in E; join Ep, EQ. Because fC=CF, and CD is parallel to EF, fD=DE (2. 6. E.). Now pD is common to the triangles fDp, EDp, and the angles at D are equal, being right angles, therefore the triangles are equal, and pf=pE. In like manner, it appears that Qf=QE. Again, the triangles FCP, fCQ having FC=Cf, PC=CQ, and the angles at C equal, are in all respects equal, therefore FP=fQ. In like manner it appears that Pf=QF, therefore FQ—fQ is equal to fP—FP, or (Def. 1.) to Fp—fp; that is, FQ—QE is equal to Fp—pE, which by the preceding lemma is absurd; therefore CP=Cp.

Cor. 1. Every transverse diameter meets the opposite hyperbolas each in one point only, and being produced falls within them.

Cor. 2. Every transverse diameter divides the opposite hyperbolas into parts which are equal and similar; the like parts of the curve being at opposite extremities of the diameter, and on contrary sides of it.

Prop. III.

The square of half the conjugate axis of an hyperbola is equal to the rectangle contained by the straight lines between either focus and the extremities of the transverse axis.

Draw

Of the Hyperbola.

Plate CLVIII. Fig. 39.

DRAW a ſtraight line from a, either of the extremities of the tranſverſe axis, to B, either of the extremities of the conjugate axis.

$$\text{Then } BC^2 + Ca^2 = Ba^2 = Cf^2 \text{ (Def. 7.)}$$

But becauſe Aa is biſected at C, and produced to f,

$$Cf^2 = Af \cdot fa + Ca^2 \text{ (6. 2. E.)}$$
$$\text{therefore } BC^2 + Ca^2 = Af \cdot fa + Ca^2,$$
$$\text{and } BC^2 = Af\,fa.$$

PROP. IV.

The ſtraight line which biſects the angle contained by two ſtraight lines drawn from any point in the hyperbola to the foci is a tangent to the curve at that point.

Plate CLIX. Fig. 43.

LET D be any point in the curve, let DF, Df be ſtraight lines drawn to the foci, the ſtraight line DE which biſects the angle fDF is a tangent to the curve.

Take H any other point in DE, take DG=Df, and join Hf, HF, HG, fG; let fG meet DE in I. Becauſe Df=DG and DI is common to the triangles DfI, DGI, and the angles fDI, GDI are equal, theſe triangles are equal, and fI=IG, and hence fH =HG (4. 1. E.), ſo that FH—fH=FH—HG: but ſince FH is leſs than FG+GH, FH—HG is leſs than FG, that is leſs than FD—fD or Aa, therefore FH—fH is leſs than Aa; hence the point H is without the hyperbola, (2 cor. 1.), and conſequently DHI is a tangent to the curve at D (Def. 10.).

COR. 1. There cannot be more than one tangent to the hyperbola at the ſame point. For D is ſuch a point in the line DE, that the difference of the lines DF, Df, the diſtances of that point from the foci, is evidently greater than the difference of FH, fH the diſtances of H any other point in that line; and if another line KD be drawn through D, there is in like manner a point K in that line, which will be different from D, ſuch, that the difference of FK, fK is greater than the difference of the diſtances of any other point in KD, and therefore greater than FD—fD, therefore the point K will be within the hyperbola (2 cor. 1.), and the line KD will cut the curve.

COR. 2. A perpendicular to the tranſverſe axis at either of its extremities is a tangent to the curve. The demonſtration is the ſame as for the propoſition, if it be conſidered that when D falls at either extremity of the axis, the point I falls alſo at the extremity of the axis, and thus the tangent DE, which is always perpendicular to fI, is perpendicular to the axis.

COR. 3. Every tangent to either of the oppoſite hyperbolas paſſes between that hyperbola and the centre. Let the tangent DI meet the axis in E. Becauſe DE biſects the angle FDf,

$$FD : fD :: FE : fE \text{ (3. 6. E.)}$$

But FD is greater than fD (Def. 1.), therefore FE is greater than fE, and hence E is between C and the vertex of the hyperbola to which DE is a tangent.

SCHOLIUM.

From the property of the hyperbola which forms this propoſition, the points F and f are called *Foci.* For rays of light proceeding from one focus, and falling upon a poliſhed ſurface whoſe figure is that formed by the revolution of the curve about the tranſverſe axis, are reflected in lines paſſing through the other focus.

PROP. V.

The tangents at the vertices of any tranſverſe diameter of an hyperbola are parallel.

Fig. 44.

LET Pp be a diameter, HP, hp tangents at its vertices; draw ſtraight lines from P and p to F and f the foci. The triangles FCP, fCp, having FC=fC, CP=Cp (2.), and the angles at C equal, are in all reſpects equal, and becauſe the angle FPC is equal to Cpf, FP is parallel to fp (27. 1. E.), therefore Pf is equal and parallel to pF (33. 1. E.): thus FP fp is a parallelogram of which the oppoſite angles P and p are equal (34. 1. E.); now the angles FPH, fph are the halves of theſe angles (4.); therefore the angles FPH, fph, and hence CPH, Cph, are alſo equal, and conſequently HP is parallel to hp.

COR. 1. If tangents be drawn to an hyperbola at the vertices of a tranſverſe diameter, ſtraight lines drawn from either focus to the points of contact make equal angles with theſe tangents. For the angle Fph is equal to FPH.

COR. 2. The tranſverſe axis is the only diameter which is perpendicular to tangents at its vertices. For let Pp be any other diameter. The angle CPH is leſs than FPH, that is, leſs than the half of FPf, therefore CPH is leſs than a right angle.

PROP. VI.

A ſtraight line drawn from either focus of an hyperbola to the interſection of two tangents to the curve, will make equal angles with ſtraight lines drawn from the ſame focus to the points of contact.

Fig. 45. and 46.

LET HP, Hp be tangents to an hyperbola at the points P, p; let a ſtraight line be drawn from H their interſection to F either of the foci; and let FP, Fp be drawn to the points of contact; the lines PF, pF make equal angles with HF.

Draw Pf, pf to the other focus. In PF and pF take PK=Pf, and pk=pf; join HK, Hk, and let fK, fk be drawn, meeting the tangents in G and g. The triangles fPH, KPH have Pf=PK, by conſtruction, and PH common to both, alſo the angle fPH equal to KPH (4.); therefore fH is equal to KH. In like manner it may be ſhewn that fH is equal to kH, therefore HK is equal to Hk; now FK is equal to Fk, for each is equal to the difference between FP and fP, or Fp and fp, that is, to the tranſverſe axis; therefore the triangles FKH, FkH are in all reſpects equal, and hence the angle KFH is equal to kFH, therefore PF and pF make equal angles with HF.

PROP.

PROP. VII.

Two tangents to an hyperbola, or oppoſite hyperbolas, which are limited by their mutual interſection and the points in which they touch the curve, are to each other, reciprocally, as the ſines of the angles they contain with ſtraight lines drawn from the points of contact to either focus.

LET HP, Hp, which interſect each other at H, be tangents to an hyperbola, or oppoſite hyperbolas, at the points P, p; and let PF, pF be drawn to either focus,

HP : Hp :: ſine HpF : ſine PHF.

Join HF, and in FP take FQ equal to Fp, and join HQ; then, the angles at F being equal (6.), the triangles HFQ, HFp are equal, therefore HQ is equal to Hp, and the angle HQF is equal to HpF. Now in the triangle HPQ,

HP : HQ :: ſine HQP, or ſine HQF : ſine HPF (Trig.)
therefore HP : Hp :: ſine HpF : ſine HPF.

LEMMA II.

Let KLl be a triangle, having its baſe Ll biſected at p, and let Hh, any ſtraight line parallel to the baſe, and terminated by the ſides produced, be biſected at P, then P, p the point of biſection, and K the vertex of the triangle, are in the ſame ſtraight line, and that line biſects Dd any other line parallel to the baſe.

JOIN KP, Kp. The triangles KHh, KLl being ſimilar, and Hh, Ll ſimilarly divided at P, p,

KH : KL :: (Hh : Ll ::) HP : Lp.

Now the angles at H and L are equal, therefore the triangles KHP, KLp are ſimilar, and the angle PKH is equal to pKL; to both add the angle HKp, and the angles PKH, HKp are equal to pKL, HKp, that is, to two right angles; therefore KP, Kp lie in the ſame ſtraight line (14. 1. E.)

Next let Dd meet Kp in E, then

HP : DE (:: PK : EK) :: Ph : Ed,
therefore DE is equal to Ed.

PROP. VIII.

Any ſtraight line terminated both ways by an hyperbola, and parallel to a tangent, is biſected by the tranſverſe diameter produced, that paſſes through the point of contact, or is an ordinate to that diameter.

THE ſtraight line Dd, terminated by the hyperbola, and parallel to the tangent HPh, is biſected at E by Pp the tranſverſe diameter produced, which paſſes through P, the point of contact.

Let L$p$$l$ be a tangent at the other extremity of the diameter, and let KD, Kd, tangents at the points D, d, meet the parallel tangents HPh, L$p$$l$ in the point H, L, h, l, and draw DF, dF, PF to either focus. Becauſe Hh is parallel to Dd,

HD : hd :: KD : Kd.

But KD, Kd being tangents to the hyperbola,

ſine hdF : ſine HDF :: KD : Kd (7.)
therefore ſine hdF : ſine HDF :: HD : hd,
now, ſine hPF : ſine hdF :: hd : hP (7.)
therefore, (23. 5. E.) ſine hPF : ſine HDF :: HD : hP;

but ſine HPF or ſine hPF : ſine HDF :: HD : HP, therefore the ratio of HD to hP is the ſame as the ratio of HD to HP, wherefore PH = Ph. In the ſame manner it may be demonſtrated that pL = pl, therefore (lemma 2.) the diameter Pp when produced paſſes through K, and biſects Dd, which is parallel to Hh, or Ll, at E.

COR. 1. Straight lines which touch an hyperbola at the extremities of an ordinate to any tranſverſe diameter, interſect each other in that diameter.

COR. 2. Every ordinate to a tranſverſe diameter is parallel to a tangent at its vertex. For, if not, let a tangent be drawn parallel to the ordinate, then the diameter drawn through the point of contact would biſect the ordinate, and thus the ſame line would be biſected in two different points, which is abſurd.

COR. 3. All the ordinates to the ſame tranſverſe diameter are parallel to each other.

COR. 4. A ſtraight line that biſects two parallel chords, and terminates in the oppoſite hyperbola, is a tranſverſe diameter.

COR. 5. The ordinates to the tranſverſe axis are perpendicular to it, and no other tranſverſe diameter has its ordinates perpendicular to it. This follows from 2 cor. 4. and 2 cor. 5.

COR. 6. The tranſverſe axis, indefinitely produced, divides each of the oppoſite hyperbolas into two parts which are ſimilar to one another.

PROP. IX.

If a tangent to an hyperbola meet a tranſverſe diameter, and from the point of contact an ordinate be drawn to that diameter, the ſemidiameter will be a mean proportional between the ſegments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

LET DK a tangent to the curve at D meet the tranſverſe diameter Pp in K, and let DEd be an ordinate to that diameter, Fig. 50.

Then CE : CP :: CP : CK.

Through P and p, the vertices of the diameter, draw the tangents PH and pL, meeting KD in H and L, theſe tangents are parallel to each other (5.), and to DE, the ordinate, by laſt propoſition. Draw PF, pF, DF to either of the foci. Then,

DH : HP :: ſine HPF : ſine HDF,
and DL : Lp :: ſine LpF : ſine LDF, or ſine HDF } (7.)

Now the angles HPF, LpF are equal (1 cor. 5); therefore,

Of the Hyperbola.

therefore,

$$DH : PH :: DL : pL,$$

and by alternation

$$DH : DL :: PH : pL;$$

therefore, because of the parallel lines PH, ED, pL,

$$EP : Ep :: PK : pK.$$

Take CG=CE, then PG=Ep, and by composition

$$EG : EP :: Pp : PK,$$

and taking the halves of the antecedents

$$CE : EP :: CP : PK;$$

hence, by division, CE : CP :: CP : CK.

Cor. 1. The rectangle contained by PE and Ep is equal to the rectangle contained by KE and CE.

For $CP^2=KC\cdot CE=EC^2-KE\cdot EC$ (2. 2. E.)
also $CP^2=EC^2-PE\cdot Ep$ (6. 2. E.)
therefore $EC^2-KE\cdot EC=EC^2-PE\cdot Ep$,
and $KE\cdot EC=PE\cdot Ep$.

Cor. 2. The rectangle contained by PK and Kp is equal to the rectangle contained by KE and KC.

For $KC^2=CP^2-PK\cdot Kp$ (5. 2. E.)
also $KC^2=EC\cdot KC-EK\cdot KC=CP^2-EK\cdot KC$ (3. 2. E. and by the prop.)
therefore $CP^2-PK\cdot Kp=CP^2-EK\cdot KC$.
and $PK\cdot Kp=EK\cdot KC$.

Prop. X.

If a tangent to an hyperbola meet the conjugate axis, and from the point of contact a perpendicular be drawn to that axis, the semiaxis will be a mean proportional between the segments of the axis intercepted between the centre and the perpendicular, and between the centre and the tangent.

Fig. 51.

Let DH, a tangent to the hyperbola at D, meet the conjugate axis B b in H, and let DG be perpendicular to that axis, then

$$CG : CB :: CB : CH.$$

Let DH meet the transverse axis in K, draw DE perpendicular to that axis, draw DF, Df to the foci, and describe a circle about the triangle DfF; the conjugate axis will evidently pass through the centre of the circle, and because the angle FDf is bisected by the tangent DK, the line DK will pass through one extremity of the diameter; therefore the circle passes through H. Draw DL to the other extremity of the diameter. The triangles LGD, KCH, are similar, for each is similar to the right-angled triangle LDH; therefore,

$$LG : GD (=CE) :: CK : CH;$$

hence $LG\cdot CH=CE\cdot CK=$ (by last prop.) CA^2.
Now $LC.CH=CF^2$ (35. 3. E.)
therefore $LC.CH-LG\cdot CH=CF^2-CA^2$,
that is, $CG\cdot CH=CB^2$ (Def. 7.)
wherefore CG : CB :: CB : CH.

Definition.

Fig. 52.

XI. If through A, one of the vertices of the transverse axis, a straight line HA h be drawn, equal and parallel to B b the conjugate axis, and bisected at A by the transverse axis, the straight lines CHM, C h m drawn through the centre, and the extremities of that parallel, are called *Asymptotes*.

Cor. 1. The asymptotes of two opposite hyperbolas are common to both. Through a, the other extremity of the axis, draw H′ a h', parallel to B b, and meeting the asymptotes of the hyperbola DAD in H′ and h'. Because a C is equal to AC, a H′ is equal to A h, or to BC; also a h' is equal to AH, or to BC; hence, by the definition, CH′ and C h' are asymptotes of the opposite hyperbola $d\,a\,d$.

Cor. 2. The asymptotes are diagonals of a rectangle formed by drawing perpendiculars to the axes at their vertices. For the lines AH, CB, a H′ being equal and parallel, the points H, B, H′ are in a straight line passing through B parallel to A a; the same is true of the points h, b, h'.

Prop. XI.

The asymptotes do not meet the hyperbola; and if from any point in the curve a straight line be drawn parallel to the conjugate axis, and terminated by the asymptotes, the rectangle contained by its segments from that point is equal to the square of half that axis.

Through D any point in the hyperbola draw a straight line parallel to the conjugate axis, meeting the transverse axis in E, and the asymptotes in M and m; the points M and m shall be without the hyperbola, and the rectangle MD·D m is equal to the square of BC. Fig. 53.

Draw DG perpendicular to B b the conjugate axis, let a tangent to the curve at D meet the transverse axis in K, and the conjugate axis in L, and let a perpendicular at the vertex A meet the asymptote in H. Because DK is a tangent, and DE an ordinate to the axis, CA is a mean proportional between CK and CE (9.), and therefore

$$CK : CE :: CA^2 : CE^2 \text{ (2 cor. 20. 6. E.)}$$
But CK : CE :: LC : LG,
and $CA^2 : CE^2 :: AH^2 : EM^2$;
therefore $LC : LG :: AH^2 : EM^2$.

Again, CB being a mean proportional between CL and CG (10.)

$$LC : CG :: CB^2 : CG^2,$$

and therefore

$LC : LG :: CB^2 :: CB^2+CG^2$, or CB^2+ED^2;
wherefore $AH^2 : EM^2 :: CB^2 : CB^2+ED^2$;
Now $AH^2=CB^2$ (Def. 11.)
therefore $EM^2=CB^2+ED^2$,

consequently EM^2 is greater than ED^2, and EM greater

greater than ED, therefore M is without the hyperbola. In like manner it appears that m is without the hyperbola; therefore every point in both the asymptotes is without the hyperbola. Again, the straight line Mm terminated by the asymptotes, being manifestly bisected by the axis at E,

$$ME^2 = MD \cdot Dm + DE^2;$$

but it has been shewn that

$$ME^2 = BC^2 + DE^2$$

$$\text{therefore } MD \cdot Dm = BC^2.$$

Cor. 1. Hence, if in a straight line Mm, terminated by the asymptotes, and parallel to the conjugate axis, there be taken a point D such that the rectangle $MD \cdot Dm$ is equal to the square of that axis, the point D is in the hyperbola.

Cor 2. If straight lines MDm, NRn, be drawn through D and R, any points in the hyperbola, or opposite hyperbolas, parallel to the conjugate axis, and meeting the asymptotes in M, m, and N, n, the rectangles $MD \cdot Dm$, $NR \cdot Rn$ are equal.

Prop. XII.

The hyperbola and its asymptote when produced continually approach to each other, and the distance between them becomes less than any given line.

Fig 3. Take two points E and O in the transverse axis produced, and through these points draw straight lines parallel to the conjugate axis, meeting the hyperbola in D, R, and the asymptotes in Mm, and Nn.

Because NO^2 is greater than ME^2,
and $NR \cdot Rn = MD \cdot Dm$, (2 cor. 11.)
therefore $NO^2 - NR \cdot Rn$ is greater than $ME^2 - MD \cdot Dm$,
that is RO^2 is greater than DE^2,
and RO is greater than DE;
now On is greater than Em,
therefore Rn is greater than Dm,
and since $Rn : Dm :: DM : RN$, (2 cor. 11.)
DM is greater than RN,

therefore the point R is nearer to the asymptote than D, that is, the hyperbola when produced approaches to the asymptote.

Let S be any line less than half the conjugate axis; then, because Dm, a straight line drawn from a point in the hyperbola, parallel to the conjugate axis, and terminated by the asymptote on the other side of the transverse axis, may evidently be of any magnitude greater than Ah, which is equal to half the conjugate axis, Dm may be a third proportional to S and BC; and since Dm is also a third proportional to DM (the segment between D and the other asymptote) and BC, DM may be equal to S; but the distance of D from the asymptote is less than DM, therefore that distance may become less than S, and consequently less than any given line.

Cor. Every straight line passing through the centre, within the angles contained by the asymptotes through which the transverse axis passes, meets the hyperbola, and therefore is a transverse diameter; and every straight line passing through the centre within the adjacent angles falls entirely without the hyperbola.

Scholium.

The name *asymptotes (non concurrentes)* has been given to the lines CH, Ch, because of the property they have of continually approaching to the hyperbola without meeting it, as has been proved in this proposition.

Prop. XIII.

Plate CLX.

If from two points in a hyperbola, or opposite hyperbolas, two parallel straight lines be drawn to meet the asymptotes, the rectangles contained by their segments between the points and the asymptotes are equal.

Fig. 54. and 55. Let D and G be two points in the hyperbola, or opposite hyperbolas, let parallel lines EDe, HGh be drawn to meet the asymptotes in E, e, and H, h, the rectangles $ED \cdot De$, $HG \cdot GH$ are equal.

Through D and G draw straight lines parallel to the conjugate axis, meeting the asymptotes in the points L, l, and M, m. The triangles HGM, EDL are similar, as also the triangles hGm, eDl,

$$\text{therefore } DL : DE :: GM : GH,$$

$$\text{and } Dl : De :: Gm : Gh;$$

hence, taking the rectangles of the corresponding terms of the proportions,

$$LD \cdot Dl : ED \cdot De :: MG \cdot Gm : HG \cdot Gh.$$

$$\text{But } LD \cdot Dl = MG \cdot Gm \text{ (2 cor. 11.)}$$

$$\text{therefore } ED \cdot De = HG \cdot Gh.$$

Fig. 54. and 55. Cor. 1. If a straight line be drawn through D, d, two points in the same or opposite hyperbolas, the segments DE, de between those points and the asymptotes are equal. For in the same manner that the rectangles $ED \cdot De$, $HG \cdot Gh$ have been proved to be equal, it may be shewn that the rectangles $Ed \cdot de$, $HG \cdot Gh$ are equal, therefore $ED \cdot De = Ed \cdot de$. Let Ee be bisected in O, then $ED \cdot De = EO^2 - OD^2$ and $Ed \cdot de = EO^2 - Od^2$, therefore $EO^2 - OD^2 = EO^2 - Od^2$; hence $OD = Od$, and $ED = ed$.

Fig. 54. and 55. Cor. 2. When the points D and d are in the same hyperbola, by supposing them to approach till they coincide at P, the line Ee will thus become a tangent to the curve at P. Therefore any tangent KPk, which is terminated by the asymptotes, is bisected at P, the point of contact.

Fig. 54. Cor. 3. And if any straight line KPk, limited by the asymptotes, be bisected at P a point in the curve, that line is tangent at P. For it is evident that only one line can be drawn through P which shall be limited by the asymptotes, and bisected at P.

Fig. 54. Cor. 4. If a straight line be drawn through D, any point in the hyperbola, parallel to a tangent KPk, and terminated by the asymptotes at E and e, the rectangle $ED \cdot De$ is equal to the square of PK, the segment of the tangent between the point of contact and either asymptote. The demonstration is the same as in the proposition.

Fig. 55. Cor. 5. If from any point D in a hyperbola a straight line be drawn parallel to Pp any diameter, meeting the asymptotes in E and e, the rectangle $ED \cdot De$ is equal to the square of half the diameter. The demonstration is the same as in the proposition.

Of the Hyperbola.

Prop. XIV.

If two ſtraight lines be drawn from any point in an hyperbola to the aſymptotes, and from any other point in the ſame, or oppoſite hyperbolas, two other lines be drawn parallel to the former, the rectangle contained by the firſt two lines will be equal to the rectangle contained by the other two lines.

Fig. 56.

From D any point in the hyperbola draw DH and DK to the aſymptotes, and from any other point d draw dh and dk parallel to DH and DK. The rectangles HD · DK, $hd \cdot dk$ are equal.

Join D, d meeting the aſymptotes in E, e. From ſimilar triangles

$$ED : DH :: Ed : dh,$$
$$\text{and } eD : DK :: ed : dk,$$

therefore taking the rectangles of correſponding terms,

$$ED \cdot De : HD \cdot DK :: Ed \cdot de : hd \cdot dk;$$
$$\text{but } ED \cdot De = Ed \cdot de \ (13.),$$
$$\text{therefore } HD \cdot DK = hd \cdot dk.$$

Cor. 1. If the lines D′K′, D′H′, $d'k'$, $d'h'$, be parallel to the aſymptotes, and thus form the parallelograms D′K′CH′, $d'k'$ Ch', theſe are equal to one another (16. and 14. 6. E.). And if D′C, d'C be joined, the halves of the parallelograms, or the triangles D′K′C, $d'k'$ C are alſo equal.

Cor. 2. If from D′, d', any two points in an hyperbola, ſtraight lines D′K′, $d'k'$ be drawn parallel to one aſymptote, meeting the other in K′ and k', theſe lines are to each other reciprocally as their diſtances from the centre, or D′K : $d'k'$ :: Ck' : CK′. This appears from laſt cor. and 14. 6. E.

Definitions.

Fig. 57.

XII. If A a be the tranſverſe axis, and B b the conjugate axis of two oppoſite hyperbolas DAD, dad, and if B b be the tranſverſe axis, and A a the conjugate axis of other two oppoſite hyperbolas EBE, ebe, theſe hyperbolas are ſaid to be *conjugate to the former*. When all the four hyperbolas are mentioned they are called *conjugate hyperbolas*.

Cor. The aſymptotes of the hyperbolas DAD, dad are alſo the aſymptotes of the hyperbolas EBE, ebe. This is evident from Cor. 2. to Definition 11.

XIII. Any diameter of the conjugate hyperbolas is called a *ſecond diameter of the other hyperbolas*.

Cor. Every ſtraight line paſſing through the centre, within the angle through which the conjugate or ſecond axis paſſes, is a ſecond diameter of the hyperbola.

XIV. Any ſtraight line not paſſing through the centre, but terminated both ways by the oppoſite hyperbolas, and biſected by a ſecond diameter, is called an *Ordinate to that diameter*.

Prop. XV.

Any ſtraight line not paſſing through the centre, but terminated by the oppoſite hyperbolas, and parallel to a tangent to either of the conjugate hyperbolas, is biſected by the ſecond diameter that paſſes through the point of contact, or is an ordinate to that diameter.

The ſtraight line D d terminated by the oppoſite hyperbolas, and parallel to the tangent KQ k, is biſected at E by Q q the diameter that paſſes through the point of contact.

Let D d meet the aſymptotes in G and g, and let the tangent meet them in K and k. The ſtraight lines G g, K k are evidently ſimilarly divided at E and Q, and ſince KQ=Q k (2 cor. 13.) therefore GE=E g; now DG=gd (1 cor. 13.) therefore DE=E d.

Cor. 1. Every ordinate to a ſecond diameter is parallel to a tangent at its vertex. The demonſtration is the ſame as in Cor. 2. Prop. 8.

Cor. 2. All the ordinates to the ſame ſecond diameter are parallel to each other.

Cor. 4. A ſtraight line that biſects two parallel ſtraight lines which terminate in the oppoſite hyperbolas is a ſecond diameter.

Cor. 5. The ordinates to the conjugate or ſecond axis are perpendicular to it, and no other ſecond diameter is perpendicular to its ordinates.

Cor. 6. The oppoſite hyperbolas are ſimilar to one another, and like portions of them are, in all reſpects, equal.

Prop. XVI.

If a tranſverſe diameter of an hyperbola be parallel to the ordinates to a ſecond diameter, the latter ſhall be parallel to the ordinates to the former.

Let P p, a tranſverſe diameter of an hyperbola, be parallel to DEd, any ordinate to the ſecond diameter Q q, the ſecond diameter Q q ſhall be parallel to the ordinates to the diameter P p.

Draw the diameter dCG through one extremity of the ordinate dD, and join G and D, the other extremity, meeting P p in H. Becauſe dG is biſected at C, and CH is parallel to dD, the line DG is biſected at H, therefore DG is an ordinate to the diameter P p. And becauſe dG and dD are biſected at C and E, the diameter Q q is parallel to DG (2. 6. E.), therefore Q q is parallel to any ordinate to the diameter P p.

Definitions.

XV. Two diameters are ſaid to be *conjugate to one another* when each is parallel to the ordinates to the other diameter.

Cor. Diameters which are conjugate to one another are parallel to tangents at the vertices of each other.

XVI. A third proportional to any diameter and its conjugate is called the *Parameter*, alſo the *Latus rectum of that diameter*.

Prop. XVII.

The tangent at the vertex of any tranſverſe diameter of an hyperbola, which is terminated by the aſymptotes, is equal to the diameter that is conjugate to that diameter.

Let PCp be any tranſverſe diameter of an hyperbola, HPh a tangent at its vertex, meeting the aſymptotes

totes in H and h, and Q q the diameter which is conjugate to P p; the tangent H h is equal to the diameter Q q.

Through D, any point in the hyperbola, draw a straight line parallel to the tangent and diameter, cutting either of the conjugate hyperbolas in d, and the asymptotes in E and e, and through D and d draw lines parallel to B b the conjugate axis, meeting the asymptotes in the points K, k, and L, l. The triangles DEK, d EL are similar, as also e D k, e d l, therefore

$$KD : DE :: Ld : dE,$$
$$\text{and } kD : De :: ld : de;$$

therefore, taking the rectangles of the corresponding terms,

$$KD \cdot Dk : ED \cdot De :: Ld \cdot dl : Ed \cdot de.$$

But $KD \cdot Dk = BC^2$ (11.) and $BC^2 = Ld \cdot dl$ (5 cor. 13.)

$$\text{therefore } ED \cdot De = Ed \cdot de.$$

Now $ED \cdot De = HP^2$ (4 cor. 13.),

and $Ed \cdot de = QC^2$ (5 cor. 13.)

therefore $HP^2 = QC^2$, and $HP = QC$,

and consequently $Hh = Qq$.

Cor. 1. If another tangent be drawn to the curve at p, meeting the asymptotes in H′ and h', the straight lines which join the points H, H′, also h, h', are tangents to the conjugate hyperbolas at Q and q. For pH′ as well as PH is equal and parallel to CQ, therefore the points H, Q, H′ are in a straight line parallel to P p, and HQ=H′Q (33. 1. E.), therefore HQH′ is a tangent to the curve at Q. In like manner it appears that $h\ q\ h'$ is a tangent at q.

Cor. 2. If tangents be drawn at the vertices of two conjugate diameters, they will meet in the asymptotes, and form a parallelogram of which the asymptotes are diagonals.

Prop. XVIII.

If a tangent to an hyperbola meet a second diameter, and from the point of contact an ordinate be drawn to that diameter, half the second diameter will be a mean proportional between the segments of the diameter intercepted between the centre and the ordinate, and between the centre and the tangent.

Let DL a tangent to the curve at D meet the second diameter Q q in L, and let DG d' be an ordinate to that diameter, then (Fig. 61.)

$$CG : CQ :: CQ : CL.$$

Let P p be the diameter that is conjugate to Q q, let HP h be a tangent at the vertex, terminated by the asymptotes; through D draw the ordinate DE d to the diameter P p, meeting the asymptotes in M and m; let K be the intersection of DL and P p. Because DK is a tangent at D, and DE d an ordinate to P p, CP is a mean proportional between CE and CK (9.) and therefore

$$CE^2 : CP^2 :: CE : CK.$$

Now, the lines CQ, PH, EM being parallel (8. and Def. 15.), from similar triangles,

$$CE^2 : CP^2 :: EM^2 : PH^2,$$

and CE, or DG : CK :: LG : LC;

therefore $EM^2 : PH^2 :: LG : LC$,

and by division, &c. $EM^2 - PH^2 : PH^2 :: CG : LC :: CG^2 : CG \cdot LC$.

But since $PH^2 = MD \cdot Dm$ (4 cor. 13.), $EM^2 - PH^2 = ED^2 = CG^2$,

therefore $PH^2 = CG \cdot LC$;

wherefore, and since PH=CQ (17.)

$$CG : CQ :: CQ : CL.$$

Prop. XIX.

If an ordinate be drawn to any transverse diameter of an hyperbola, the rectangle under the abscisses of the diameter will be to the square of the semi-ordinate as the square of the diameter to the square of its conjugate.

Let DEd be an ordinate to the transverse diameter Pp, and let Q q be its conjugate diameter. (Fig. 62.)

$$PE \cdot Ep : DE^2 :: Pp^2 : Qq^2.$$

Let DKL a tangent at D meet the diameter in K, and its conjugate in L. Draw DG parallel to P p, meeting Q q in G. Because CP is a mean proportional between CE and CK (9.)

$$CP^2 : CE^2 :: CK : CE,$$

and by division $CP^2 : PE \cdot Ep :: CK : KE$.

But, because ED is parallel to CL,

CK : KE :: CL : DE, or CG,

and because CQ is a mean proportional between CG and CL (18.)

$$CL : CG :: CQ^2 : CG^2, \text{ or } DE^2,$$

therefore $CP^2 : PE \cdot Ep :: CQ^2 : DE^2$,

and by inversion and alternation,

$$PE \cdot Ep : DE^2 :: CP^2 : CQ^2 :: Pp^2 : Qq^2.$$

Cor. 1. If an ordinate be drawn to any second diameter of an hyperbola, the sum of the squares of half the second diameter and its segment intercepted by the ordinate from the centre is to the square of the semi-ordinate, as the square of the second diameter to the square of its conjugate.

Let DG be a semi-ordinate to the second diameter Q q. It has been shewn that

$$CG^2 : CQ^2 :: PE \cdot Ep : CP^2,$$

therefore, by comp.

$$CQ^2 + CG^2 : CQ^2 : CE^2 \text{ or } DG^2 : CP^2,$$

and by alter.

$$CQ^2 + CG^2 : CE^2 :: CQ^2 : CP^2 :: Qq^2 : Pp^2.$$

Cor. 2. The squares of semi-ordinates, and of ordinates to any transverse diameter, are to one another as the rectangles contained by the corresponding abscisses; and the squares of semi-ordinates, and of ordinates,

Of the Hyperbola.

nates to any fecond diameter are to one another as the fums of the fquares of half that diameter and the fegments intercepted by the ordinate from the centre.

Cor. 3. The ordinates to any tranfverfe diameter, which intercept equal fegments of that diameter from the centre, are equal to one another, and, converfely, equal ordinates intercept equal fegments of the diameter from the centre.

Prop. XX.

Plate CLXI. The tranfverfe axis of an hyperbola is the leaft of all its tranfverfe diameters, and the conjugate axis is the leaft of all its fecond diameters.

Fig. 64. Let Rr be the tranfverfe axis, Pp any other tranfverfe diameter, draw PE perpendicular to Rr; then CE being greater than CR, and CP greater than CE, much more is CP greater than CR, therefore Pp is greater than Rr. In like manner it is fhewn that if Ss be the conjugate axis, and Qq any other fecond diameter, Qq is greater than Ss.

Prop. XXI.

Plate CLX. If an ordinate be drawn to any tranfverfe diameter of an hyperbola, the rectangle under the abfciffes of the diameter is to the fquare of the femi-ordinate as the diameter to its parameter.

Fig. 65. Let DE be a femi-ordinate to the tranfverfe diameter Pp; let PG be the parameter of the diameter, and Qq the conjugate diameter. By the definition of the parameter (Def. 16.)

$$Pp : Qq :: Qq : PG,$$
therefore $Pp : PG :: Pp^2 : Qq^2$, (2 cor. 20. 6. E.)
But $Pp^2 : Qq^2 :: PE \cdot Ep . DE^2$, (19.)
therefore $PE \cdot Ep : DE^2 :: Pp : PG$.

Cor. Let the parameter PG be perpendicular to the diameter Pp; join pG, and from E draw EM parallel to PG, meeting pG in M. The fquare of DE the femi-ordinate is equal to the rectangle contained by PE and EM.

For $PE \cdot Ep : DE^2 :: Pp : PG$,
and $Pp : PG :: Ep : EM :: PE \cdot Ep : PE \cdot EM$,
therefore $DE^2 = PE \cdot EM$.

Scholium.

If the rectangles PGLp, HGKM be completed, it will appear that the fquare of ED is equal to the rectangle MP, which rectangle is greater than the rectangle KP, contained by the abfcifs PE, and the parameter GP, by a rectangle KH fimilar and fimilarly fituated to LP, the rectangle contained by the parameter and diameter. It was on account of the excefs of the fquare of the ordinate above the rectangle contained by the abfcifs and parameter that Apollonius gave the curve to which the property belonged the name of Hyperbola.

Prop. XXII.

Plate CLXI. If from the vertices of two conjugate diameters of an hyperbola there be drawn ordinates to any third tranfverfe diameter, the fquare of the fegment of that diameter, intercepted between the ordinate from the vertex of the fecond diameter, and the centre, is equal to the rectangle contained by the fegments between the other ordinate and the vertices of the third tranfverfe diameter. And the fquare of the fegment intercepted between the ordinate from the vertex of the tranfverfe diameter and the centre is equal to the fquare of the fegment between the other ordinate, and the centre, together with the fquare of half the third tranfverfe diameter.

Fig. 64. Let Pp, Qq be two conjugate diameters, of which Pp is a tranfverfe, and Qq a fecond diameter; let PE, QG be femi-ordinates to any third tranfverfe diameter Rr, then $CG^2 = RE \cdot Er$, and $CE^2 = CG^2 + CR^2$.

Draw the tangents PH, QK, meeting Rr in H and K. The rectangles $HC \cdot CE$ and $KC \cdot CG$ are equal, for each is equal to CR^2 (9.) therefore,

$$HC : CK :: CG : CE.$$

But the triangles HPC, CQK are evidently fimilar (cor. Def. 15.) and fince PE, QG are parallel, their bafes CH, KC fimilarly divided at E and G, therefore

$$HC : CK :: HE : CG,$$
wherefore $CG : CE :: HE : CG$,
confequently $CG^2 = CE \cdot EH =$ (1 cor. 9.) $RE \cdot Er$.

Again, from the fimilar triangles HPC, CQK,

$$HC : CK :: CE : KG.$$

Now it was fhewn that $HC : CK :: CG : CE$,
therefore $CG : CE :: CE : KG$,
confequently
$CE^2 = CG \cdot GK =$ (3. 2. E.) $CG^2 + GC \cdot CK$.
But $GC \cdot CK = CR^2$ (18.)
therefore $CE^2 = CG^2 + CR^2$.

Cor. 1. Let Ss be the diameter that is conjugate to Rr, then Rr is to Ss as CG to PE, or as CE to QG.

For $Rr^2 : Ss^2 :: RE \cdot Er$, or $CG^2 : PE^2$,
therefore $Rr : Ss :: CG : PE$.

In like manner $Rr : Ss :: CE : QG$.

Cor. 2. The difference between the fquares of CE, CG the fegments of the tranfverfe diameter to which the femi-ordinates PE, QG are drawn, is equal to the fquare of CR the femi-diameter. For it has been fhewn that $CE^2 = CG^2 + CR^2$;

therefore $CE^2 - CG^2 = CR^2$.

Cor. 3. The difference of the fquares of any two conjugate diameters is equal to the difference of the fquares of the axes. Let Rr, Ss be the axes, and Pp, Qq any two conjugate diameters; draw PE, QG perpendicular to Rr, and PL, QM perpendicular to Ss. Then

$$CE^2 - CG^2 = CR^2,$$
and $CM^2 - CL^2$, or $GB^2 - PE^2 = CS^2$,
therefore $CE^2 + PE^2 - (CG^2 + GQ^2) = CR^2 - CS^2$,
that is (47. 1. E.) $CP^2 - CQ^2 = CR^2 - CS^2$,
therefore $Pp^2 - Qq^2 = Rr^2 - Ss^2$.

Prop.

Of the Hyperbola.

PROP. XXIII.

If four straight lines be drawn touching conjugate hyperbolas at the vertices of any two conjugate diameters, the parallelogram formed by these lines is equal to the rectangle contained by the transverse and conjugate axes.

Fig. 65.

LET P*p*, Q*q* be any two conjugate diameters, a parallelogram DEGH formed by tangents to the conjugate hyperbolas at their vertices is equal to the rectangle contained by A*a*, B*b* the two axes.

Let A*a*, one of the axes, meet the tangent PE in K; join QK, and draw PL, QM perpendicular to A*a*.

Because CK : CA :: CA : CL (9.)
and CA : CB :: CL : QM (1 cor. 22.)
ex æq. CK : CB :: CA : QM,
therefore CK · QM=CB · CA.

But CK · QM=twice trian. CKQ=paral. CPEQ,
therefore the parallelogram CPEQ=CB · CA;

and, taking the quadruples of these, the parallelogram DEGH is equal to the rectangle contained by A*a* and B*b*.

PROP. XXIV.

If two tangents at the vertex of any transverse diameter of an hyperbola meet a third tangent, the rectangle contained by their segments between the points of contact, and the points of intersection, is equal to the square of the semi-diameter to which they are parallel. And the rectangle contained by the segments of the third tangent between its points of contact and the parallel tangents, is equal to the square of the semi-diameter to which it is parallel.

Fig. 66.

LET PH, *ph*, tangents at the vertices of a transverse diameter P*p*, meet DH*h*, a tangent to the curve at any point D, in H and *h*; let CQ be the semi-diameter to which the tangents PH, *ph* are parallel, and CR that to which H*h* is parallel; then

PH · *ph*=CQ^2, and DH · D*h*=CR^2.

Let H*h* meet the semi-diameters CP, CQ in L and K. Draw ED, RM parallel to CQ, and DG parallel to CP.

Because LP · L*p*=LE · LC (2 cor. 9.)
LP : LE :: LC : L*p*;

Hence, and because of the parallels PH, ED, CK, *ph*,

PH : ED :: CK : *ph*,
wherefore PH · *ph*=ED · CK.
But ED · CK=CG · CK=CQ^2 (18.)
therefore PH · *ph*=CQ^2.

Again, the triangles LED, CMR are evidently similar, and LE, LD are similarly divided at H and P, also at *h* and *p*,

therefore PE : HD :: (LE : LD ::) CM : CR,
also *p*E : *h*D :: (LE : LD ::) CM : CR,

hence, taking the rectangles of the corresponding terms,

PE · *p*E : HD · *h*D :: CM^2 : CR^2.

But, if CD be joined, the points D and R are evidently the vertices of two conjugate diameters (cor. def. 15.) and therefore PE · *p*E=CM^2 (22.)

therefore HD · *h*D=CR^2.

COR. The rectangle contained by LD and DK, the segments of a tangent intercepted between D the point of contact, and P*p*, Q*q*, any two conjugate diameters, is equal to the square of CR, the semi-diameter to which the tangent is parallel.

Let the parallel tangents PH, *ph* meet LK in H and *h*, and draw DE a semi-ordinate to P*p*. Because of the parallels ED, PH, CK, *ph*,

LE : LD :: EP : DH,
and EC : DK :: E*p* : D*h*,
therefore
LE · EC : LD · DK :: EP · E*p* : DH · D*h*.
But LE · EC=EP · E*p* (1 cor. 9.)
therefore LD · DK=DH · D*h*=(by this prop.) CR^2.

PROP. XXV.

If two straight lines be drawn from the foci of an hyperbola perpendicular to a tangent, straight lines drawn from the centre, to the points in which they meet the tangent, will each be equal to half the transverse axis.

Fig. 67.

LET P*d*D be a tangent to the curve at P, and FD, *fd* perpendiculars to the tangent from the foci, the straight lines joining the points C, D and C, *d* are each equal to AC, half the transverse axis.

Join FP, *f*P, and produce FD, P*f* till they intersect in E. The triangles FDP, EDP have the angles at D right angles, and the angles FPD, EPD equal (4.), and the side DP common to both; they are therefore equal, and consequently have ED=DF, and EP=PF, wherefore E*f*=FP—P*f*=A*a*. Now the straight lines FE, F*f* being bisected at D and C, the line DC is parallel to E*f*, and thus the triangles F*f*E, FCD are similar,

therefore F*f*: *f*F, or A*a* :: FC : CD;
but FC is half F*f*, therefore CD is half of A*a*.

COR. If a straight line Q*q* be drawn through the centre parallel to the tangent D*d*, it will cut off from PE, P*f* the segments PG, P*g*, each equal to AC half the transverse axis. For C*d*PG, CDP*g* are parallelograms, therefore PG=*d*C=AC, and P*g*=DC=AC.

PROP. XXVI.

The rectangle contained by perpendiculars drawn from the foci of an hyperbola to a tangent is equal to the square of half the conjugate axis.

Fig. 67.

LET P*d*D be a tangent, and FD, *fd* perpendiculars from the foci, the rectangle contained by FD and *fd* is equal to the square of BC half the conjugate axis.

It is evident from last proposition that the points D, *d* are in the circumference of a circle, whose centre is

is the centre of the hyperbola, and radius CA half the tranverse axis; now FDd being a right angle, if d C be joined, and produced, it will meet DF in H, a point in the circumference; and since FC=fC, and CH=Cd, and the angles FCH, fCd are equal, FH is equal to $f\,d$, therefore,

$$DF \cdot df = DF \cdot FH = AF \cdot aF \text{ (36. 3. E.)} = CB^2 \text{ (3.)}$$

Cor. If PF, Pf, be drawn from the point of contact to the foci, the square of FD is a fourth proportional to fP, FP and CB^2. For the angles fPd, FPD are equal (4.), and FDP, $f\,d$ P are right angles, therefore the triangles FDP, fdP are similar, and

$$fP : FP :: fd : FD :: fd \cdot FD \text{ or } BC^2 : FD^2.$$

Prop. XXVII.

Fig. 68.

If from C the centre of an hyperbola a straight line CL be drawn perpendicular to a tangent LD, and from D the point of contact a perpendicular be drawn to the tangent, meeting the transverse axis in H, and the conjugate axis in h, the rectangle contained by CL and DH is equal to the square of CB, the semi-conjugate axis; and the rectangle contained by CL and Dh is equal to the square of CA, the semi-transverse axis.

Let the axes meet the tangent in M and m, and from D draw the semi-ordinates DE, De, which will be perpendicular to the axes.

The triangles DEH, CLm are evidently equiangular, therefore,

$$DH : DE :: Cm : CL,$$
$$\text{hence } CL \cdot DH = DE \cdot Cm,$$
$$\text{but } DE \cdot C\,m \text{ or } C\,e \cdot Cm = BC^2 \text{ (10.)}$$
$$\text{therefore } CL \cdot DH = BC^2.$$

In the same way it may be shewn that $CL \cdot Dh = AC^2$.

Cor. 1. If a perpendicular be drawn to a tangent at the point of contact, the segments intercepted between the point of contact and the axes are to each other reciprocally as the squares of the axes by which they are terminated.

For $AC^2 : BC^2 :: CL \cdot Dh : CL \cdot DH :: Dh : DH$.

Cor. 2. If DF be drawn to either focus, and HK be drawn perpendicular to DF; the straight line DK shall be equal to half the parameter of the transverse axis.

Draw CG parallel to the tangent at D, meeting DH in N, and DF in G. The triangles GDN, HDK are similar, therefore

$$GD : DN :: HD : DK;$$
$$\text{and hence } GD \cdot DK = HD \cdot DN.$$
$$\text{But } GD = AC \text{ (cor. 25.) and } ND = CL,$$
$$\text{therefore } AC \cdot DK = HD : CL = \text{(by the prop.) } CB^2,$$
$$\text{wherefore } AC : BC :: BC : DK,$$
hence DK is half the parameter of Aa (def. 16.)

Definition.

Fig. 69.

XVII. If a point G be taken in the transverse axis of an hyperbola, so that the distance of G from the centre may be a third proportional to CF, the distance of either focus from the centre, and CA the semi-transverse axis, a straight line HGh drawn through G, perpendicular to the axis, is called the *Directrix* of the hyperbola.

Cor. 1. If MFm, an ordinate to the axis, be drawn through the focus, tangents to the hyperbola at the extremities of the ordinate will meet the axis at the point G (9.).

Cor. 2. The hyperbola has two directrices, for the point G may be taken on either side of the centre.

Prop. XXVIII.

The distance of any point in an hyperbola from either directrix is to its distance from the focus nearest that directrix, in the constant ratio of the semi-transverse axis to the distance of the focus from the centre.

Fig. 69.

Let D be any point in the hyperbola; let DK be drawn perpendicular to the directrix, and DF to the focus nearest the directrix; DK is to DF as CA, half the tranverse axis, to CF, the distance of the focus from the centre.

Draw Df to the other focus, and DE perpendicular to Aa; take L a point in the axis so that AL=FD, and consequently La=Df; then CL is evidently half the sum of AL and aL, or of FD and fD, and CE half the sum of FE and fE, and because

$$Df - DF : Ff :: fE + FE : Df + DF \text{ (Trig.)}$$

by taking the halves of the terms of the proportion,

$$CA : CF :: CE : CL.$$
$$\text{But } CA : CF :: CG : CA \text{ (def. 17.)},$$
$$\text{therefore, } CG : CA :: CE : CL,$$
$$\text{hence (19. 5. E.) } EG : AL :: CG : CA :: CA : CF$$
$$\text{that is, } DK : DF :: CA : CF.$$

Cor. 1. If the tangent GMN be drawn through M, the extremity of the ordinate passing through the focus, and ED be produced to meet GM in N, EN shall be equal to DF. For draw MO perpendicular to the directrix, then, because M and D are points in the hyperbola, and from similar triangles,

$$FM : FD :: MO : DK :: GF : GE :: MF : EN,$$
therefore FD=EN.

Cor. 2. If AI and $a\,i$ be drawn perpendicular to the transverse axis at its extremities, meeting the tangent, GM in I and i, then AI=AF and ai=aF.

Prop. XXIX.

Fig. 70.

If through P and Q the vertices of two semi-diameters of an hyperbola there be drawn straight lines PD, QE parallel to one of the asymptotes CN, meeting the other asymptote in D and E, the hyperbolic sector PCQ is equal to the hyperbolic trapezium PDEQ.

Let CQ meet PD in G. The triangles CDP, CEQ are equal (1 cor. 14.) therefore, taking the triangle CDG from both, the triangle CGP is equal to the quadrilateral DEQG; to these add the figure PGQ,

PGQ, and the hyperbolic ſector PCQ is equal to the hyperbolic trapezium PDEQ.

PROP. XXX.

Fig. 71. If from the centre of an hyperbola the ſegments CD, CE, CH be taken in continued proportion, in one of the aſymptotes, and the ſtraight lines DP, EQ, HR be drawn parallel to the other aſymptote, meeting the hyperbola in P, Q, R, the hyperbolic areas PDEQ, QEHR are equal.

THROUGH Q draw a tangent to the curve, meeting the aſymptotes in K and L: join PR meeting the aſymptotes in M and N; draw the ſemi-diameters CP, CQ, CR, let CQ meet PR in G.

Becauſe QE is parallel to CM, and KQ is equal to QL (2 cor. 13.) CE is equal to EL; and becauſe MC, PD, RH, are parallel, and MP is equal to RN (1 cor. 13.) CD is equal to HN. Now, by hypotheſis.

CD : CE :: CE : CH,
therefore NH : LE :: CE : CH;
but CE : CH :: HR : EQ (2 cor. 14.)
therefore NH : LE :: HR : EQ,
and by alternation NH : HR :: LE : EQ.

Now the angles at H and E are equal, therefore the triangles NHR, LEQ are equiangular, and NR is parallel to LQ; conſequently RP is an ordinate to the diameter CQ (8.) and is biſected by it at G; and as CQ biſects all lines which are parallel to KL, and are terminated by the hyperbola, it will biſect the area PQR. Let the equal areas PQG, RQG be taken from the equal triangles PCG, RCG, and there will remain the hyperbolic ſectors PCQ, RCQ equal to each other. Therefore (29.) the areas DPQE, EQRH are alſo equal.

COR. Hence if CD, CE, CH, &c. any number of ſegments of the aſymptote be taken in continued proportion, the areas DPQE, DPQRH, &c. reckoned from the firſt line DP, will be in arithmetical progreſſion.

PROP. XXXI. PROBLEM.

Fig. 72, 73. Two ſtraight lines H *a*, B *b*, which biſect each other at right angles in C, being given by poſition, to deſcribe an hyperbola, of which H *a* ſhall be the tranſverſe and B *b* the conjugate axis.

FIRST METHOD. By a Mechanical Deſcription.

Fig. 72. JOIN AB, and in A *a*, produced, take CF, C *f* each equal to AB; the points F, *f* will be the foci of the hyperbola.

Let one end of a ſtring be faſtened at F, and the other to G the extremity of a ruler *f* DG, and let the difference between the length of the ruler and the ſtring be equal to A *a*. Let the other end of the ruler be fixed to the point *f*, and let the ruler be made to revolve about *f* as a centre in the plane in which the axes are ſituated, while the ſtring is ſtretched by means of a pin D, ſo that the part of it between G and D is applied cloſe to the edge of the ruler; the point of the pin will by its motion trace a curve line DAD upon the plane which is one of the hyperbolas required.

If the ruler be made to revolve about the other focus F, while the end of the ſtring is faſtened to *f*, the oppoſite hyperbola will be deſcribed by the moving point D; for in either caſe G *f*—(GD+DF), that is, D*f*—DF is by hypotheſis equal to A *a* the tranſverſe axis.

SECOND METHOD. By finding any number of points in the curve.

Fig. 73. Find F, either of the foci as before, draw HAK, *h a k* perpendicular to the tranſverſe axis at its extremities, and take AH and AK on each ſide of the vertex equal to AF, alſo *a h* and *a k* each equal to *a* F; join H *h* and K *k*; take E any point in A *a*, and through E draw NE *n* parallel to HK, meeting H *h* and K *k* in N and *n*. On F as a centre, with a radius equal to EN or E *n*, let a circle be deſcribed meeting N *n* in D and *d*, theſe will be two points in the hyperbola; and in the ſame way may any number of points in the hyperbola, or oppoſite hyperbolas, be found. The reaſon of this conſtruction is obvious from cor. 1. and 2. to Prop. 28.

PROP. XXXII. PROBLEM.

Plate CLXII. An hyperbola being given by poſition, to find its axes.

Fig. 74. LET HA *h* be the given hyperbola. Draw two parallel ſtraight lines H *h*, K *k* terminating in either of the oppoſite hyperbolas, and biſect them at L and M; join LM, and produce it to meet the hyperbola in P; then LP will be a tranſverſe diameter (4 cor. 8.). Let *p* be the point in which it meets the oppoſite hyperbola, biſect P *p* in C, the point C is the centre (2.). Take D any point in the hyperbola, and on C as a centre with the diſtance CD deſcribe a circle; if this circle lie wholly without the oppoſite hyperbolas, then CD muſt be half the tranſverſe axis (20.), but if not, let the circle meet the hyperbola again in *d*, join D *d*, and biſect it in E, join CE, meeting the oppoſite hyperbolas in A and *a*, then A *a* will be the tranſverſe axis (5 cor. 8.) for it is perpendicular to D *d* (3. 3. E.) which is an ordinate to A *a*. The other axis will be found by drawing B *b* a ſtraight line through the centre perpendicular to A *a*, and taking CB ſo that CB^2 may be a fourth proportional to the rectangle AE · E *a*, and the ſquares of DE and CA, thus CB is half the conjugate axis (19.).

PART

PART IV.

SECT. I.

OF THE CONE AND ITS SECTIONS.

Definitions.

Fig. 75. I. If through the point V, without the plane of the circle ADB, a ſtraight line AVE be drawn, and produced indefinitely both ways, and if the point V remain fixed while the ſtraight line AVE is moved round the whole circumference of the circle, two ſuperficies will be generated by its motion, each of which is called a *Conical Superficies*, and theſe mentioned together are called *Oppoſite Conical Superficies*.

II. The ſolid contained by the conical ſuperficies, and the circle ADB is called a *Cone*.

III. The fixed point V is called the *Vertex of the cone*.

IV. The circle ADB is called the *Baſe of the cone*.

V. Any ſtraight line drawn from the vertex to the circumference of the baſe is called a *Side of the cone*.

VI. A ſtraight line VC drawn through the vertex of the cone, and the centre of the baſe, is called the *Axis of the cone*.

VII. If the axis of the cone be perpendicular to the baſe it is called a *Right cone*.

VIII. If the axis of the cone be not perpendicular to the baſe, it is called a *Scalene cone*.

Prop. I.

If a cone be cut by a plane paſſing through the vertex, the ſection will be a triangle.

Fig. 75. Let ADBV be a cone, of which VC is the axis; let AD be the common ſection of the baſe of the cone and the cutting plane; join VA, VD. When the generating line comes to the points A and D, it is evident that it will coincide with the ſtraight lines VA, VD, they are therefore in the ſurface of the cone, and they are in the plane which paſſes through the points V, A, D, therefore the triangle VAD is the common ſection of the cone and the plane which paſſes through its vertex.

Prop. II.

If a cone be cut by a plane parallel to its baſe, the ſection will be a circle, the centre of which is in the axis.

Fig. 75. Let EFG be the ſection made by a plane parallel to the baſe of the cone, and VAB, VCD two ſections of the cone made by any two planes paſſing through the axis VC; let EG, HF be the common ſections of the plane EFG, and the triangles VAB, VCD. Becauſe the planes EFG, ADB are parallel, HE, HF will be parallel to CA, CD, and

AC : EH :: (VC : VH ::) CD : HF,

but AC=CD, therefore EH=HF. For the ſame reaſon GH=HF, therefore EFG is a circle of which H is the centre and EG the diameter.

Prop. III.

Fig. 76. If a ſcalene cone ADBV be cut through the axis by a plane perpendicular to the baſe, making the triangle VAB, and from any point H, in the ſtraight line AV, a ſtraight line HK be drawn in the plane of the triangle VAB, ſo that the angle VHK may be equal to the angle VBA, and the cone be cut by another plane paſſing through HK perpendicular to the plane of the triangle ABC, the common ſection HFKM of this plane and the cone will be a circle.

Take any point L in the ſtraight line HK, and through L draw EG parallel to AB, and let EFGM be a ſection parallel to the baſe, paſſing through EG; then the two planes HFKM, EFGM being perpendicular to the plane VAB, their common ſection FLM is perpendicular to ELG, and ſince EFGM is a circle (by laſt prop.) and EG its diameter, the ſquare of FL is equal to the rectangle contained by EL and LG (35. 3. E.); but ſince the angle VHK is equal to VBA, or VGE, the angles EHK, EGK are equal, therefore the points E, H, G, K, are in the circumference of a circle (21. 3. E.), and $HL \cdot LK = EL \cdot LG$ (35. 3. E.)$=FL^2$, therefore the ſection HFKM is a circle of which HLK is a diameter (35. 3. E.).

This ſection is called a *Subcontrary Section*.

Prop. IV.

If a cone be cut by a plane which does not paſs through the vertex, and which is neither parallel to the baſe, nor to the plane of a ſubcontrary ſection, the common ſection of the plane and the ſurface of the cone will be an ellipſe, a parabola, or an hyperbola, according as the plane paſſing through the vertex parallel to the cutting plane falls without the cone, touches it, or falls within it.

Fig. 77, 79. Let ADBV be any cone, and let ONP be the common ſection of a plane paſſing through its vertex and the plane of the baſe, which will fall without the baſe, will touch it, or will fall within it.

Let FKM be a ſection of the cone parallel to VPO; through C the centre of the baſe draw CN perpendicular to OP, meeting the circumference of the baſe in A and B; let a plane paſs through V, A and B, meeting the plane OVP in the line NV, the ſurface of the cone in VA, VB, and the plane of the ſection FKM in LK; then becauſe the planes OVP, MKF are parallel, KL will be parallel to VN, and will meet VB one ſide of the cone in K; it will meet VA the

Of the Cone and its Sections.

the other side in H, fig. 77. within the cone; it will be parallel to VA in fig. 78. and it will meet VA, produced beyond the vertex, in H, fig. 79.

Let EFGM be a section of the cone parallel to the base, meeting the plane VAB in EG, and the plane FKM in FM, and let L be the intersection of EG and FM, then EG will be parallel to BN, and FM will be parallel to PO, and therefore will make the same angle with LK wherever the lines FM, LK cut each other, and since BN is perpendicular to PO, EG is perpendicular to FM. Now the section EFGM is a circle of which EG is the diameter (2.); therefore FM is bisected at L, and $FL^2 = EL \cdot LG$.

Fig. 77.

CASE I. Let the line PNO be without the base of the cone. Through K and H draw KR and HQ parallel to AB. The triangles KLG, KHQ are similar, as also HLE, HKR; therefore

$$KL : LG :: KH : HQ,$$
$$\text{and } HL : LE :: KH : KR;$$
$$\text{therefore } KL \cdot HL : LG \cdot LE \text{ or } LF^2 :: KH^2 : HQ \cdot KR.$$

Now the ratio of KH^2 to $HQ \cdot KR$ is the same wherever the sections HFKM, EFGM intersect each other, therefore $KL \cdot HL$ has a constant ratio to LF^2, consequently (1 cor. 11. Part II.) the section HFKM is an ellipse, of which HK is a diameter and MF an ordinate.

Fig. 78.

CASE II. Next, suppose the line ONP to touch the circumference of the base in A. Let DIS be the common section of the base and the plane FKM, the line DIS is evidently parallel to FLM and perpendicular to AB, therefore $DI^2 = AI \cdot IB$,

$$\text{hence } DI^2 : FL^2 :: AI \cdot IB : EL \cdot LG.$$

But since EG is parallel to AB, and IK parallel to AV, AI is equal to EL, and

$$IB : LG :: KI : KL;$$
$$\text{therefore } DI^2 : FL^2 :: KI : KL.$$

Hence it appears (cor. 9. Part I.), that the section DFKMS is a parabola, of which KLI is a diameter and DIS, FLM ordinates to that diameter.

Fig. 79.

CASE III. Lastly, Let the line PNO fall within the base; draw VT through the vertex parallel to EG. The triangles HVT, HEL are similar, as also the triangles KVT, KGL, therefore

$$HT : TV :: HL : LE,$$
$$\text{and } KT : TV :: KL : LG,$$
$$\text{therefore } HT \cdot KT : TV^2 :: HL \cdot LK : LE \cdot LG \text{ or } LF^2.$$

Hence it appears, that $HL \cdot LK$ has to LF^2 a constant ratio, therefore the section DFKMS is an hyperbola, of which KH is a transverse diameter, and FM an ordinate to that diameter, (2 cor. 19. Part III.).

SCHOLIUM.

From the four preceding propositions it appears, that the only lines which can be formed by the common section of a plane and the surface of a cone, are these five. I. A straight line, or rather two straight lines intersecting each other in the vertex of the cone, and forming with the straight line which joins the points in which they meet the base a triangle. II. A circle. III. An ellipse. IV. A parabola. V. An hyperbola. The two first of these, however, viz. the triangle and circle, may be referred to the hyperbola and the ellipse, for if the axes of an hyperbola be supposed to retain a constant ratio to each other, and, at the same time to diminish continually, till at last the vertices coincide; the opposite hyperbolas will evidently become two straight lines intersecting each other in a point; and a circle may be considered as an ellipse, whose axes are equal, or whose foci coincide with the centre; so that the only three sections which require to be separately considered, are the *ellipse*, the *parabola*, and the *hyperbola*.

Of the Curvature of the Conic Sections.

SECT. II.

OF THE CURVATURE OF THE CONIC SECTIONS.

DEFINITIONS.

I. A circle is said to *touch* a conic section in any point, when the circle and conic section have a common tangent in that point.

II. If a circle touch a conic section in any point, so that no other circle touching it in the same point can pass between it and the conic section on either side of the point of contact, it is said to have the *same curvature* with the conic section in the point of contact, and it is called the CIRCLE OF CURVATURE.

LEMMA.

Fig. 80.

Let PL be any chord in a circle, PX a tangent at one of its extremities, and LK a diameter passing through the other extremity: draw any chord G g parallel to the tangent PX, meeting PL in E, and from its extremities draw GH, g h perpendicular to the diameter, meeting PL in N and n; the square of GE is equal to the rectangle contained by PE and LN, and the square of g E is equal to the rectangle contained by PE and L n.

From G and g draw the straight lines GP, g P, GL, g L, and let LM a perpendicular to the diameter, and therefore a tangent to the circle at L, meet the tangent PX in M. The triangle NGE is evidently similar to the triangle LMP, and LM=MP, therefore NG=GE; hence the angles GNL, GEP are equal. Now the angle PGE is equal to the alternate angle GPX, that is, to the angle GLN in the alternate segment of the circle (32. 3. E.), therefore the triangles PGE, GLN are similar, and

$$PE : EG :: GN \text{ or } EG : NL,$$
$$\text{therefore } GE^2 = PE \cdot NL,$$

In the same way it may be demonstrated that $ng = gE$, and that the triangles P g E, g L n are similar, and therefore that

$$PE : Eg :: gn \text{ or } Eg : nL,$$
$$\text{and hence } gE^2 = PE \cdot nL.$$

PROP. I.

If a circle be described touching a conic section, and cutting off from the diameter that passes through

Of the Curvature of the Conic Sections.

through the point of contact a segment greater than the parameter of that diameter, a part of the circumference on each side of the point of contact will be wholly without the conic section; but if it cuts off from the diameter a segment less than the parameter, a part of the circumference on each side of the point of contact will be wholly within the conic section.

Fig. 81, 82, 83, 84.

LET P*p* be the diameter of a conic section; let a circle GP*g* touch the section in P the vertex of the diameter, and cut off from it a segment PL, which is either greater or less than the parameter of the diameter; in the former case a part GP*g* of the circumference of the circle on each side of P the point of contact will be wholly without the conic section, as in fig. 81. and fig. 82. and in the latter a part GP*g* of the circumference on each side of P will be wholly within the section, as in fig. 83. and fig. 84.

Through L draw LK a diameter of the circle; let DE*d* an ordinate to the diameter of the section meet the circle in G and *g*, so that the points G, P, *g* may be on the same side of LK the diameter of the circle, and draw GH, *gh*, PO perpendicular to LK, the two former lines meeting LP in N and *n*. From L towards P place LR in the diameter equal to its parameter; then in the former case the point R will fall between L and P, as in fig. 81. and 82.; and in the latter it will fall in LP produced, as in fig. 82. and 83.

CASE I. First, let the section be a parabola (fig. 81. 83.)

Then DE^2, also $dE^2 = PE \cdot RL$ (Cor. prop. 9. of Part I.)

$$\left.\begin{array}{l}\text{Now } GE^2 = PE \cdot LN \\ \text{and } gE^2 = PE \cdot Ln\end{array}\right\} \text{(Lemma).}$$

$$\begin{array}{l}\text{Therefore } DE^2 : GE^2 :: LR : LN, \\ \text{and } dE^2 : gE^2 :: LR : Ln.\end{array}$$

Now if the ordinate D*d* be supposed to approach to the tangent at the vertex, the points G, *g* will approach to P, the lines GH, *gh* to the line PO, and the points N, *n* to the vertex P, where they will at last coincide; hence it is evident, that the ordinate DE*d* may be at such a distance from the tangent that the points N, *n*, and the vertex P, may be all on the same side of the point R; in this position of the ordinate if the segment cut off by the circle be greater than the parameter, as in fig. 81. then LR will be less than either LN, or L*n*, and therefore DE^2 less than GE^2, also dE^2 less than gE^2, so that the points G, *g* are both without the parabola. If the ordinate be supposed to approach nearer to the tangent, as the points N, *n* will also approach nearer to P, the line LR will still be less than either LN, or L*n*, and therefore DE^2 less than GE^2, and dE^2 less than gE^2. Hence it follows, that every point in the arch GP*g*, which lies on each side of the point of contact is without the parabola.

If the segment cut off by the circle be less than the parameter (fig. 83.), and therefore LR greater than either LN or L*n*, then, reasoning as before, it will appear that DE^2 is greater than GE^2, and dE^2 greater than gE^2, so that the points G, *g* are within the parabola; and as the same will hold for every other position of the ordinate nearer to the tangent, the arch GP*g* which lies on each side of the point of contact is wholly within the parabola.

CASE II. Next, let the section be an ellipse, or an hyperbola (fig. 82. 84.) (A). Take V a point in LR, so that

$$pP : pE :: LR : LV,$$

$$\text{and therefore } Pp : LR :: pE : LV :: pE \cdot EP : LV \cdot EP.$$

$$\text{But } Pp : LR :: pE \cdot EP : DE^2 \text{ or } dE^2 \text{ (13. Part II. and 21. Part III.),}$$

$$\text{therefore } DE^2, \text{ also } dE^2 = LV \cdot EP.$$

$$\left.\begin{array}{l}\text{Now } GE^2 = LN \cdot EP \\ \text{and } gE^2 = Ln \cdot EP,\end{array}\right\} \text{(Lemma.)}$$

$$\begin{array}{l}\text{therefore } DE^2 : GE^2 :: LV : LN, \\ \text{and } dE^2 : gE^2 :: LV : Ln.\end{array}$$

Now as P*p* and RL are similarly divided at E and V, if the point E approach to P, the point V will approach to R, and as E may come nearer to P than any assignable line, so V may come nearer to R than any assignable line; but as in the same circumstances GH and *gh* approach to PO, and N and *n* approach to P, it is evident that the ordinate D*d* may have such a position that the points N, *n*, and the vertex P, may be all on the same side of V, and the same thing have place for every other position of the ordinate nearer to the tangent; therefore, in these circumstances, when LP the segment cut off from the diameter is greater than LR the parameter (fig. 82.), LV will be less than either LN or L*n*, and consequently DE^2 less than GE^2, also dE^2 less than gE^2; thus the points G, *g*, as well as every other point in the arch GP*g* which lies on both sides of the vertex, are without the ellipse or hyperbola.

On the contrary, when LP is less than LR the parameter (fig. 84.), LV will be greater than either LN or L*n*, and therefore DE^2 greater than GE^2, also dE^2 greater than gE^2; and therefore the points G, *g*, as well as every other point in the arch GP*g*, are within the ellipse or hyperbola.

COR. 1. If a circle touch a conic section, and cut off from the diameter that passes through the point of contact a segment equal to its parameter, it will have the same curvature with the conic section in the point of

(A) As the reasoning applies alike to the ellipse and hyperbola, to avoid a number of figures, those for the hyperbola are omitted.

of contact. For if a greater circle be described it will cut off from the diameter a segment greater than its parameter, therefore a part of its circumference on each side of the point of contact will be wholly without the conic section; and as it will also be without the former circle, it will not pass between that circle and the conic section at the point of contact. If, on the other hand, a less circle be described, it will cut off from the diameter a segment less than its parameter, therefore a part of its circumference on each side of the point of contact will fall within the conic section; and as it will be within the former circle, it will not pass between that circle and the conic section at the point of contact. Hence (Def. 2.), the circle which cuts off a segment equal to the parameter is the circle of curvature.

Cor. 2. Only one circle can have the same curvature with a conic section in a given point.

Prop. II.

The circle of curvature at the vertex of the axis of a parabola, or at the vertex of the transverse axis of an ellipse or hyperbola, falls wholly within the conic section; but the circle of curvature at the vertex of the conjugate axis of an ellipse falls wholly without the conic section.

Let Pp be the axis of the parabola (fig. 85.), and PGLg the circle of curvature at its vertex, which therefore cuts off from the axis a segment PL equal to the parameter of the axis; because the tangent at the vertex is common to the parabola and circle, the centre of the circle is in Pp. Let DEd an ordinate to the axis meet the circle in G and g; it may be shewn as in last proposition that

$$DE^2 : GE^2 :: LP : LE.$$

But in every position of the ordinate LP is greater than LE, therefore DE² is always greater than GE², and dE² greater than gE²; therefore the circle is wholly within the parabola. Next let Pp be the transverse axis of an ellipse or hyperbola (fig. 86, 87.), or the conjugate axis of an ellipse (fig. 88.), and PGLg the circle of curvature, then as in the parabola the centre of the circle will be in the axis. Draw Dd an ordinate to the axis meeting the circle in G, g; and take a point V in PL, so that

$$pP : pE :: LP : LV;$$

then it will appear as in last prop. that

$$DE^2 : GE^2 :: LV : LE.$$

Now, when Pp is the transverse axis of an ellipse, (fig. 86.) as Pp is greater than LP, and Pp : PL :: PE : PV, therefore PE is greater than PV, and hence LV is always greater than LE, therefore DE² is greater than GE², also dE² greater than gE², so that the circle falls wholly within the ellipse.

Again, when Pp is the transverse axis of an hyperbola (fig. 87.), as pE is greater than pP, therefore LV is greater than LP, and consequently greater also than LE; hence DE² is greater than GE, and dE² is greater than gE², and the circle is wholly within the hyperbola.

Lastly, When Pp is the conjugate axis of an ellipse (fig. 88.) as Pp is less than LP, and Pp : LP :: PE :: PV, therefore, PE is less than PV; hence LV is less than LE, and consequently DE² is less than GE², also dE² less than gE², therefore the circle is wholly without the ellipse.

Of the Curvature of the Conic Sections.

Prop. III.

The circle of curvature at the vertex of any diameter of a conic section, which is not an axis, meets the conic section again in one point only; and between that point and the vertex of the diameter the circle falls wholly within the conic section on the one side, and wholly without it on the other.

Fig. 89, 90.

Case I. Let the conic section be a parabola, of which Pp is a diameter (fig. 89.) and PLK the circle of curvature at the vertex, cutting off from the diameter a segment PL equal to its parameter. Draw LK a diameter of the circle, and draw PO perpendicular to LK, this line will necessarily meet the circle again, let it meet the circle in I; draw IS parallel to the tangent at P, meeting the chord PL in S; then, because IP is perpendicular to LK,

$$IS^2 = PS \cdot PL \text{ (Lemma)};$$

hence (Cor. Prop. 9. Part I.) I is a point in the parabola.

Let DEd an ordinate to the diameter Pp meet the arch PLI anywhere in G; draw GH perpendicular to LK, meeting PL in N, then because LP is equal to the parameter, as in Prop. I. Case I.

$$DE^2 : GE^2 :: LP : LN :: LO : LH.$$

But wherever the point G be taken in the arch PLI, LO is greater than LH, therefore DE² is also greater than GE²; thus the arch PGLI falls wholly within the parabola.

Let the ordinate DEd now meet the arch PKI anywhere, as at g, draw gh perpendicular to LK, meeting LP in n, then it will appear as before that

$$dE^2 : gE^2 :: LP : Ln :: LO : Lh;$$

but LO is less than Lh, and therefore dE² less than gE², thus the arch PgKI falls wholly without the parabola.

Case II. Let the conic section be either an ellipse or hyperbola (fig. 90.) of which Pp is a diameter, and PLK the circle of curvature at its vertex, cutting off PL equal to its parameter. Draw LK the diameter of the circle and LQ perpendicular to LK, and let pQ, a tangent to the conic section in p, meet LQ in Q. Join PQ, this line will necessarily meet the circle again; let it meet the circle in I; and draw IS, IT parallel to Qp, QL, meeting PL in S, T. Because of the parallels,

$$pP : pS :: QP : QI :: LP : LT,$$

$$\text{hence } pP : LP :: pS : LT :: pS \cdot SP : LT \cdot SP;$$

$$\text{but } LT \cdot SP = IS^2 \text{ (Lemma)},$$

$$\text{therefore } pP : LP :: pS \cdot SP : SI^2;$$

hence I is a point in the ellipse or hyperbola (13. Prop. Part II. and 21. Prop. Part III.).

Let DEd an ordinate to the diameter Pp meet the arch PLI anywhere in G, if the point L is between P

Of the Curvature of the Conic Sections.

P and p, or the arch PIL, if L is in Pp produced. Let Dd meet PI in Y, draw GH perpendicular to LK meeting PL in N, and PI in Z, and draw YV parallel to GN meeting LP in V. Becauſe EY, pQ are parallel, alſo VY, LQ,

$$Pp : pE :: (QP : QY ::) LP : LV;$$

now LP being the parameter, we have, as in Caſe II. Prop. I.

$$DE^2 : GE^2 :: LV : LN :: QY : QZ;$$

but wherever the point G be taken in the arch PGI, QY is greater than QZ, therefore alſo DE^2 is greater than GE^2; thus the arch PGI falls wholly within the conic ſection.

Let the ordinate DEd now meet the other arch Pg I anywhere in g; draw gh perpendicular to LK meeting LP in n, and IP in z, then it will in like manner appear that

$$dE^2 : gE^2 :: LV : Ln :: QY : Qz;$$

and ſince in this caſe QY is leſs than Qz, therefore dE^2 is leſs than gE^2; hence the arch PgI is wholly without the conic ſection.

Prop. IV.

The chord of the circle of curvature which is drawn from the point of contact through the focus of a parabola is equal to that which is cut off from the diameter; and half the radius of the circle is a third proportional to the perpendicular from the focus upon the tangent, and the diſtance of the point of contact from the focus.

Fig. 91.

Let PL be the chord cut off from the diameter, and PFH the chord paſſing through F the focus; draw PM the diameter of the circle, join HL, HM, and draw FK perpendicular to the tangent at P. Becauſe the lines PFH, PL make equal angles with the tangent at P (3. Part I.), the angles PHL, PLH are equal (32. 3. E.) hence PH=PL. Secondly, the triangles FKP, PHM, being manifeſtly ſimilar,

$$FK : FP :: PH, \text{ or } 4PF : PM,$$

hence $FK : FP :: FP : \frac{1}{4}PM$, or $\frac{1}{2}$ the radius.

Cor. 1. Hence the radius is equal to $\frac{2FP^2}{FK}$.

Cor. 2. The radius is alſo equal to $\frac{2FK^3}{AF^2}$, where AF is the diſtance of the focus from the vertex of the parabola; for $FP=\frac{FK^2}{AF}$ (11. Part I.)

Cor. 3. Hence alſo the radius is equal to $\frac{\frac{1}{2}L \cdot FP^3}{FK^3}$, where L denotes the parameter of the axis,

for $\frac{2FP^2}{FK}=\frac{2AF \cdot FP^3}{AF \cdot FP \cdot FK}=\frac{\frac{1}{2}L \cdot FP^3}{FK^3}$.

Prop. V.

The radius of the circle of curvature at the vertex of any diameter of an ellipſe, or hyperbola, is a third proportional to the perpendicular drawn from the centre upon the tangent, and half the conjugate diameter; and the chord which is drawn from the point of contact through the focus is a third proportional to the tranſverſe axis, and conjugate diameter.

Fig. 9

Let PL be the chord cut off from the diameter, and PFH the chord paſſing through F the focus; draw PM the diameter of the circle, and from the centre O draw OR perpendicular to PL, which will biſect PL in R; join HM, and draw the conjugate diameter QCq meeting PH in N and PM in S, then PS is equal to the perpendicular from the centre C upon the tangent. The triangles PSC, PRO are ſimilar, therefore,

$$PS : PC :: PR : PO,$$

but $PC : CQ :: CQ : PR$ (Def. of param.)
therefore $PS : CQ :: CQ : PO$.

Secondly, the triangles PSN, PHM are ſimilar,

therefore $PN : PS :: PM : PH$;
but $PS : CQ :: (CQ : PO ::) Qq : PM$,
therefore $PN : CQ :: Qq : PH$,

or, ſince PN=AC (Cor. 17. Part II. and Cor. 25. Part III.),

$$Aa : Qq :: Qq : PH.$$

Cor. 1. Hence the radius of curvature is equal to $\frac{CQ^2}{PS}$, and the chord paſſing through the focus is equal to $\frac{2CQ^2}{AC}$.

Cor. 2. The radius of curvature is alſo equal to $\frac{CQ^3}{AC \cdot BC}$, for $PS=\frac{AC \cdot BC}{CQ}$ (15. Part II. and 23. Part III.).

Cor. 3. Draw FK from the focus perpendicular to the tangent, and let L denote the parameter of the tranſverſe axis; the radius of curvature is alſo equal to $\frac{\frac{1}{2}L \times FP^3}{FK^3}$. For the triangles PFK, NPS are manifeſtly ſimilar, therefore

$$FK : FP :: PS : PN, \text{ or } AC :: BC : CQ;$$

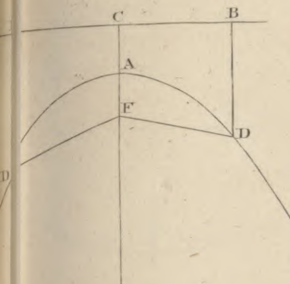
$$\text{hence } CQ=\frac{FP}{FK} \times BC,$$

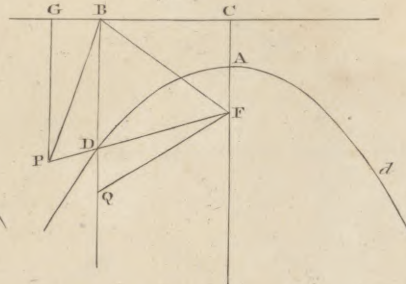
$$\text{and } \frac{CQ^3}{AC \cdot BC}=\frac{FP^3}{FK^3} \times \frac{BC^2}{AC}=\frac{FP^3}{FK^3} \times \tfrac{1}{2}L.$$

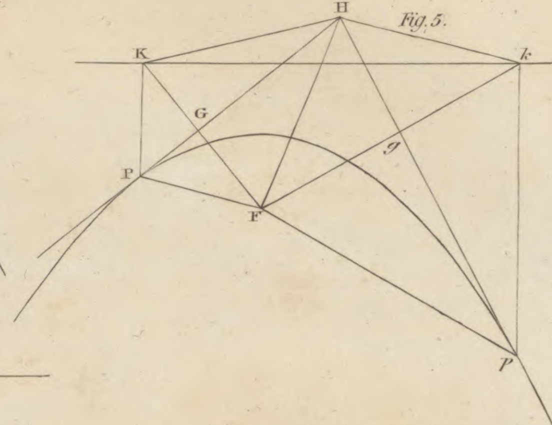
This expreſſion for the radius of curvature is the ſame for all the three conic ſections.

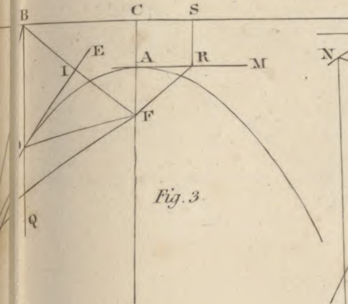
CONICHTHYODONTES,

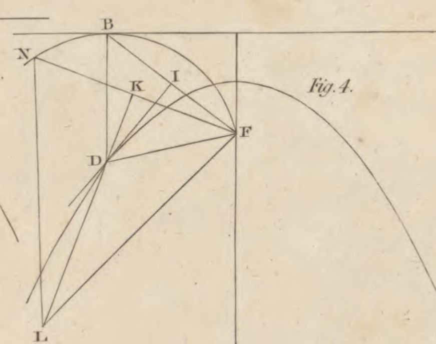
CONIC SECTIONS. *PLATE CLVI.*

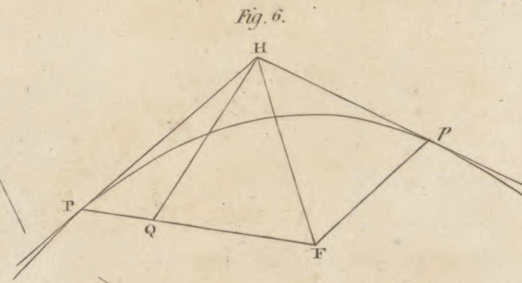


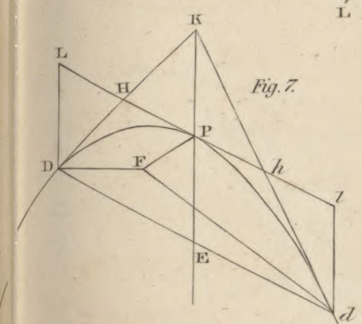


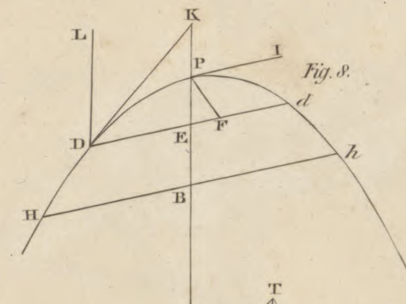


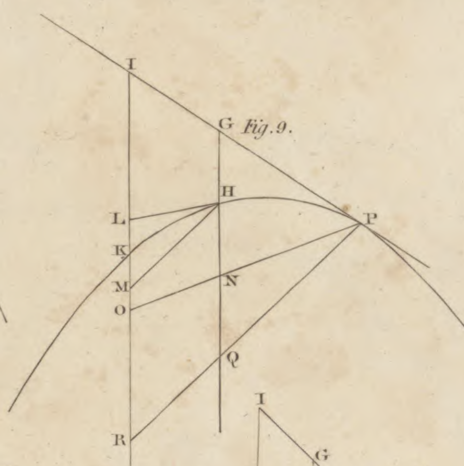


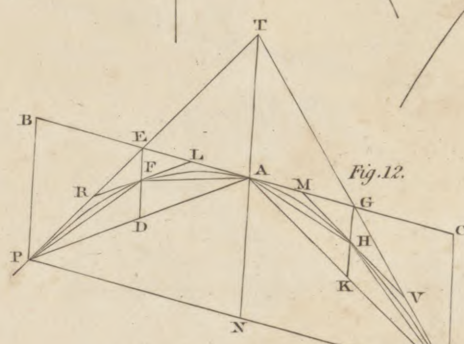


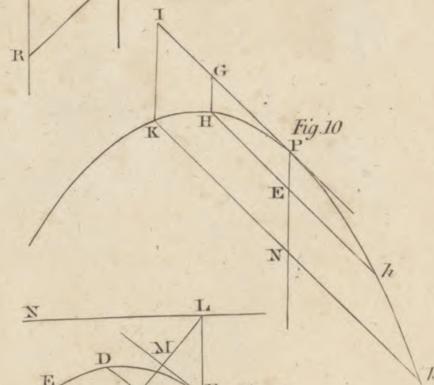


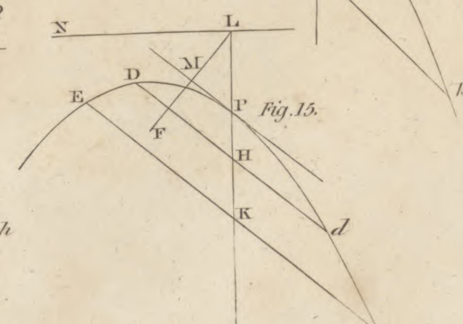


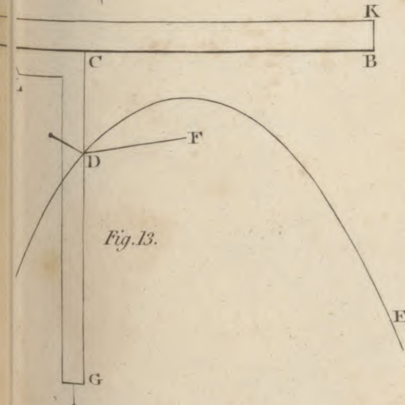


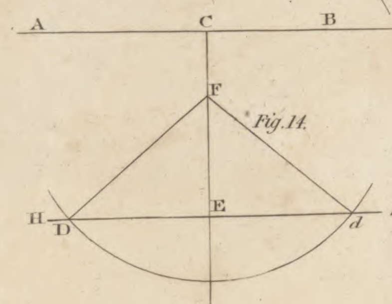




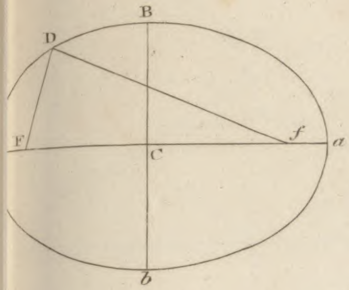


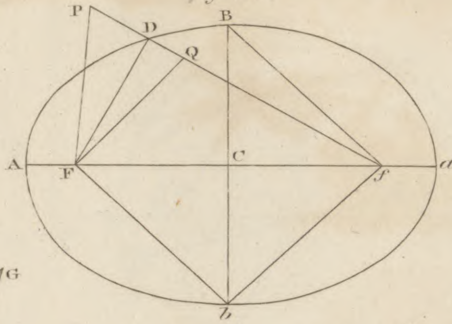


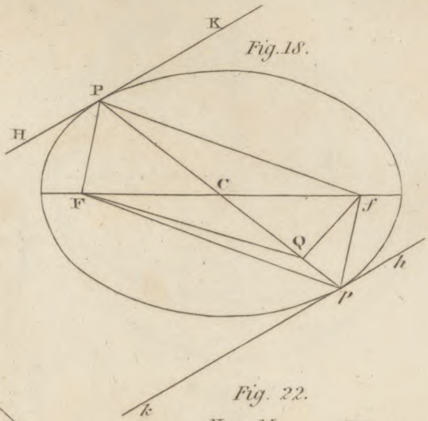


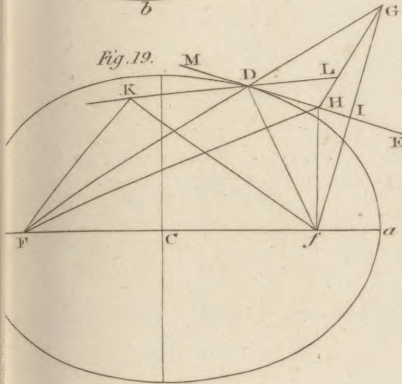


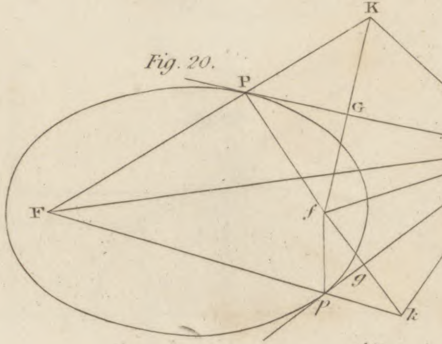
W. Archibald Sculp.t

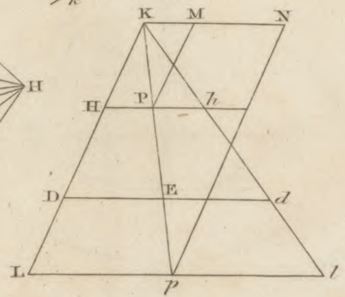


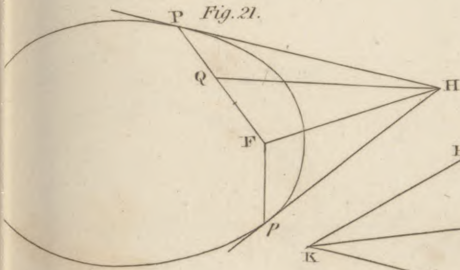


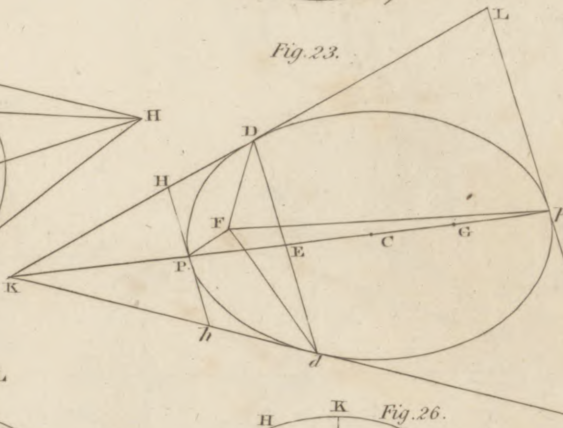


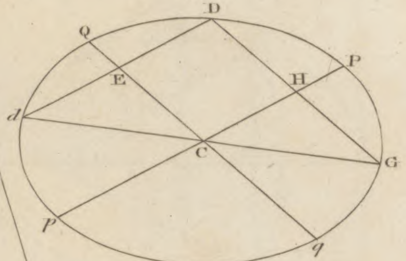


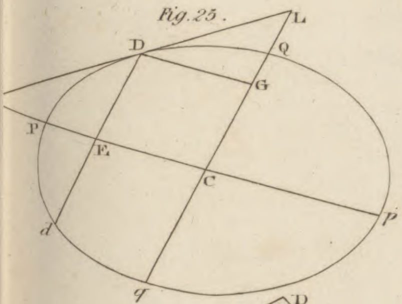


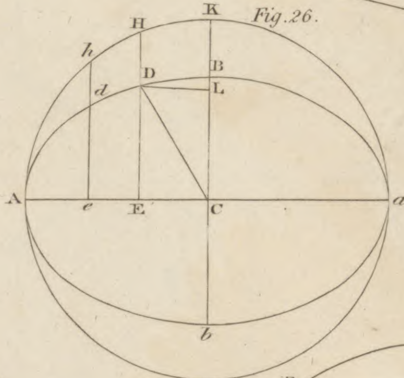


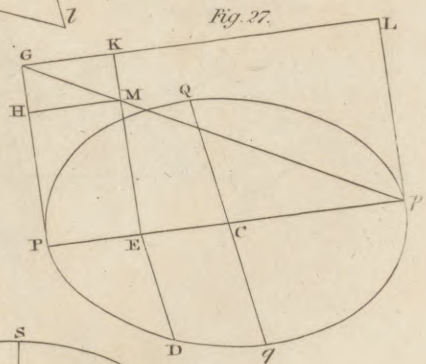


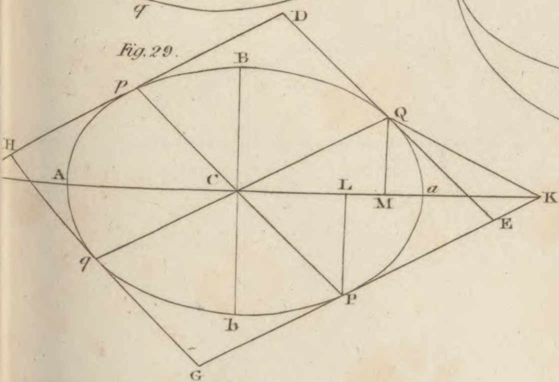


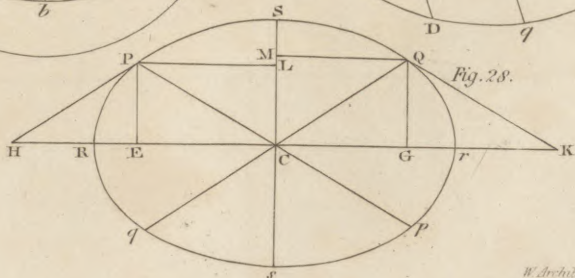








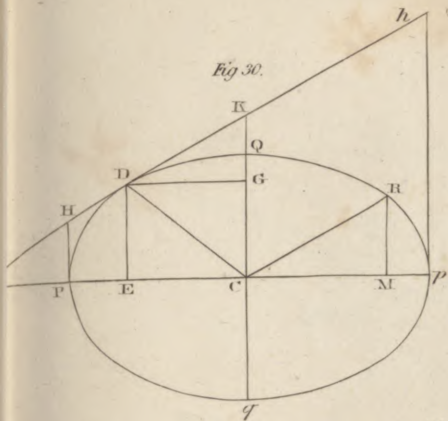


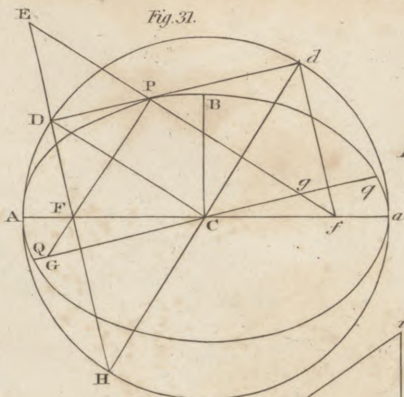


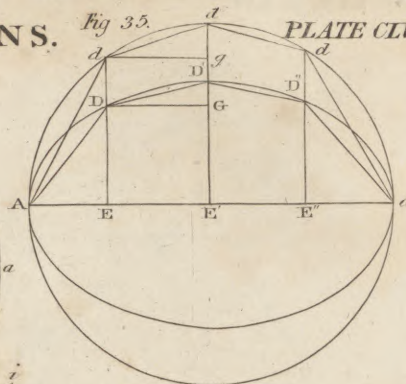
W. Archibald Sculpt

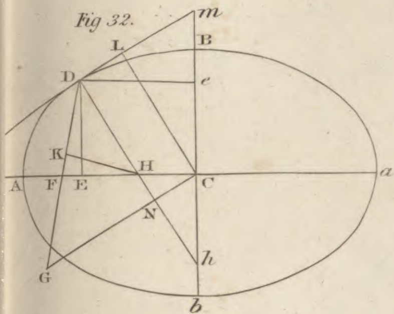
CONIC SECTIONS.

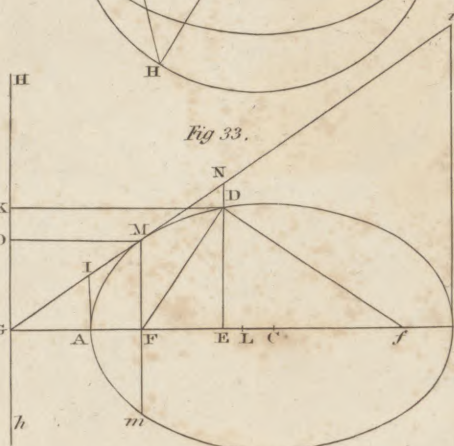
PLATE CLVIII.

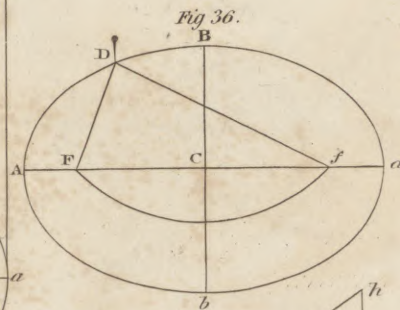


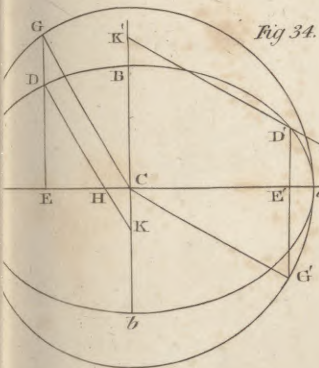


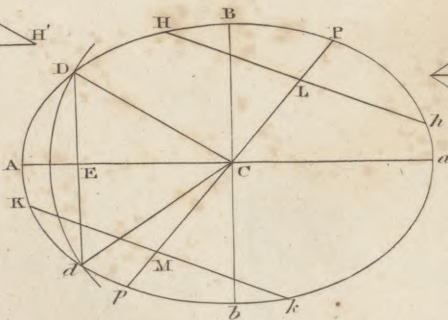


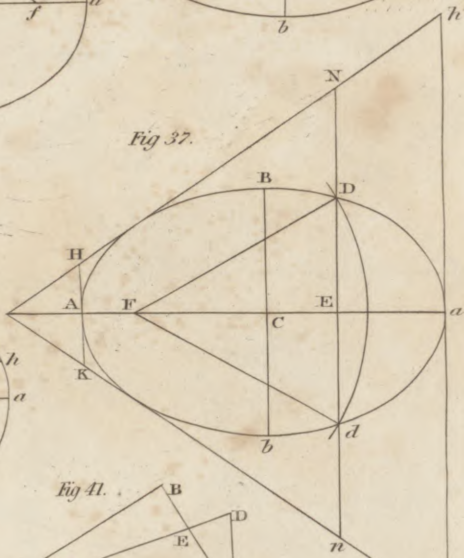


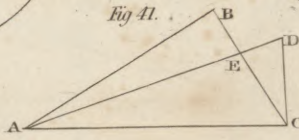


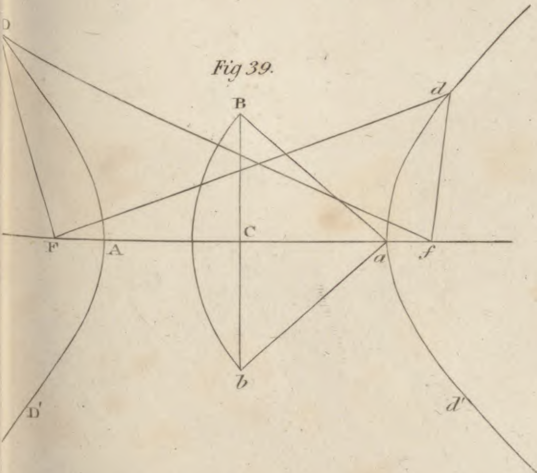


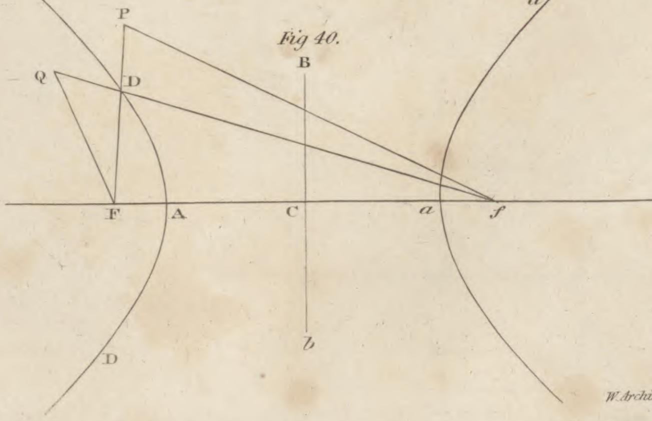




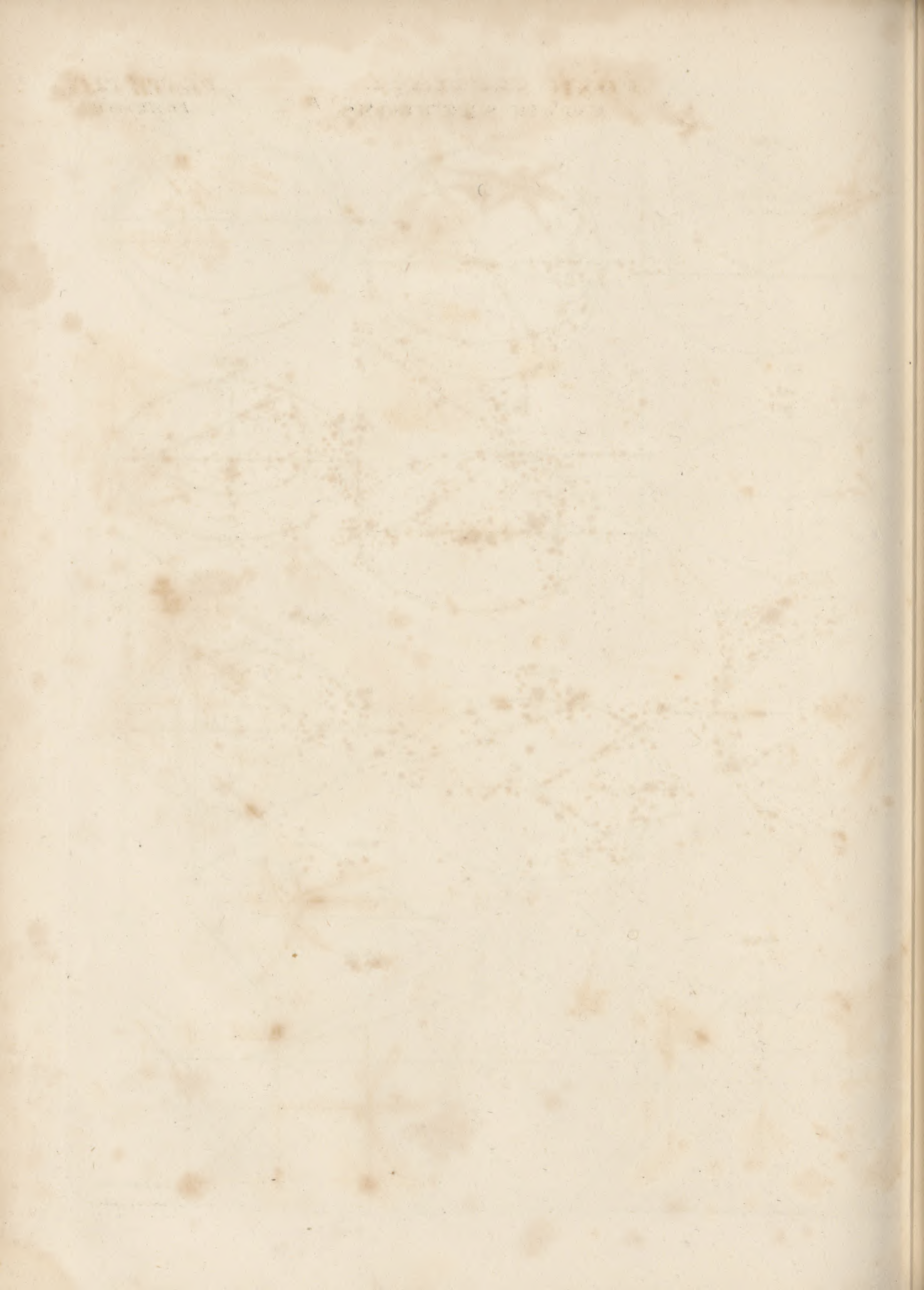








W. Archibald Sculpt



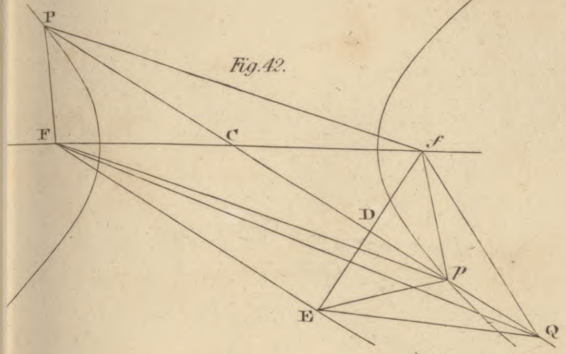


Fig. 42.
P
F
C
f
D
p
E
Q

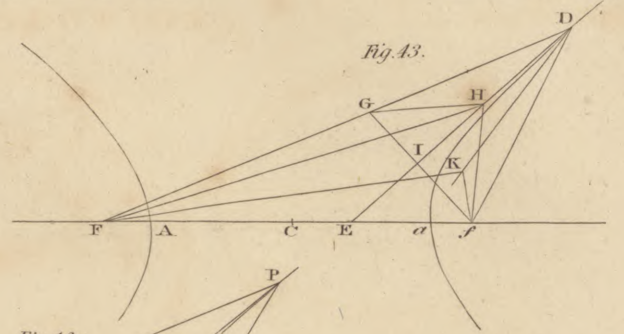


Fig. 43.
D
G
H
I
K
F
A
C
E
a
f

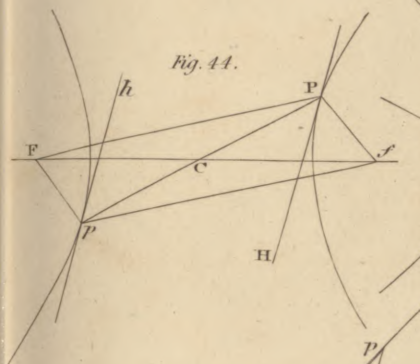


Fig. 44.
h
P
F
C
f
p
H

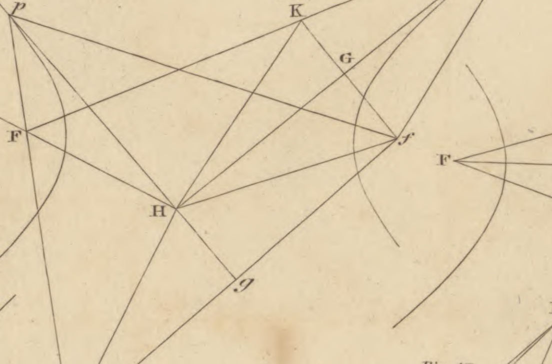


Fig. 46.
P
p
K
G
F
f
H
g
k

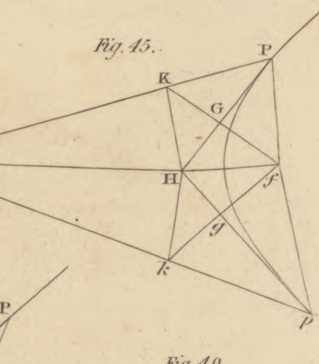


Fig. 45.
P
K
G
F
H
f
g
k
p

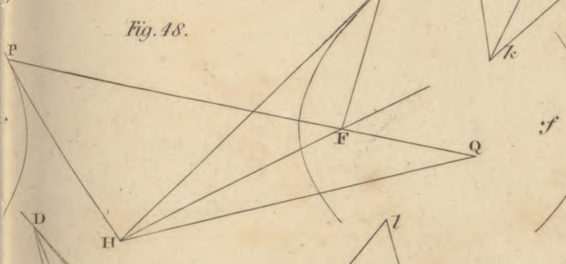


Fig. 48.
p
P
F
Q
H
f

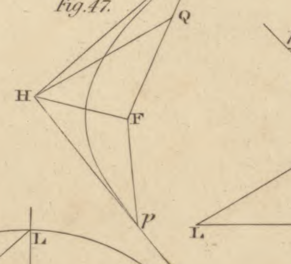


Fig. 47.
P
Q
H
F
p

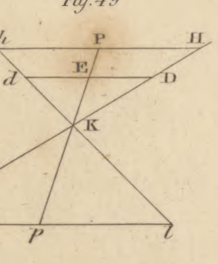


Fig. 49
h
P
H
d
E
D
K
L
p
l

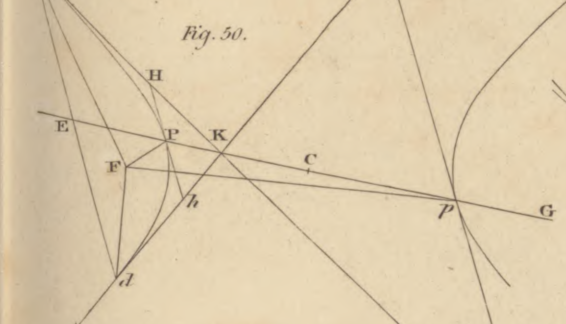


Fig. 50.
D
l
H
E
P
K
C
F
h
p
G
d
L

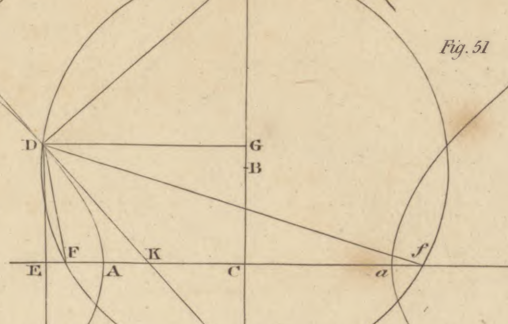


Fig. 51
L
D
G
B
f
F
K
E
A
C
a
H
b

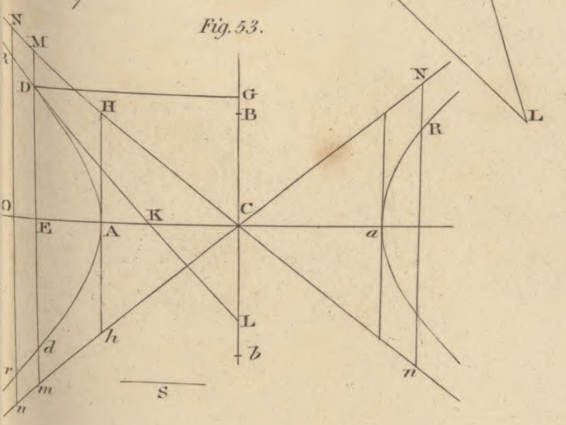
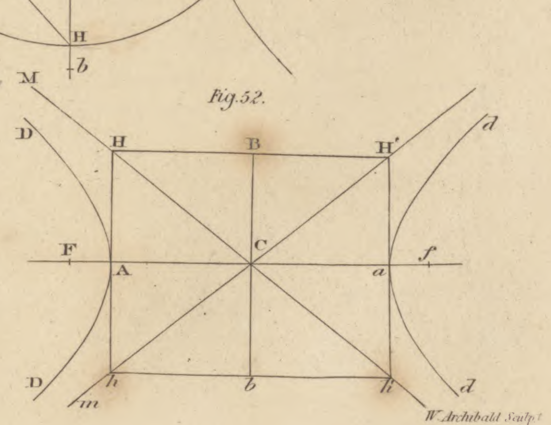


Fig. 53.
N
M
R
D
G
H
B
N
R
O
E
A
K
C
a
L
b
d
h
n
r
m
n
S


M
Fig. 52.
D
H
B
H'
d
F
C
f
A
a
D
h
b
h'
d
m
W. Archibald Sculp.t

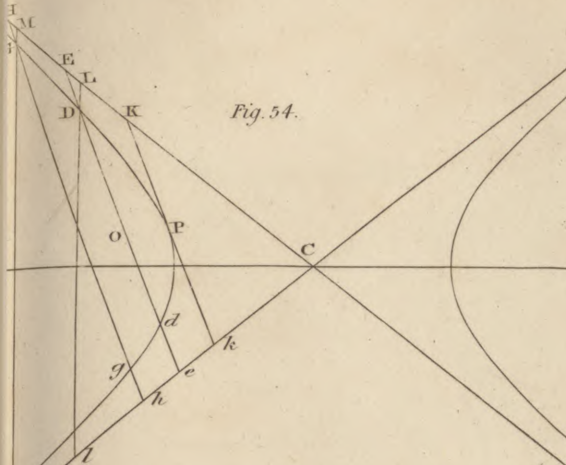


Fig. 54.

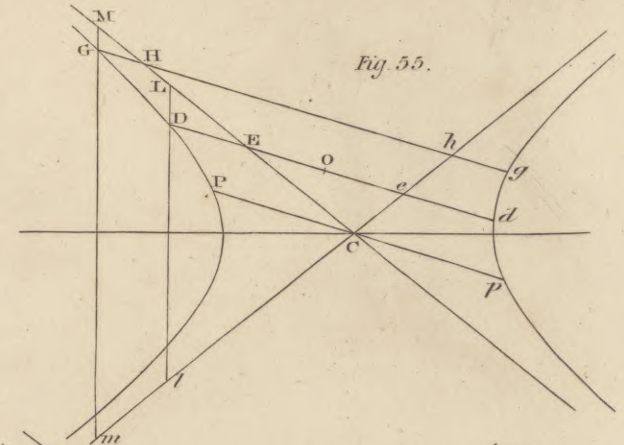


Fig. 55.

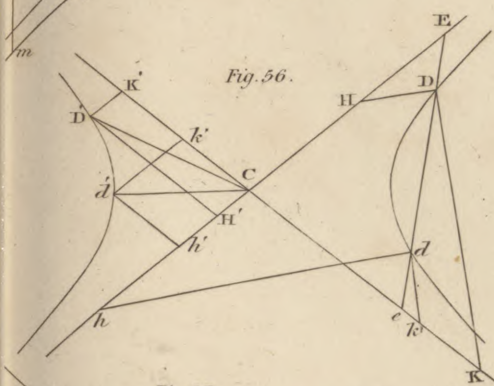


Fig. 56.

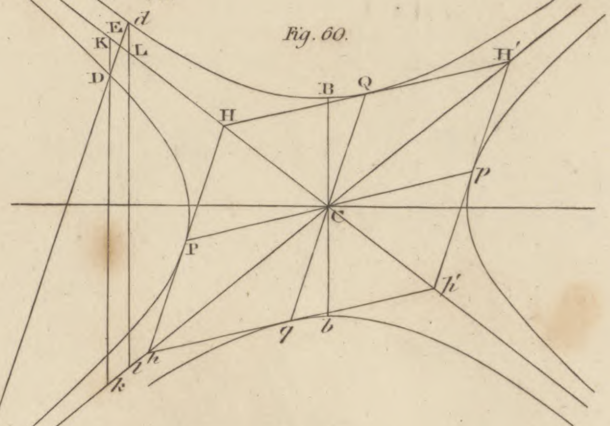


Fig. 60.

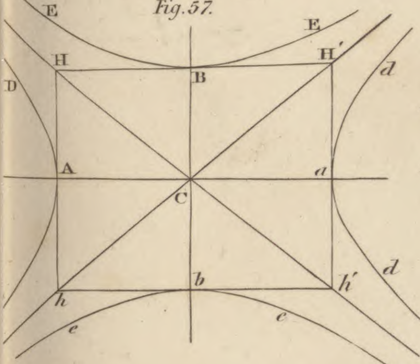


Fig. 57.

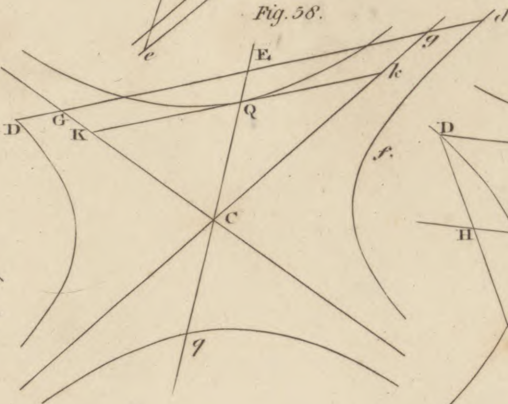


Fig. 58.

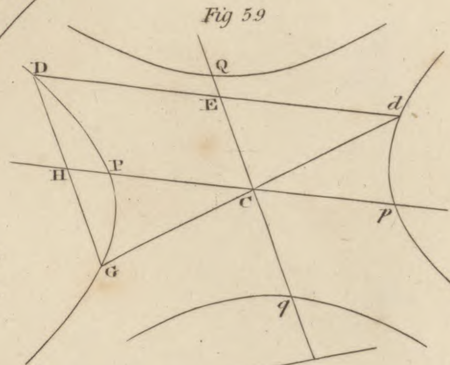


Fig. 59

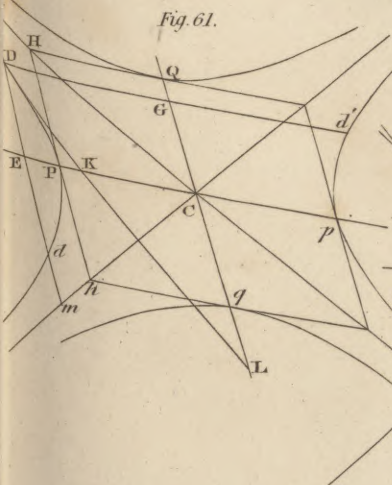


Fig. 61.

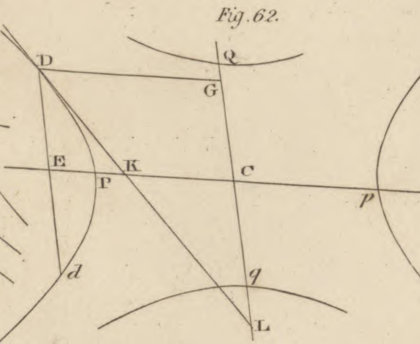


Fig. 62.

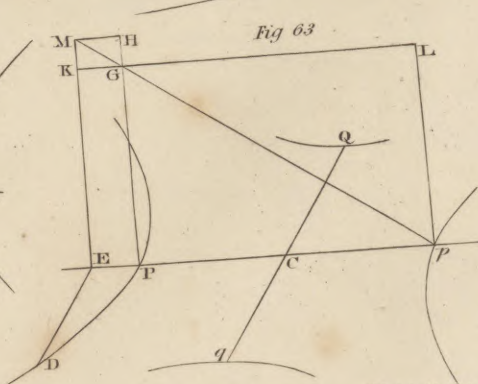


Fig. 63

W. Archibald Sculp.

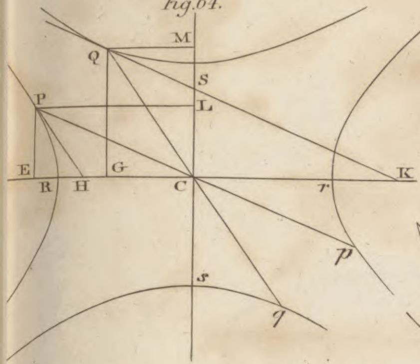


Fig. 64.

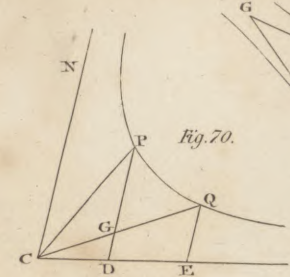


Fig. 70.

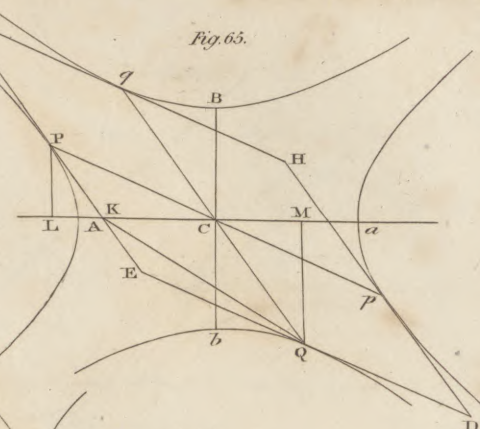


Fig. 65.

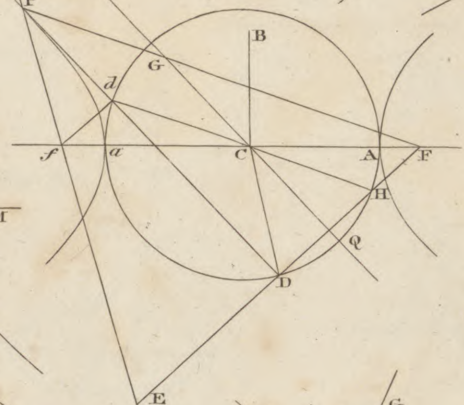


Fig. 67.

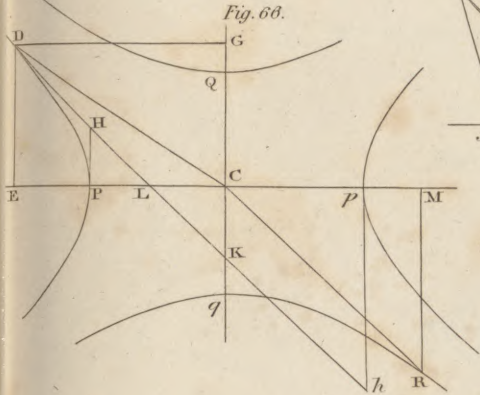


Fig. 66.

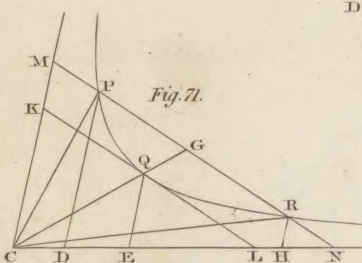


Fig. 71.

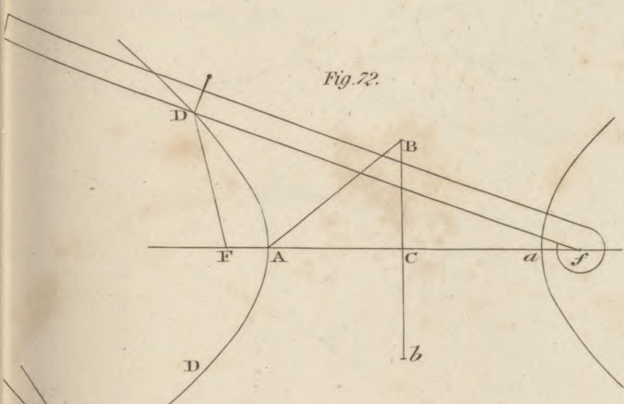


Fig. 72.

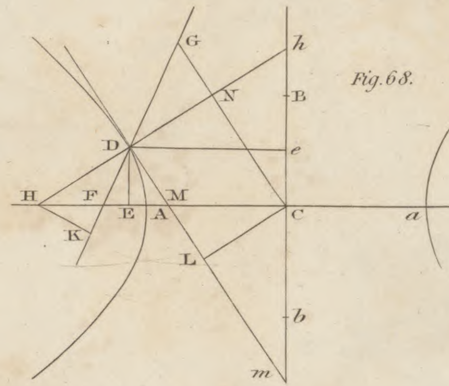


Fig. 68.

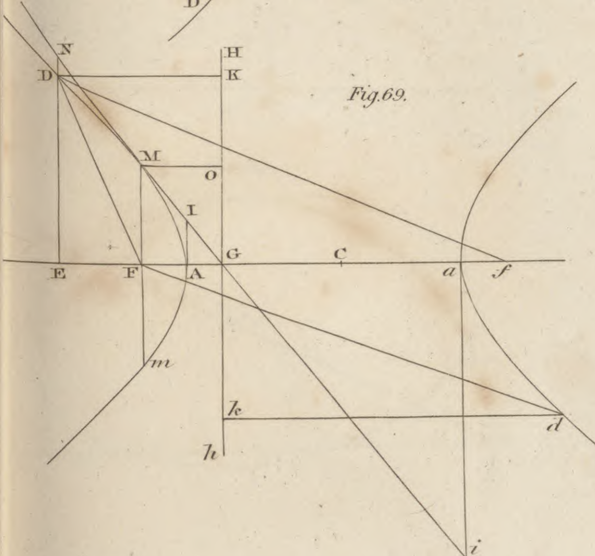


Fig. 69.

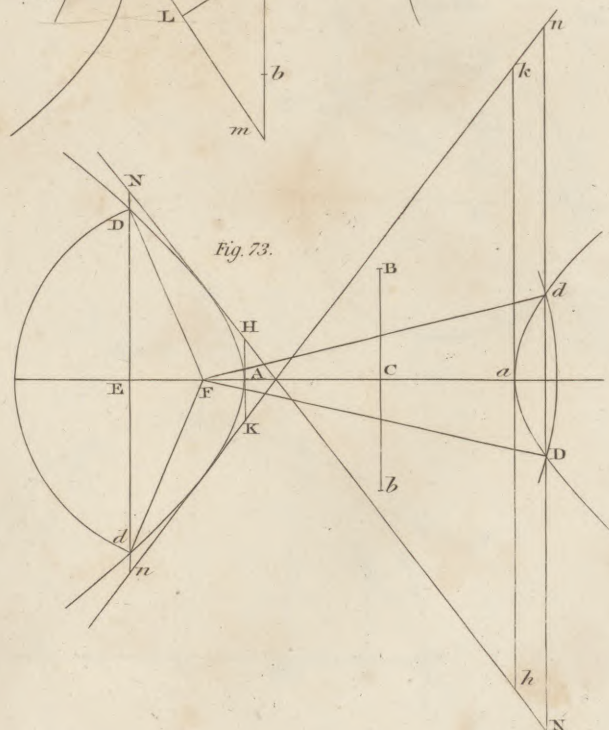
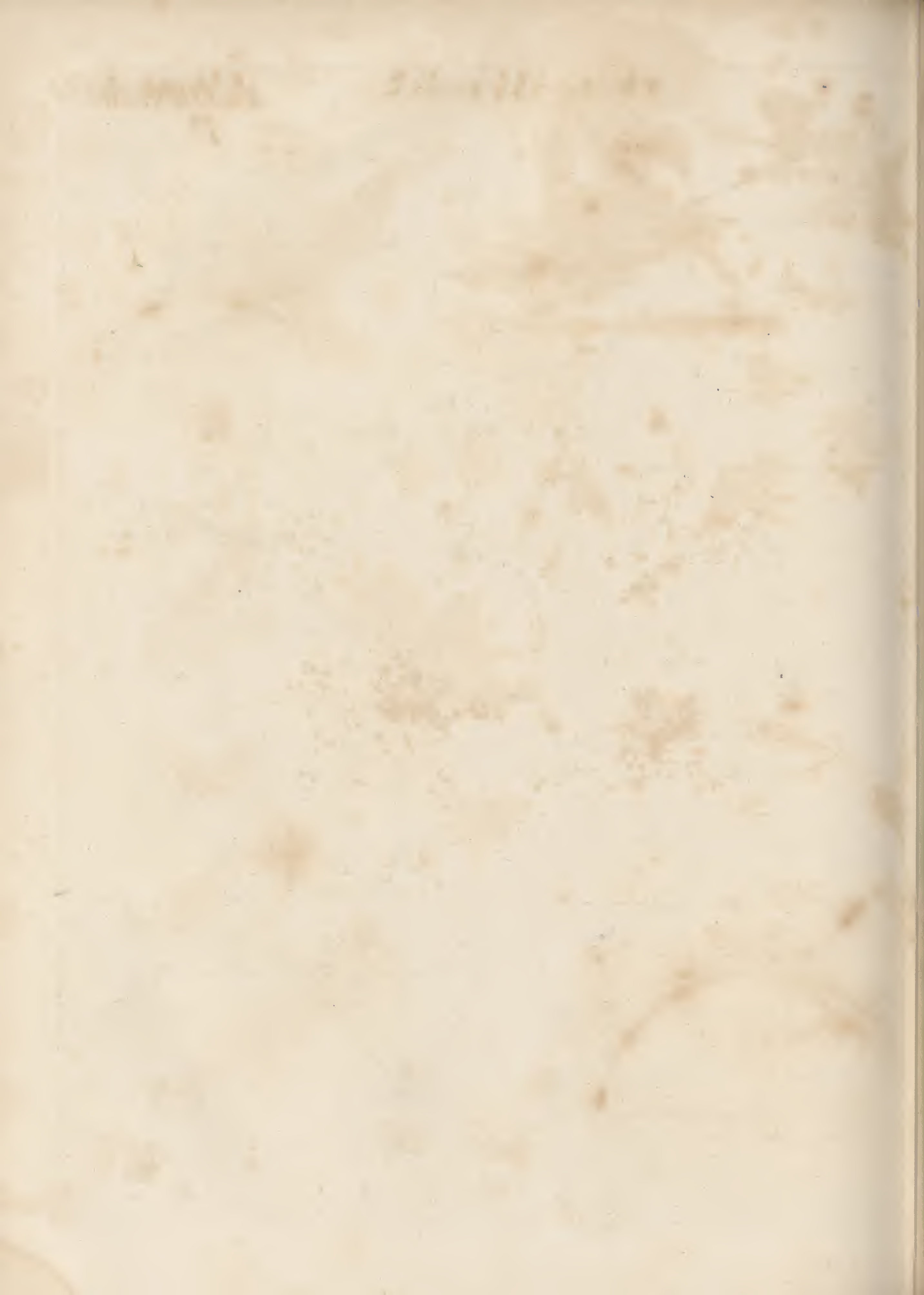
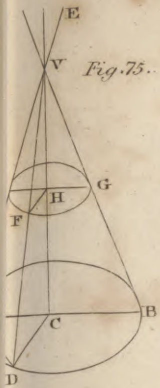
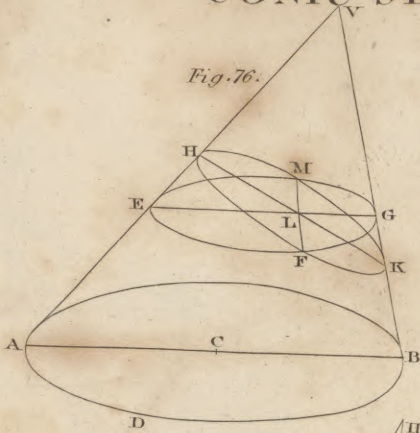
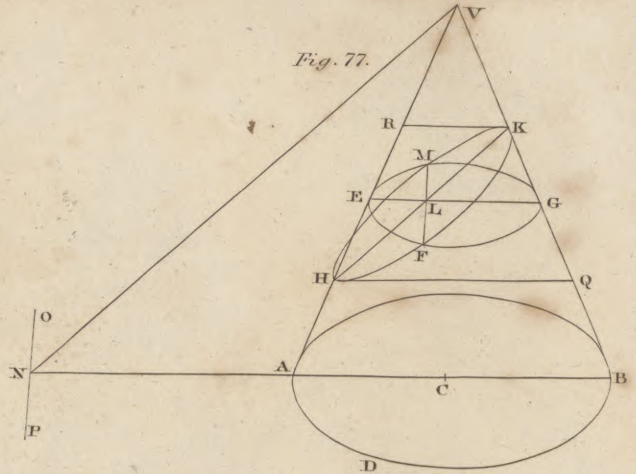


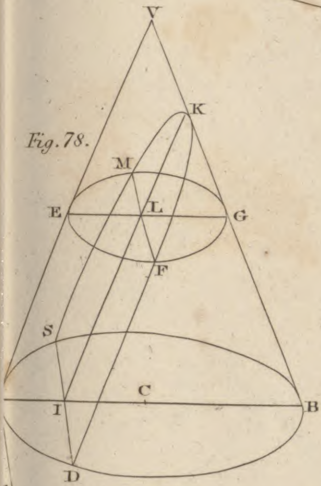
Fig. 73.

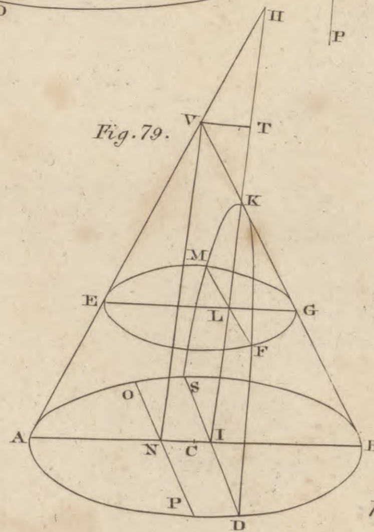


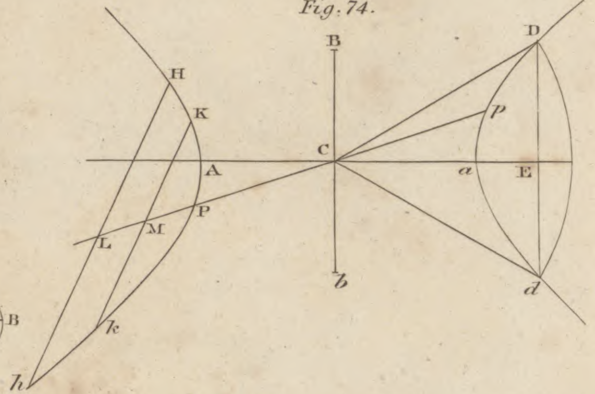


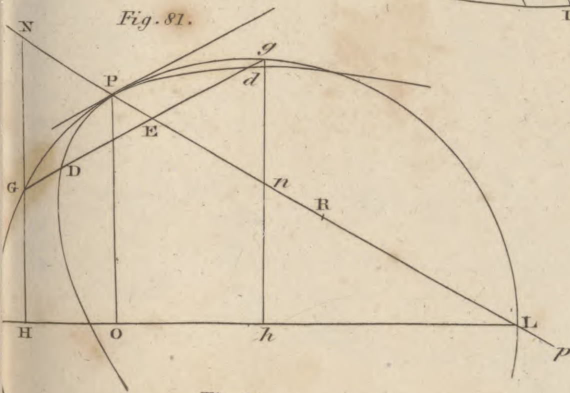


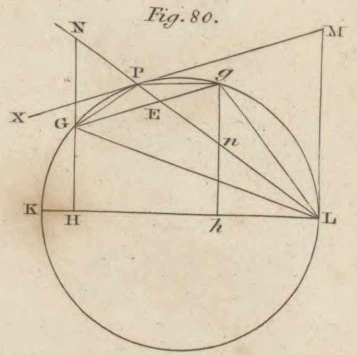


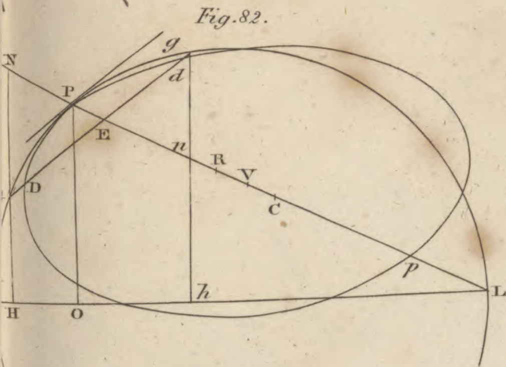


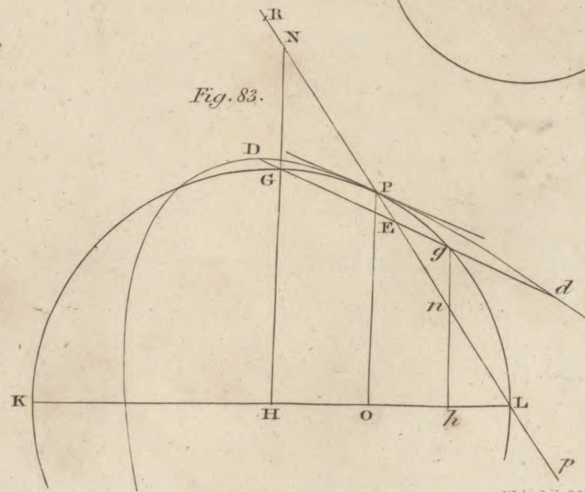




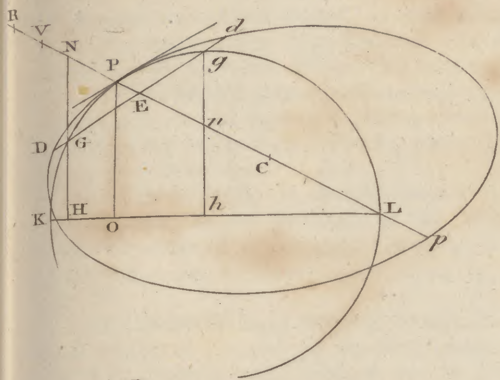


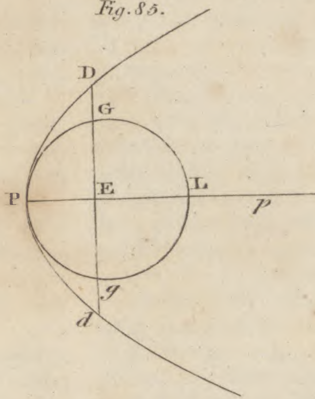


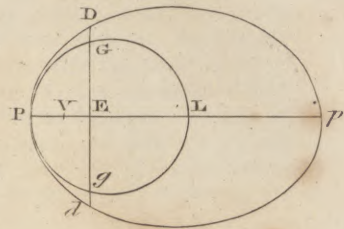


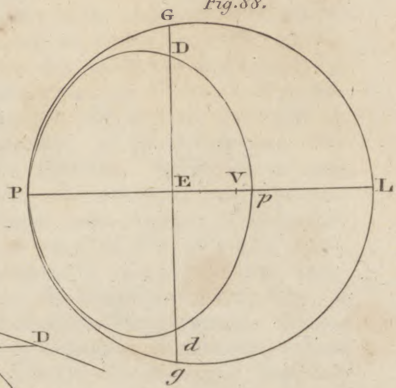


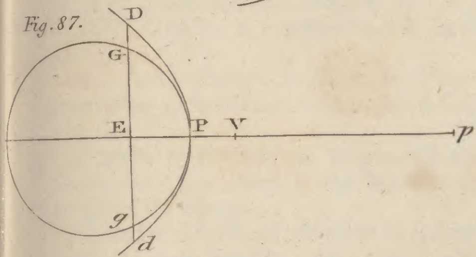
W. Archibald sculp.

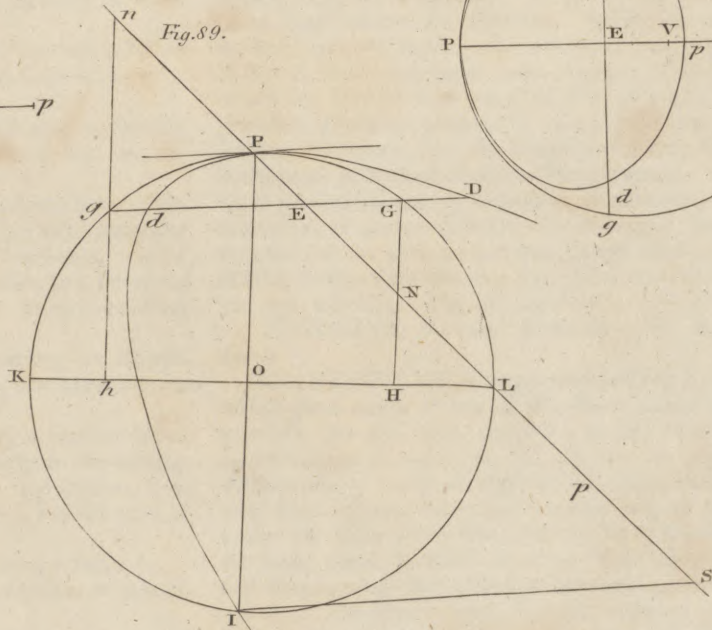


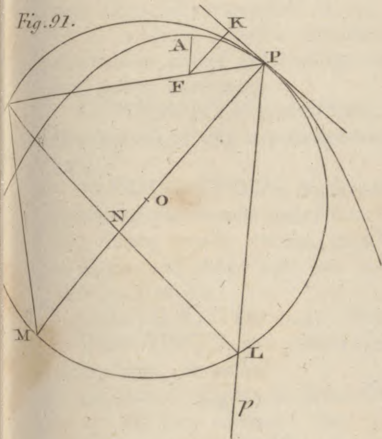


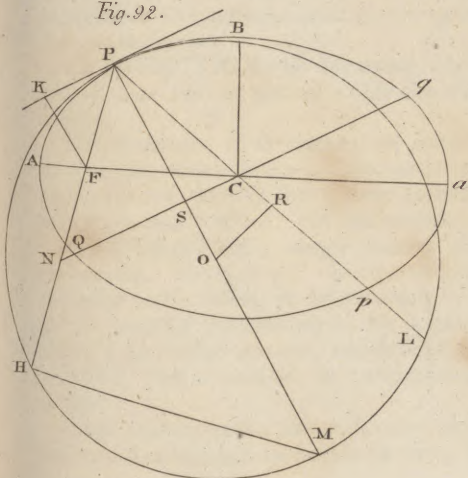


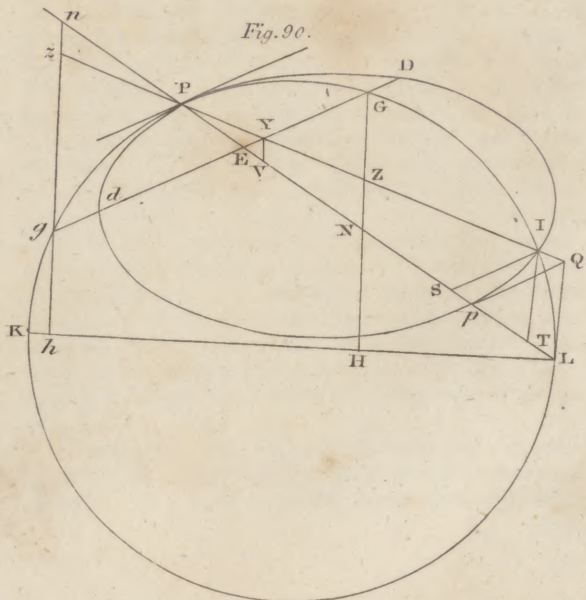












W. Archibald sculp.

CONICHTHYODONTES, or PLECTRONITÆ, in *Natural History*, a name by which the fossil teeth of fishes are sometimes distinguished.

CONIFERA, in *Botany*, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, containing the following genera, viz. cupressus, ephedra, equisetum, juniperus, pinus, taxus, thuja. See BOTANY *Index*.

CONIFEROUS TREES, such as bear hard dry seed-vessels of a conical figure; consisting of several woody parts, being mostly scaly, adhering close together, and separating when ripe.

CONIMBRICA, in *Ancient Geography*, a town of Lusitania, on the south side of the river Monda; from the ruins of which arose Coimbra, in its neighbourhood, a city of Portugal. W. Long. 9. 5. N. Lat. 40. 16.

CONINGSECK, a town of Suabia in Germany, and capital of a county of the same name, 20 miles north of Constance. E. Long. 9. 20. N. Lat. 47. 50.

CONJOINT, in a general sense, signifies united or connected.

CONJOINT Degrees, in *Music*, two notes which follow each other immediately in the order of the scale, as *ut* and *re*.

CONJOINT Tetrachords, two tetrachords, or fourths, where the same chord is the highest of one and the lowest of the other.

CONISSALÆ, an old term in natural history, signifying a class of fossils, which were said to be naturally and essentially compounded, not inflammable, nor soluble in water, found in detached masses, and formed of crystalline matter debased by earth. It included sand and gritty substances.

CONJUGATE DIAMETER, or *Axis of an Ellipsis*, the shortest of the two diameters, or that bisecting the axis.

CONJUGATION, in *Grammar*, a regular distribution of the several inflections of verbs in their different voices, moods, tenses, numbers, and persons, so as to distinguish them from one another. See GRAMMAR and LANGUAGE.

CONIUM, HEMLOCK. See BOTANY *Index*.

CONJUNCT, in a general sense, signifies conjoined, concurrent, or united.

CONJUNCT Rights, in *Scots Law*, such as are granted to two or more persons. See LAW *Index*.

CONJUNCT, or *Confidant Persons*, in *Scots Law*, such as are about the person of another, or employed by him. See LAW *Index*.

CONJUNCTION, in *Astronomy*, the meeting of two or more stars or planets in the same degree of the zodiac.

CONJUNCTION, in *Grammar*, an indeclinable word or particle, which serves to join words and sentences together, and thereby shows their relation or dependence upon one another. See GRAMMAR.

CONJURATION, magic words, characters, or ceremonies, whereby evil spirits, tempests, &c. are supposed to be raised, or driven away. The Romish priests pretend to expel devils, by preparing holy water in a particular manner, and sprinkling it over the possessed, with a number of conjurations and exorcisms.

Some authors make the difference between conjuration and witchcraft to consist in this; that the former effects its end by prayers and invocation of God's name, &c. to compel the devil to do what is desired; so that the conjuror is supposed to be at war with the devil, and that evil spirit to act merely out of constraint: whereas the latter attains its end by an immediate application to the devil himself: and the devil's complaisance is supposed to be the consequence of some compact between them, so that the devil and the witch have a good understanding together. Both these, again, differ from inchantment and sorcery; in that these latter operate secretly and slowly by spells, charms, &c. without ever calling on the devil, or having any conference with him.

CONN. See COND.

CONNAUGHT, one of the four provinces of Ireland, bounded on the east by that of Leinster, on the west by the ocean, on the north and north-west by part of the ocean and province of Ulster, and on the south and east by Munster. It is about 130 miles in length, and 84 in breadth. It has no rivers of any great note besides the Shannon. It has several convenient bays and creeks, and is fertile in many places. It had several dangerous bogs, overrun with woods, which are now in some measure cleared away. This province produces abundance of cattle, sheep, deer, hawks, and honey; but the inhabitants being lazy, it is the least cultivated of all the four provinces. It contains 1 archbishopric, 5 bishoprics, 6 counties, 7 market-towns, 8 places of trade, 10 boroughs that sent members to the Irish parliament, 47,256 houses, 24 old castles, besides fortresses that have been erected of late, and 330 parishes. The principal town is Galway.

CONNARUS, CEYLON SUMACH. See BOTANY *Index*.

CONNECTICUT, a large river in New England, which gives name to one of the five colonies of that province (see the next article). It rises in a swamp on the height of land, in N. Lat. 45. 10. W. Long. 71. After a sleepy course of eight or ten miles, it tumbles over four separate falls, and turning west keeps close under the hills which form the northern boundary of the vale through which it runs. The Amonoosuck and Israel rivers, two principal branches of Connecticut river, fall into it from the east, between the latitudes 44° and 45°. Between the towns of Walpole on the east, and Westminster on the west side of the river, are the great falls. The whole river, compressed between two rocks scarcely 30 feet asunder, shoots with amazing rapidity into a broad bason below. Over these falls, a bridge 160 feet in length was built in 1784, under which the highest floods may pass without detriment. This is the first bridge that was ever erected over this noble river. Above Deerfield in Massachusets it receives Deerfield river from the west, and Miller's river from the east, after which it turns westerly in a sinuous course to Fighting-falls, and a little after tumbles over Deerfield falls, which are impassable by boats. At Windsor in Connecticut it receives Farmington river from the west, and at Hartford meets the tide. From Hartford it passes on in a crooked course, until it falls into Long Island sound between Saybrook and Lyme.

The length of this river, in a straight line, is nearly 300 miles. Its general course is several degrees west of south. It is from 80 to 100 roods wide, 130 miles from

Connecticut.

from its mouth. At its mouth is a bar of ſand which conſiderably obſtructs the navigation. Ten feet water at full tides is found on this bar, and the ſame depth to Middleton. The diſtance of the bar from this place, as the river runs, is 36 miles. Above Middleton are ſeveral ſhoals which ſtretch quite acroſs the river. Only ſix feet water is found on the ſhoal at high tide, and here the tide ebbs and flows but about eight inches. About three miles below Middleton the river is contracted to about 40 roods in breadth by two high mountains. Almoſt everywhere elſe the banks are low, and ſpread into fine extenſive meadows. In the ſpring floods, which generally happen in May, theſe meadows are covered with water. At Hartford the water ſometimes riſes 20 feet above the common ſurface of the river, and having all to paſs through the above-mentioned ſtrait, it is ſometimes two or three weeks before it returns to its uſual bed. Theſe floods add nothing to the depth of water on the bar at the mouth of the river: this bar lying too far off in the ſound to be affected by them.

On this beautiful river, whoſe banks are ſettled almoſt to its ſource, are many pleaſant, neat, well-built towns. On its weſtern bank, from its mouth northward, are the towns of Saybrook, Haddam, Middleton, Weathersfield, Hartford, Windſor, and Suffield, in Connecticut; Weſt Springfield, Northampton, Hatfield, and Deerfield, in Maſſachuſets; Guilford, Brattleborough, in which is Fort Dummer, Weſtminſter, Windſor, Hartford, Fairlee, Newbury, Brunſwick, and many others in Vermont. Croſſing the river into New Hampſhire, and travelling on the eaſtern bank, you paſs through Woodbury nearly oppoſite to Brunſwick, Northumberland, the Coos country, Lyman, Orford, Lyme, Hanover, in which is Dartmouth College, Lebanon, Corniſh, Clermont, Charleſton, or N° 4, Cheſterfield, and many others in New Hampſhire; Sunderland, Hadley, Springfield, Long Meadow, in Maſſachuſets; and in Connecticut, Enfield, Eaſt Windſor, Eaſt Hartford, Glaſtenbury, Eaſt Haddam, and Lyme.

This river is navigable to Hartford, upwards of 50 miles from its mouth, and the produce of the country for 200 miles above is brought thither in boats. The boats which are uſed in this buſineſs are flat-bottomed, long and narrow, for the convenience of going up ſtream, and of ſo light a make as to be portable in carts. They are taken out of the river at three different carrying-places, all of which make 15 miles.

Sturgeon, ſalmon, and ſhad, are caught in plenty in their ſeaſon, from the mouth of the river upwards, excepting ſturgeon, which do not aſcend the upper falls; beſides a variety of ſmall fiſh, ſuch as pike, carp, perch, &c.

From this river are employed three brigs of 180 tons each, in the European trade; and about 60 ſail from 60 to 150 tons, in the Weſt India trade; beſides a few fiſhermen, and 40 or 50 coaſting veſſels.

Connecticut, one of the five ſtates of New England in America; bounded on the north by Maſſachuſets; on the eaſt by Rhode Iſland; on the ſouth by the ſound which divides it from Long Iſland; and on the weſt by the province of New York.

The diviſional line between Connecticut and Maſſachuſets, as ſettled in 1728, was found to be about 72 miles in length. The line dividing Connecticut from Rhode Iſland was ſettled in 1728, and found to be about 45 miles. The ſea coaſt, from the mouth of Paukatuk river, which forms a part of the eaſtern boundary of Connecticut, in a direct ſouthweſtwardly line to the mouth of Bryam river, is reckoned at about 90 miles. The line between Connecticut and New York runs from latitude 41. 0. to latitude 42. 2.; 72 miles. Connecticut contains about 4674 ſquare miles; equal to about 2,960,000 acres.

Rivers.

This ſtate is watered by ſeveral fine rivers, the principal of which are, *Connecticut* deſcribed in the preceding article, Houſatonik, and the Thames. One branch of the Houſatonik riſes in Laneſborough, the other in Windſor, both in Berkſhire county in Maſſachuſets. It paſſes through a number of pleaſant towns, and empties into the ſound between Stratford and Milford. It is navigable 12 miles, to Derby. A bar of ſhells, at its mouth, obſtructs its navigation for large veſſels. In this river, between Saliſbury and Canaan, is a cataract, where the water of the whole river, which is 150 yards wide, falls about 60 feet perpendicularly, in a perfectly white ſheet. A copious miſt ariſes, in which floating rainbows are ſeen in various places at the ſame time, exhibiting a ſcene exceedingly grand and beautiful.

The Thames empties into Long Iſland ſound at New London. It is navigable 14 miles, to Norwich Landing. Here it loſes its name, and branches into Shetucket on the eaſt, and Norwich or Little River on the weſt. The city of Norwich ſtands on the tongue of land between theſe rivers. Little River, about a mile from its mouth, has a remarkable and very romantic cataract. A rock 10 or 12 feet in perpendicular height, extends quite acroſs the channel of the river. Over this the whole river pitches, in one entire ſheet, upon a bed of rocks below. Here the river is compreſſed into a very narrow channel between two craggy cliffs, one of which towers to a conſiderable height. The channel deſcends gradually, is very crooked, and covered with pointed rocks. Upon theſe the water ſwiftly tumbles, foaming with the moſt violent agitation, 15 or 20 rods, into a broad baſon which ſpreads before it. At the bottom of the perpendicular falls, the rocks are curiouſly excavated by the conſtant pouring of the water. Some of the cavities, which are all of a circular form, are five or ſix feet deep. The ſmoothneſs of the water above its deſcent, the regularity and beauty of the perpendicular fall, the tremendous roughneſs of the other, and the craggy, towering cliff which impends the whole, preſent to the view of the ſpectator a ſcene indeſcribably delightful and majeſtic. On this river are ſome of the fineſt mill ſeats in New England, and thoſe immediately below the falls, occupied by Lathrop's mill, are perhaps not exceeded by any in the world. Acroſs the mouth of this river is a broad, commodious bridge, in the form of a wharf, built at a great expence.

Shetucket river, the other branch of the Thames, four miles from its mouth, receives Quinnabog, which has its ſource in Brimfield in Maſſachuſets; thence paſſing through Sturbridge and Dudley in Maſſachuſets, it croſſes into Connecticut, and divides Pomfret from Killingly, Canterbury from Plainfield, and Liſbon from Preſton, and then mingles with Shetucket. In

paſſing

passing through this hilly country, it tumbles over many falls, and affords a vast number of mill seats. The source of the Shetucket is not far from that of Quinnabog. It has the name of Willamantik while passing through Stafford, and between Tolland and Willington, Coventry, and Mansfield. Below Windham it takes the name of Shetucket, and empties as above. These rivers are fed by numberless brooks from every part of the adjacent country. At the mouth of Shetucket is a bridge of timber 124 feet in length, supported at each end by pillars, and held up in the middle by braces on the top, in the nature of an arch.

Harbours. The two principal harbours are at New London and New Haven. The former opens to the south. From the light-house, which stands at the mouth of the harbour, to the town, is about three miles; the breadth is three quarters of a mile, and in some places more. The harbour has from five to six fathoms water, a clear bottom, tough ooze, and as far as one mile above the town is entirely secure and commodious for large ships. New Haven harbour is greatly inferior to that of New London. It is a bay which sets up northerly from the sound about four miles. Its entrance is about half a mile wide. It has very good anchorage, and two and a half fathoms at low water, and three fathoms and four feet at common tides. The whole of the sea coast is indented with harbours, many of which are safe and commodious, but are not sufficiently used to merit a description.

Connecticut, though subject to the extremes of heat and cold in their seasons, and to frequent sudden changes, is very healthful. As many as one in 46 of the inhabitants of Connecticut, who were living in 1774, were upwards of 70 years old. From accurate calculation it is found, that about one in eight live to the age of 70 years and upwards; one in 13 to the age of 80 years, and one in about 30 to the age of 90.

In the maritime towns the weather is variable, according as the wind blows from the sea or land. As you advance into the country, the sea breezes have less effect upon the air, and consequently the weather is less variable. The shortest day is 8 hours and 58 minutes, and the longest 15 hours. The north-west winds, in the winter-season, are often extremely severe and piercing, occasioned by the great body of snow which lies concealed from the dissolving influence of the sun in the immense forests north and north-west. The clear and serene temperature of the sky, however, makes amends for the severity of the weather, and is favourable to health and longevity. Connecticut is generally broken land, made up of mountains, hills, and valleys; and is exceedingly well watered. Some small parts of it are thin and barren. It lies in the fifth and sixth northern climates, and has a strong fertile soil. Its principal productions are Indian corn, rye, wheat in many parts of the state, oats, and barley, which are heavy and good, and of late buck-wheat, flax in large quantities, some hemp, potatoes of several kinds, pumpkins, turnips, pease, beans, &c. &c. fruits of all kinds, which are common to the climate. The soil is very well calculated for pasture and mowing, which enables the farmers to feed large numbers of neat cattle and horses. Actual calculation has evinced, that any given quantity of the best mowing land in Connecticut, produces about twice as much clear profit as the same quantity of the best wheat land in the state of New York. Many farmers, in the eastern part of the state, have lately found their advantage in raising mules, which are carried from the ports of Norwich and New London to the West India islands, and yield a handsome profit. The beef, pork, butter, and cheese, of Connecticut, are equal to any in the world.

Trade. The trade of Connecticut is principally with the West India islands, and is carried on in vessels from 60 to 140 tons. The exports consist of horses, mules, oxen, oak staves, hoops, pine boards, oak planks, beans, Indian corn, fish, beef, pork, &c. Horses, live cattle and lumber, are permitted in the Dutch, Danish, and French ports. Beef and fish are liable to such heavy duties in the French islands, as that little profit arises to the merchant who sends them to their ports. Pork and flour are prohibited. As the ordinance making free ports in the French West India islands extends to all foreigners, the price of molasses and other articles has been greatly enhanced by the English purchasers for Canada and Nova Scotia; so that the trade of Connecticut with the French West India islands is not profitable. Cotton, cocoa, indigo, and sugars, are not permitted to be brought away by Americans. The severity with which these prohibitory laws are administered is such, as that these articles cannot be smuggled.

Connecticut has a large number of coasting vessels employed in carrying the produce of the state to other states.—To Rhode Island, Massachusets, and New Hampshire, they carry pork, wheat, corn, and rye. To North and South Carolinas and Georgia, butter, cheese, salted beef, cyder, apples, potatoes, hay, &c. and receive in return rice, indigo, and money. But as New York is nearer, and the state of the markets always well known, much of the produce of Connecticut, especially of the Western parts, is carried there; particularly pot and pearl ashes, flax-seed, beef, pork, cheese, and butter in large quantities. Most of the produce of Connecticut river, from the parts of Massachusets, New Hampshire, and Vermont, as well as of Connecticut, which are adjacent, goes to the same market. Considerable quantities of the produce of the eastern parts of the state are marketed at Boston and Providence.

The value of the whole exported produce and commodities from this state, before the year 1774, was then estimated at about 200,000l. lawful money annually. Since this time no accurate estimate has been made, so that it is impossible to tell whether the amount has since been increased or diminished.

In 1774, the number of shipping in Connecticut was 189; their tonnage 10,317; seafaring men 1162; besides upwards of 20 sail of coasting vessels, which employed about 90 seamen. This state is not yet fully recovered from the confusion in which it was involved by the late war; so that the number of shipping, &c. has not, at any period since 1774, been ascertained with accuracy. It is probable, however, considering the losses sustained by the war, the decay of the shipbuilding business, and the number of unfortunate shipwrecks,

Connecticut.

wrecks, and losses by hurricanes in the West Indies, that the shipping and seamen are not now so numerous as in 1774.

The number of shipping from the port of New London employed in 1788 in the European and West India trade, was four ships, one snow, 54 brigantines, 32 schooners, and 45 sloops. The number of horses and cattle exported from the district round New London, from the 10th of January 1787, to the 10th of January 1788, was 6917; besides jack-asses imported and exported, not included. From 1786 to 1787, the number was 6671; so that the last year exceeded the other 246. From March 1787 to January 1788, 1459 horses, 780 oxen, and 23 cows, were exported from the port of Middleton.

5 Manufactures.

The farmers in Connecticut and their families are mostly clothed in plain, decent, homespun cloth. Their linens and woollens are manufactured in the family way; and although they are generally of a coarser kind, they are of a stronger texture, and much more durable, than those imported from France and Great Britain. Many of their cloths are fine and handsome.

In New Haven is a linen manufactory which flourishes, and one for cotton is about to be established. In East Hartford is a glass-work, a snuff and powder mill, and an iron-work and slitting mill. Iron-works are established also at Salisbury, Norwich, and other parts of the state. At Stafford is a furnace at which are made large quantities of hollow ware and other ironmongery, sufficient to supply the whole state. Paper is manufactured at Norwich, Hartford, New Haven, and in Litchfield county. Nails of every size are made in almost every town and village in Connecticut; so that considerable quantities can be exported to the neighbouring states, and at a better rate than they can be had from Europe. Ironmongery, hats of the best kinds, candles, leather, shoes, and boots, are manufactured in this state. We must not omit to mention wooden dishes and other wooden ware, which are made in vast quantities in Suffield and some few other places, and sold in almost every part of the eastern states. Oil mills, of a new and very ingenious construction, have been erected in several parts of the state.

It appears from experiments made formerly in this state, that a bushel of sun-flower seed yields a gallon of oil; and that an acre of ground planted with the seed at three feet apart, will yield between forty and fifty bushels of the seed This oil is as mild as sweet oil, and is equally agreeable with salads, and as a medicine. It may, moreover, be used with advantage in paints, varnishes, and ointments. From its being manufactured in our own country, it may always be procured and used in a fresh state. The oil is pressed from the seed in the same manner that cold-drawn linseed oil is drawn from flax-seed, and with as little trouble. Sweet olive oil sells for six shillings a quart. Should the oil of the sun-flower sell for only two-thirds of that price, the produce of an acre of ground, supposing it to yield only 40 bushels of the seed, will be 32l. a sum far beyond the product of an acre of ground in any kind of grain. The seed is raised with very little trouble, and grows in land of moderate fertility. It may be gathered and shelled, fit for the extraction of the oil, by women and children.

6 Civil divisions and population.

Connecticut is divided into eight counties, viz. Hartford, New Haven, New London, Fairfield, Windham, Litchfield, Middlesex, and Tolland. The counties are subdivided into upwards of 80 townships; each of which is a corporation, invested with power to hold lands, choose their own town-officers, to make prudential laws, the penalty of transgression not to exceed 20s. and to choose their own representatives to the general assembly. The townships are generally divided into two or more parishes, in each of which is one or more places of public worship.

Connecticut is the most populous, in proportion to its extent, of any of the thirteen states. It is laid out in small farms from 50 to 300 or 400 acres each, which are held by the farmers in fee-simple; and are generally cultivated as well as the nature of the soil will admit. The state is chequered with innumerable roads or high-ways, crossing each other in every direction. A traveller in any of these roads, even in the most unsettled parts of the state, will seldom pass more than two or three miles without finding a house or cottage, and a farm under such improvements as to afford the necessaries for the support of a family. The whole state resembles a well-cultivated garden; which, with that degree of industry that is requisite for happiness, produces the necessaries and conveniences of life in great plenty.

In 1759, the number of inhabitants in Connecticut was 130,611; in 1774, there were 197,856 souls. In 18 years, the increase was 67,245; from 1774 to 1782, the increase was but 11,294 persons. This comparatively small increase of inhabitants may be satisfactorily accounted for from the destruction of the war, and the numerous emigrations to Vermont, the western parts of New Hampshire, and other states.

The inhabitants are almost entirely of English descent. There are no Dutch, French, or Germans, and very few Scotch or Irish people, in any part of New England.

Character, manners, &c.

In addition to what has been already said on these particulars under New England, it may be observed, that the people of Connecticut are remarkably fond of having all their disputes, even those of the most trivial kind, settled according to law. The prevalence of this litigious spirit affords employment and support for a numerous body of lawyers. The number of actions entered annually upon the several dockets in the state, justifies the above observations. That party spirit, however, which is the bane of political happiness, has not raged with such violence in this state as in Massachusets and Rhode Island. Public proceedings have been conducted, generally, and especially of late, with much calmness and candour. The people are well informed in regard to their rights, and judicious in the methods they adopt to secure them.

The clergy, who are numerous, and, as a body, very respectable, have hitherto preserved a kind of aristocratical balance in the very democratical government of the state; which has happily operated as a check upon the overbearing spirit of republicanism. It has been lamented that the unhappy religious disputes

putes which have too much prevailed among ſome of the clergy, and the too great attention that others have paid to their temporal concerns, to the neglect of their flocks, and an inattention to the qualifications of thoſe who have been admitted to the ſacred office, have, heretofore, conſiderably diminiſhed their influence. It is a pleaſing circumſtance that the rage for theological diſputation is abating; and greater ſtrictneſs is obſerved in the admiſſion of candidates to the miniſtry. Their influence is on the increaſe; and it is no doubt to be attributed, in part, to their increaſing influence, that an evident reformation in the manners of the people of this ſtate has taken place ſince the peace. In regard to learning and abilities, the clergy, at the preſent day, are equal to their predeceſſors at any former period.

As to eccleſiaſtical government and diſcipline, each church is a ſeparate juriſdiction, and claims authority to chooſe their own miniſter, to exerciſe government, and to enjoy goſpel ordinances within itſelf. The churches, however, are not independent of each other; they are aſſociated for mutual benefit and convenience. The aſſociations have power to licenſe candidates for the miniſtry, to conſult for the general welfare, and to recommend meaſures to be adopted by the churches, but have no authority to enforce them. When diſputes ariſe in churches, councils are called, by the parties, to ſettle them; but their power is only adviſory. There are as many aſſociations in the ſtate as there are counties; and they meet twice in a year. Theſe are all combined in one general aſſociation, who meet annually.

All religions that are conſiſtent with the peace of ſociety are tolerated in Connecticut; and a ſpirit of liberality and catholiciſm is increaſing. There are very few religious ſects in this ſtate; the bulk of the people are Congregationaliſts. Beſides theſe there are Epiſcopalians and Baptiſts; and formerly there was a ſociety of Sandimanians at New-Haven; but they are now reduced to a very ſmall number. The Epiſcopalian churches are reſpectable, and are under the ſuperintendence of a biſhop. There were 29 congregations of the Baptiſts in 1784. Theſe congregations, with thoſe in the neighbouring ſtates, meet in aſſociations, by delegation, annually.

There are a great number of very pleaſant towns, both maritime and inland, in Connecticut. It contains five incorporated towns or cities. Two of theſe, Hartford and New-Haven, are the capitals of the ſtate. The general aſſembly is holden at the former in May, and at the latter in October, annually. See HARTFORD and *New-HAVEN.*

In no part of the world is the education of all ranks of people more attended to than in Connecticut. Almoſt every town in the ſtate is divided into diſtricts, and each diſtrict has a public ſchool kept in it a greater or leſs part of every year. Somewhat more than one third of the money ariſing from a tax on the polls and rateable eſtate of the inhabitants, is appropriated to the ſupport of ſchools, in the ſeveral towns, for the education of children and youth. The law directs that a grammar ſchool ſhall be kept in every country town through the ſtate.

There is a grammar ſchool at Hartford, and another at New-Haven, ſupported by a donation of Governor Hopkins. This venerable and benevolent gentleman, in his laſt will, dated 1657, left in the hands of Theophilus Eaton, Eſq. and three others, a legacy of 1324l. "as an encouragement, in theſe foreign plantations, of breeding up hopeful youths both at the grammar ſchool and college." In 1664, this legacy was equally divided between New-Haven and Hartford; and grammar ſchools were erected, which have been ſupported ever ſince.

Connecticut.

At Greenfield there is a reſpectable academy, under the care and inſtruction of the Rev. Dr Dwight. At Plainfield is another, under the care of the Rev. Mr Benedict. This academy has flouriſhed for ſeveral years, and furniſhed a number of ſtudents for Yale and Dartmouth colleges. At Norwich and Windham, likewiſe, are academies furniſhed with able inſtructors; each of theſe academies has 60 or 70 ſcholars.

Yale College was founded in 1700, and remained at Killingworth until 1707—then at Saybrook until 1716, when it was removed and fixed at New-Haven. See *New-HAVEN.*

11 Mines, minerals and foſſils.

On the bank of Connecticut river, two miles from Middleton, is a lead mine, which was wrought during the war at the expence of the ſtate, and was productive. It is too expenſive to work in time of peace. Copper mines have been diſcovered and opened in ſeveral parts of the ſtate, but have proved unprofitable, and are much neglected. Iron mines are numerous and productive. Steel ore has been found in the mountains between Woodbury and New Milford. Talcs of various kinds, white, brown, and chocolate coloured cryſtals, zinc or ſpeltzer, a ſemimetal, and ſeveral other foſſils and metals, have been found in Connecticut.

12 Mode of levying taxes.

All freeholders in the ſtate are required by law to give in liſts of their polls and rateable eſtate, to perſons appointed in the reſpective towns to receive them, on or before the 20th of Auguſt annually. Theſe are valued according to law, arranged in proper order, and ſent to the general aſſembly annually in May.

The ſum total of the liſt of the polls and rateable eſtate of the inhabitants of Connecticut, as brought into the general aſſembly in May 1787, were as follows:

Sum total of the ſingle liſt	L.1,484,901	6	4¼
Aſſeſſments	47,790	2	9
One quarter of the fourfolds	1,176	9	4
Total	L.1,533,867	18	5¼

On this ſum taxes are levied, ſo much on the pound, according to the ſum propoſed to be raiſed. A tax of two-pence on the pound would raiſe 12,782l. 4s.

The ordinary annual expences of government before the war amounted to near 4000l. ſterling, excluſive of that which was appropriated to the ſupport of ſchools. The expences have ſince increaſed.

13 Mineral ſprings.

At Stafford is a medicinal ſpring, which is ſaid to be a ſovereign remedy for ſcorbutic, cutaneous, and other diſorders. At Guilford is a ſpring, whoſe water, it is ſaid, when ſeparated from the fountain, will evaporate even when put into a bottle and tightly corked.

It is difficult to ſay what is the conſtitution of this ſtate.

Connecticut.

14 Constitution and courts of justice.

state. Contented with the form of government which originated from the charter of Charles II. granted in 1662, the people have not been disposed to run the hazard of framing a new constitution since the declaration of independence. They have tacitly adopted their old charter as the ground of civil government, so far as it is applicable to an independent people.

Agreeable to this charter, the supreme legislative authority of the state is vested in a governor, deputy-governor, twelve assistants or counsellors, and the representatives of the people, styled the *General Assembly*. The governor, deputy-governor, and assistants, are annually chosen by the freemen in the month of May. The representatives (their number not to exceed two from each town) are chosen by the freemen twice a-year, to attend the two annual sessions, on the second Thursday of May and October. This assembly has power to erect judicatories, for the trial of causes civil and criminal, and to ordain and establish laws for settling the forms and ceremonies of government. By these laws the general assembly is divided into two branches, called the upper and lower houses. The upper house is composed of the governor, deputy-governor, and assistants; the lower house, of the representatives of the people. No law can pass without the concurrence of both houses. The judges of the superior court hold their offices during the pleasure of the general assembly. The judges of the county courts, and justices, are annually appointed. Sheriffs are appointed by the governor and council, without limitation of time. The governor is captain-general of the militia, the deputy-governor lieutenant-general. All other military officers are appointed by the assembly, and commissioned by the governor.

The mode of electing the governor, deputy-governor, assistants, treasurer, and secretary, is as follows: The freemen in the several towns meet on the Monday next after the first Tuesday in April, annually, and give in their votes for the persons they choose for the said offices respectively, with their names written on a piece of paper, which are received and sealed up by a constable in open meeting, the votes for each office by themselves, with the name of the town and office written on the outside. These votes, thus sealed, are sent to the general assembly in May, and there counted by a committee from both houses. All freemen are eligible to any office in government. In choosing assistants, twenty persons are nominated, by the vote of each freeman, at the freemen's meeting for choosing representatives in September annually. These votes are sealed up, and sent to the general assembly in October, and are there counted by a committee of both houses, and the twenty persons who have the most votes stand in nomination; out of which number the twelve who have the greatest number of votes, given by the freemen at their meeting in April, are in May declared assistants in the manner above mentioned. The qualifications of freemen are, maturity in years, quiet and peaceable behaviour, a civil conversation, and freehold estate to the value of forty shillings per annum, or forty pounds personal estate in the list, certified by the select men of the town; it is necessary also that they take the oath of fidelity to the state. Their names are enrolled in the town clerk's office, and they continue freemen for life, unless disfranchised by sentence of the superior court, on conviction of misdemeanor.

The courts are as follows: The justices of the peace, of whom a number are annually appointed in each town by the general assembly, have authority to hear and determine civil actions, where the demand does not exceed four pounds. If the demand exceeds forty shillings, an appeal to the county is allowed. They have cognizance of small offences, and may punish by fine not exceeding forty shillings, or whipping not exceeding ten stripes, or sitting in the stocks. There are eight county courts in the state, held in the several counties by one judge and four justices of the quorum, who have jurisdiction of all criminal cases, arising within their respective counties, where the punishment does not extend to life, limb, or banishment. They have original jurisdiction of all civil actions which exceed the jurisdiction of a justice. Either party may appeal to the superior court, if the demand exceeds twenty pounds, except on bonds or notes vouched by two witnesses.

There are several courts of probate in each county, consisting of one judge. The peculiar province of this court, is, the probate of wills, granting administration of intestate estates, ordering distribution of them, and appointing guardians for minors, &c. An appeal lies from any decree of this court to the superior court.

The superior court consists of five judges. It has authority in all criminal cases extending to life, limb or banishment, and other high crimes and misdemeanors, to grant divorces, and to hear and determine all civil actions brought by appeal from the county courts, or the court of probate, and to correct the errors of all inferior courts. This is a circuit court, and has two stated sessions in each county annually. The superior and county courts try matters of fact by a jury, or without if the parties will agree.

There is a supreme court of errors, consisting of the deputy-governor and the twelve assistants. Their sole business is to determine writs of error brought on judgments of the superior court, where the error complained of appears on the record. They have two stated sessions annually, viz. on the Tuesdays of the weeks preceding the stated sessions of the general assembly.

The county court is a court of chancery, empowered to hear and determine cases in equity, where the matter in demand does not exceed one hundred pounds. The superior court has cognizance of all cases where the demand exceeds that sum. Error may be brought from the county to the superior court, and from the superior court to the supreme court of errors, on judgment in cases of equity as well as of law.

The general assembly only have power to grant pardons and reprieves, to grant commissions of bankruptcy, or protect the persons and estates of unfortunate debtors.

The common law of England, so far as it is applicable to this country, is considered as the common law of this state. The reports of adjudication in the court of king's bench, common pleas, and chancery, are read in the courts of this state as authorities; yet the judges do not consider them as conclusively binding,

ing, unlefs founded on folid reafons which will apply in this ftate, or fanctioned by concurrent adjudications of their own courts.

The feudal fyftem of defcents was never adopted in this ftate. All the real eftate of inteftates is divided equally among the children, males and females, except that the eldeft fon has a double portion. And all eftates given in tail muft be given to fome perfon then in being, or to their immediate iffue, and fhall become fee-fimple eftates to the iffue of the firft donee in tail. The widow of an inteftate is entitled to a third part of the perfonal eftate for ever, and to her dower, or third part of the houfes and lands belonging to the inteftate at the time of his death, during her life.

The practice of law in this ftate has more fimplicity, but lefs precifion, than in England. Affiftants and judges are empowered to iffue writs through the ftate, and juftices through their refpective counties. In thefe writs, the fubftance of the complaints or the declarations muft be contained; and if neither of the parties fhow good reafon for delay, the caufes are heard and determined the fame term to which the writs are returnable. Few of the fictions of law, fo common in the Englifh practice, are known in this ftate. The plaintiff has always his election to attach or fummon the defendant. Attorneys are admitted and qualified by the county courts. Previous to their admiffion to the bar, they muft ftudy two years with a practifing attorney in the ftate, if they have had a college education, and three years if they have not; their morals muft be good, and their characters unblemifhed; and they muft fuftain an examination by the attorneys of the court of the county where they are admitted, and be by them recommended to the court. When admitted to the county court, they can practife without other qualifications, in any court in the ftate. There are upon an average about thirteen attorneys to each county, one hundred and four in the ftate; a very great proportion for the real exigencies of the people. Yet from the litigious fpirit of the citizens, the moft of them find employment and fupport. There is no attorney general, but there is one attorney to the ftate in each county.

The prefent territory of Connecticut, at the time of the firft arrival of the Englifh, was poffeffed by the Pequot, the Mohegan, Podunk, and many other fmaller tribes of Indians.

The Pequots were numerous and warlike. Their country extended along the fea coaft from Paukatuk to Connecticut river. About the year 1630, this powerful tribe extended their conquefts over a confiderable part of Connecticut, over all Long Ifland, and part of Narraganfett. Saffacus, who was the grand monarch of the whole country, was king of this nation. The feat of his dominions was at New London; the ancient Indian name of which was Pequot.

The Mohegans were a numerous tribe, and their territory extenfive. Their ancient claim, which was furveyed and fettled by commiffioners from Queen Anne in 1705, comprehended all New London county, except a narrow ftrip of about eight miles wide, on the fea-coaft, almoft the whole of the county of Windham, and a part of the counties of Tolland and Hartford. Uncas, diftinguifhed for his friendfhip to the Englifh, was the fachem of this tribe.

The Podunks inhabited Eaft Hartford, and the circumjacent country. The firft fachem of this tribe, of whom the Englifh had any knowledge was Tatanimoo. He was able to bring into the field more than 200 fighting men.

The firft grant of Connecticut was made by the Plymouth council to the earl of Warwick, in 1630, and confirmed by his majefty in council the fame year. This grant comprehended all that part of New England which lies weft from Narraganfett river, 120 miles on the fea-coaft, from thence in latitude and breadth aforefaid to the South fea. The year following, the earl affigned the grant to Lord Say and Sele, Lord Brook, and nine others.

No Englifh fettlements were attempted in Connecticut, until the year 1633, when a number of Indian traders, having purchafed of Zequaffon and Natawanute, two principal fachems, a tract of land at the mouth of Little river in Windfor, built a houfe and fortified it, and ever after maintained their right of foil upon the river.

The fame year, a little before the arrival of the Englifh, a company of Dutch traders came to Hartford, and built a houfe which they called the *Hirfe of Good Hope*, and erected a fmall fort, in which they planted two cannon. The remains of this fettlement are ftill vifible on the bank of Connecticut river. This was the only fettlement of the Dutch in Connecticut in thefe ancient times. The Dutch, and after them the province of New York, for a long time claimed as far eaft as the weftern bank of Connecticut river. It belongs to the profeffed hiftorian to prove or difprove the juftice of this claim. Douglas fays, "The partition line between New York and Connecticut, as eftablifhed December 1. 1664, runs from the mouth of Memoroncok river, a little weft of Byram river, N. N. W. and was the ancient eafterly limits of New York, until November 23. 1683, when the line was run nearly the fame as it is now fettled." If Douglas is right, the New York claim could not have been well founded.

In 1634, Lord Say and Sele, &c. fent over a fmall number of men, who built a fort at Saybrook, and held a treaty with the Pequot Indians, who in a formal manner gave to the Englifh their right to Connecticut river and the adjacent country.

In 1635, the Plymouth council granted to the duke of H milton, all lands between Narraganfett and Connecticut rivers, and back into the country as far as Maffachufets fouth line. This covered a part of the earl of Warwick's patent, and occafioned fome difputes in the colony. There were feveral attempts to revive the Hamilton claim, but they were never profecuted.

In October of this year, about fixty perfons from Newton, Dorchefter, and Watertown, in Maffachufets, came and fettled at Hartford, Wethersfield, and Windfor, in Connecticut; and the June following the famous Mr Hooker and his company came and fettled at Hartford, and was a friend and father to the colony to the day of his death.

The firft court held in Connecticut was at Hartford, April 26. 1636.

The year 1637 was diftinguifhed by the war with the Pequots. This warlike nation had, for fome time, been troublefome neighbours. They folicited the Nar-

ragansetts to join them in extirpating the English. They had surprised and killed several of the English upon Connecticut river. These threatening appearances and actual hostilities induced the three colonies of Massachusets, Plymouth, and Connecticut, to combine their forces, to carry the war into their country, and to attempt the entire destruction of the whole tribe. Myantonomo, the Narranganset sachem, and Uncas, sachem of the Mohegans, sent to the English and offered their service to join with them against the Pequots. Forces were accordingly raised in all the colonies; but those of Connecticut, on account of their vicinity to the enemy, were first in action. Captain Mason, with 80 English and 100 Indians from Connecticut river, proceeded by water to the Narragansetts country, where 200 of that tribe joined him. On the 24th of May, they began their march for Sassacus fort on Pequot, now Thames river. They afterwards determined first to assault Mystic fort, which was situated between them and Pequot river. On the morning of the 26th of May the attack was made. The Indians, after a midnight revel, were buried in a deep sleep. At the moment of their approach, the sentinel happened to be gone into a wigwam to light his pipe. The barking of a dog gave the alarm. The Indians awoke, seized their arrows and began their hideous yell. They were joined in their tremendous noise by the Indians in the English army, who were in the rear and afraid to approach. The battle was warm and bloody, and the victory complete. The fort was taken—about 70 wigwams burnt—50 or 60 of the Indians were killed—many were wounded and taken, and the rest escaped. Sassacus and his warriors at Pequot, struck with terror at the news of this defeat, demolished their principal fort, burnt their wigwams, and fled to the westward. Captain Stoughton, with 160 men from Massachusets, had by this time arrived at Saybrook. He with his forces joined Captain Mason and pursued the Indians, and overtook and surrounded them in a great swamp near Fairfield. A sachem and 99 women and children came out and delivered themselves up to their pursuers. Terms of peace were offered to the rest: but after a short parley they determined, that as they had lived they would die together. There were about 80 who made this resolution. Part of these escaped by means of the darkness of the night. The rest were either killed or taken. In this action the Indians had guns, which is the first account of their having used them. Sassacus fled to the Mohawks, by whom it is reported he was murdered; but it is most probable that he and his company incorporated with them. Many of the Indian captives were unjustifiably sent to Bermudas and sold for slaves. The Pequot tribe was wholly extinguished. This successful expedition struck the Indians that remained with such terror, as restrained them from open hostilities for near forty years after.

The English thus obtained the country east of the Dutch settlements, by right of conquest. The pursuit of the Indians led to an acquaintance with the lands on the sea-coast from Seabrook to Fairfield. It was reported to be a very fine country. This favourable report induced Messrs Eaton and Hopkins, two very respectable London merchants, and Mr Davenport, a man of distinguished piety and abilities, with their company, who arrived this year (1637) from London, to think of this part of the country as the place of their settlement. Their friends in Massachusets, sorry to part with so valuable a company, dissuaded them from their purpose. Influenced, however, by the promising prospects which the country afforded, and flattering themselves that they should be out of the jurisdiction of a general governor, with which the country was from time to time threatened, they determined to proceed. Accordingly, in March 1638, with the consent of their friends on Connecticut river, they settled at New Haven, and laid the foundation of a flourishing colony, of which Quinnipiak, now New Haven, was the chief town. The first public worship in this new plantation, was attended on Lord's day, April 18. 1638, under a large spreading oak. The Rev. Mr Davenport preached from Mat. iii. 1. on the temptations of the wilderness. Both colonies, by voluntary compact, formed themselves into distinct commonwealths, and remained so until their union in 1665.

In 1639, the three towns on Connecticut river, already mentioned, finding themselves without the limits of any jurisdiction, formed themselves into a body politic, and agreed upon articles of civil government. These articles were the foundation of Connecticut charter which was granted in 1662. The substance of the articles, so far as they respect the holding of assemblies, the time and manner of electing magistrates and other civil officers (except that in the old confederation no person was to be chosen governor more than once in two years), and the extent of legislative powers was transferred into, and established in said charter.

The first church was gathered in New Haven this year, and consisted of seven members. These were chosen by the settlers after Mr Davenport had preached from the words of Solomon, 'Wisdom hath builded her house, she hath hewed out her seven pillars.' These men were indeed the pillars of the church, to whom the rest were added as they became qualified. They were also the court to try all civil actions.

The first settlers in New Haven had all things common; all purchases were made in the name and for the use of the whole plantation; and the lands were apportioned out to each family, according to their number and original stock.

At their first election, in October 1639, Mr Theophilus Eaton was chosen governor for the first year. Their elections, by agreement, were to be annual; and the word of God their only rule in conducting the affairs of government in the plantation.

In 1643, the articles of confederation between the four New England colonies, mentioned under the article New England, were unanimously adopted by the colonies of New Haven and Connecticut.

The English settlement on Delaware, which was under the jurisdiction of New Haven, was surprised by the Swedes, and the people put in irons, under a false pretence that they were entering into a conspiracy with the Indians to extirpate the Swedes.

The general court of New Haven, this year, established it as a fundamental article not to be disputed, That none be admitted as free burgesses but church members, and that none but such should vote at elections.

tions. They alſo ordained, That each town chooſe from among themſelves judges (church members) to be a court, to have cognizance of all civil actions not exceeding twenty pounds; and of criminal cauſes, where the puniſhment was ſitting in the ſtocks, whipping, and fining not exceeding five pounds. There was liberty of appeal from this to the court of magiſtrates. The court of magiſtrates conſiſted of all the magiſtrates throughout the colony, who were to meet twice a-year at New Haven, for the trial of all capital cauſes. Six made a quorum. The general court was to conſiſt of the governor, deputy-governor, magiſtrates, and two repreſentatives from each town. The annual election of officers of government was at this time eſtabliſhed, and has ever ſince continued.

The unſettled ſtate of the colony had hitherto prevented their eſtabliſhing a eode of laws. To ſupply this defect, the general court ordered, 'That the judicial laws of God, as they were delivered to Moſes, and as they are a fence to the moral, being neither typical nor ceremonial, nor having any reference to Canaan, ſhall be accounted of moral equity, and generally bind all offenders, and be a rule to all the courts in this juriſdiction in their proceedings againſt offenders, until they be branched out into particulars hereafter.'

About this time a war broke out between the Mohegan and Narraganſett Indians. A perſonal quarrel between Myantonomo ſachem of the Narraganſetts, and Uncas ſachem of the Mohegans, was the foundation of the war. Myantonomo raiſed an army of 900 warriors, and marched towards the Mohegan country. Uncas by his ſpies received timely notice of their approach. His ſeat of reſidence was in ſome part of Norwich. He quickly collected 600 of his braveſt warriors, and told them, 'The Narraganſetts muſt not come into our town; we muſt meet them.' They accordingly marched about three miles to a large plain, where the two armies met, and halted within bow-ſhot of each other. A parley was propoſed by Uncas, and agreed to by Myantonomo. The ſachems met, and Uncas addreſſed his enemy as follows. 'You have a great many brave men: ſo have I. You and I have quarrelled; but theſe warriors, what have they done? Shall they die to avenge a private quarrel between us? No. Come like a brave man, as you pretend to be, and let us fight. If you kill me, my men ſhall be your's: if I kill you, your men ſhall be mine.' Myantonomo replied: 'My men came to fight, and they ſhall fight.' Uncas, like an experienced warrior, aware of the reſult of the conference from the ſuperior force of his enemy, had previouſly ſignified to his men, that if Myantonomo refuſed to fight him in ſingle combat, he would immediately fall, which was to be the ſignal for them to begin the attack. As ſoon therefore as Myantonomo had finiſhed his laconic ſpeeeh, Uncas dropped: his men inſtantly obeyed the ſignal, and poured in a ſhower of arrows upon the unſuſpecting Narraganſetts, and ruſhing on with their horrid yells and ſavage fierceneſs, put them to flight. Many were killed on the ſpot, the reſt were cloſely purſued, and ſome were precipitately driven down craggy precipices, and daſhed in pieces. At a place called, from this event, *Sachem's plain*, Uncas overtook and ſeized Myantonomo by the ſhoulder. They ſat down together; and Uncas with a hoop called in his men, and the battle ceaſed. Doubtful what to do with the royal priſoner, Uncas and his warriors, in council, determined to carry him to the governor and council at Hartford, and be adviſed by them. Thither he was accordingly conducted. The governor having adviſed with his council, told Uncas, that the Engliſh were not then at war with the Narraganſetts, and of courſe that it was not proper for them to intermeddle in the matter. Uncas was left to do with him as he pleaſed. Myantonomo was conducted back to the plain where he was taken, and put to death by Uncas himſelf. The tragic ſcene did not end with his death. Uncas, after the manner of the Indians, with his tomahawk cut off a large piece of fleſh from the ſhoulder of his ſlaughtered enemy, broiled and ate it, ſaying, with an air of ſavage triumph, 'It is the ſweeteſt meat I ever ate. It makes me have a ſtout heart.' His body was afterwards buried, and a pillar erected over it, the remains of which are viſible to this day.

The Narraganſetts were greatly enraged at the death of their prince, and reſolved to take vengeance on the Mohegans. The united colonies interpoſed to prevent a war between them, but in vain. The Narraganſetts reſolutely deelared, they would continue the war until they had Uncas's head. But as Uncas had ever been a friend to the Engliſh, they joined him againſt his enemies, and were victorious. Such, however, was the enmity of the Narraganſetts to the Engliſh, that they afterwards ſent ſome of their men to Uncas, with large preſents, to induce him to join with them in a war with the colonies. Uncas replied, "Go tell your king, that I will go to Norwich, and adviſe with Major John Maſon and Mr Fitch; if they tell me to join him and fight againſt the Engliſh, I will join him." In the war that happened ſoon after, Uncas aſſiſted the Engliſh, and the Narraganſetts were ſubdued, and never after were formidable.

In conſideration of the ſucceſs and increaſe of the New England colonies, and that they had been of no charge to the nation, and in proſpect of their being in future very ſcrviceable to it, the Engliſh parliament, March 10. 1643, granted them an exemption from all cuſtoms, ſubſidies, and other duties, until further order.

In 1644, the Connecticut adventurers purchaſed of Mr Fenwick, agent for Lord Say and Sele, and Lord Brook, their right to the colony of Connecticut, for 1600l.

The hiſtory of Connecticut is marked with traces of the ſame ſpirit which has been mentioned as characteriſtic of the Maſſachuſſets, in different ſtages of their hiſtory. Indeed, as Maſſachuſets was the ſtock whence Connecticut proceeded, this is to be expected.

The colonies of Connecticut and New Haven, from their firſt ſettlement, increaſed rapidly: tracts of land were purchaſed of the Indians, and new towns ſettled from Stamford to Stonington, and far back into the country, when, in 1761, Major John Maſon, as agent for the colony, bought of the natives all lands which had not before been purchaſed by particular towns, and made a public ſurrender of them to the colony, in the preſence of the general aſſembly. Having done theſe things, the colonies petitioned King Charles II. for

Connecticut.

for a charter, and their petition was granted. His majeſty, on the 23d of April 1662, iſſued his letters patent under the great ſeal, ordaining that the colony of Connecticut ſhould for ever hereafter be one body corporate and politic, in fact and in name, confirming to them their ancient grant and purchaſe, and fixing their boundaries as follows, viz. " All that part of his Majeſty's dominions in New England, in America, bounded eaſt by Narraganſett river, commonly called *Narraganſett bay*, where the river falleth into the ſea; and on the north by the line of Maſſachuſets plantation, and on the ſouth by the ſea, and in longitude as the line of the Maſſachuſets colony, running from eaſt to weſt, that is to ſay, from the ſaid Narraganſett bay on the eaſt, to the South ſea on the weſt part, with the iſlands thereunto belonging." This charter has ever ſince remained the baſis of the government of Connecticut.

Such was the ignorance of the Europeans reſpecting the geography of America, when they firſt aſſumed the right of giving away lands which the God of nature had long before given to the Indians, that their patents extended they knew not where; many of them were of doubtful conſtruction, and very often covered each other in part, and have produced innumerable diſputes and miſchiefs in the colonies, ſome of which are not ſettled to this day. Connecticut conſtrued her charter literally, and paſſing over New York, which was then in poſſeſſion of the ſubjects of a Chriſtian prince, claimed, in latitude and breadth mentioned therein, to the South ſea. Accordingly purchaſes were made of the Indians, on the Delaware river, weſt of the weſtern bounds of New York, and within the ſuppoſed limits of Connecticut charter, and ſettlements were made thereon by people from, and under the juriſdiction of, Connecticut. The charter of Pennſylvania, granted to William Penn, in 1681, covered theſe ſettlements. This laid the foundation for a diſpute, which for a long time was maintained with warmth on both ſides. The matter was at laſt ſubmitted to gentlemen choſen for the purpoſe, who decided the diſpute in favour of Pennſylvania. Many, however, ſtill aſſert the juſtice of the Connecticut claim. The ſtate of Connecticut has lately ceded to Congreſs all their lands weſt of Pennſylvania, except a reſerve of 20 miles ſquare. This ceſſion Congreſs have accepted, and thereby indubitably eſtabliſhed the right of Connecticut to the reſerve.

The colony of New Haven, though unconnected with the colony of Connecticut, was comprehended within the limits of their charter, and, as they concluded, within their juriſdiction. But New Haven remonſtrated againſt their claim, and refuſed to unite with them until they ſhould hear from England. It was not until the year 1665, when it was believed that the king's commiſſioners had a deſign upon the New England charters, that theſe two colonies formed a union, which has ever ſince amicably ſubſiſted between them.

In 1672, the laws of the colony were reviſed, and the general court ordered them to be printed; and alſo, that " every family ſhould buy one of the law books; ſuch as pay in ſilver, to have a book for 12d. ſuch as pay in wheat, to pay a peck and a half a book: and ſuch as pay in peaſe, to pay 2s. a book, the peaſe at 3s. the buſhel." Perhaps it is owing to this early and univerſal ſpread of law books, that the people of Connecticut are to this day ſo fond of the law. In 1750, the laws of Connecticut were again reviſed and publiſhed in a ſmall folio volume of 258 pages. Dr Douglas obſerves, that they were the moſt natural, equitable, plain, and conciſe code of laws for plantations hitherto extant. There has been a reviſion of them ſince the peace, in which they were greatly and very judiciouſly ſimplified.

The years 1675 and 1676 were diſtinguiſhed by the wars with Philip and his Indians, and with the Narraganſetts, by which the colony was thrown into great diſtreſs and confuſion. The inroads of the enraged ſavages were marked with cruel murders, and with fire and devaſtation.

In 1684, the charters of Maſſachuſets Bay and Plymouth were taken away, in conſequence of Quo warrantos which had been iſſued againſt them. The charter of Connecticut would have ſhared the ſame fate had it not been for ——— Wadſworth, Eſq. who, having very artfully procured it when it was on the point of being delivered up, buried it under an oak tree in Hartford, where it remained until all danger was over, and then was dug up and reaſſumed.

Connecticut has ever made rapid advances in population. There have been more emigrations from this than from any of the other ſtates, and yet it is at preſent full of inhabitants. This increaſe, under the divine benediction, may be aſcribed to ſeveral cauſes. The bulk of the inhabitants are induſtrious, ſagacious huſbandmen. Their farms furniſh them with all the neceſſaries, moſt of the conveniences, and but few of the luxuries of life. They of courſe are generally temperate, and, if they chooſe, can ſubſiſt with as much independence as is conſiſtent with happineſs. The ſubſiſtence of the farmer is ſubſtantial, and does not depend on incidental circumſtances, like that of moſt other profeſſions. There is no neceſſity of ſerving an apprenticeſhip to the buſineſs, nor of a large ſtock of money to commence it to advantage. Farmers, who deal much in barter, have leſs need of money than any other claſs of people. The eaſe with which a comfortable ſubſiſtence is obtained, induces the huſbandman to marry young. The cultivation of his farm makes him ſtrong and healthful. He toils cheerfully through the day—eats the fruit of his own labour with a gladſome heart—at night devoutly thanks his bounteous God for his daily bleſſings—retires to reſt, and his ſleep is ſweet. Such circumſtances as theſe have greatly contributed to the amazing increaſe of inhabitants in this ſtate.

Beſides, the people live under a free government, and have no fear of a tyrant. There are no overgrown eſtates, with rich and ambitious landlords, to have an undue and pernicious influence in the election of civil officers. Property is equally enough divided, and muſt continue to be ſo as long as eſtates deſcend as they now do. No perſon is prohibited from voting, or from being elected into office, on account of his poverty. He who has the moſt merit, not he who has the moſt money, is generally choſen into public office. As inſtances of this, it is to be obſerved, that many of the citizens of Connecticut, from the humble walks of life, have ariſen to the firſt offices in the ſtate, and filled them with

with dignity and reputation. That base business of electioneering, which is so directly calculated to introduce wicked and designing men into office, is yet but little known in Connecticut. A man who wishes to be chosen into office, acts wisely for that end, when he keeps his desires to himself.

A thirst for learning prevails among all ranks of people in the state. More of the young men in Connecticut, in proportion to their numbers, receive a public education, than in any of the states. Dr Franklin and other literary characters have honoured this state by saying, that it is the *Athens of America*.

The revolution, which so essentially affected the governments of most of the colonies, produced no very perceptible alteration in the government of Connecticut. While under the jurisdiction of Great Britain, they elected their own governors, and all subordinate civil officers, and made their own laws in the same manner and with as little controul as they now do. Connecticut has ever been a republic, and perhaps as perfect and as happy a republic as has ever existed. While other states, more monarchical in their government and manners, have been under a necessity of undertaking the difficult task of altering their old, or forming new constitutions, and of changing their monarchical for republican manners, Connecticut has uninterruptedly proceeded in her old track, both as to government and manners; and by these means has avoided those convulsions which have rent other states into violent parties.

CONNECTION, or CONNEXION, the relation or dependence of one thing upon another.

CONNECTION, or *Continuity*, in the drama, consists in the joining of the several scenes together.

The connection is said to be observed, when the scenes of an act succeed one another immediately, and are so joined as that the stage is never left empty.

CONNECTIVES, in *Grammar*, one of the four species under which, according to Mr Harris, all words may be included. They are of two kinds: and as they connect sentences or words, are called by the different names of *conjunctions* and *prepositions*. See GRAMMAR.

CONNIVENT VALVES, in *Anatomy*, those wrinkles, cellules, and vascules, which are found in the insides of the two intestines ilium and jejunum. See ANATOMY, N° 93. *et seq*.

CONNOISSEUR, a French term, of late used in English: it literally denotes a person well versed in any thing; being formed of the verb *connoitre*, "to know, understand." Hence it comes to be used in our language for a critic, or person who is a thorough judge or master in any way, particularly in matters of painting and sculpture.

CONNOR, BERNARD, a learned physician, was born in the county of Kerry, in Ireland, about the year 1666. Having determined to apply himself to the study of physic, he went to France, and resided some time in the university of Montpelier. Afterwards he went to Paris; where he obtained great skill in medicine, anatomy, and chemistry. From thence he travelled to Venice, with the two sons of the high-chancellor of Poland; and then taking a tour through great part of Germany, went to Warsaw, where he was made physician to King John Sobieski. In 1695, he came to England, read a course of lectures in London and Oxford, and became member of the Royal Society and College of Physicians; afterwards, being invited to Cambridge, he read public lectures there, and made various experiments in chemistry. He has rendered himself memorable for a philosophical and medical treatise in Latin, entitled *Evangelium Medici*, i. e. "the Physician's Gospel;" tending to explain the miracles performed by Christ as natural events, upon the principles of natural philosophy. He wrote also a history of Poland; and died in 1698, aged 32.

CONNOR, a city of Ireland, in the county of Antrim, and province of Ulster. W. Long. 6. 30. N. Lat. 54. 50.

CONOCARPUS, BUTTON-WOOD. See BOTANY *Index*.

CONOID, in *Geometry*, a solid body, generated by the revolution of a conic section about its axis. See CONIC *Sections*.

CONOIDES, in *Anatomy*, a gland found in the third ventricle of the brain, called *pinealis*, from its resemblance to a pine apple. See ANATOMY *Index*.

CONON, the renowned Athenian general and admiral, flourished 394 years before Christ. See ATTICA, N° 162, 163. After his defeat by Lysander, he fled to Evagoras king of Cyprus; after which he put himself under the protection of Artaxerxes king of Persia; with whose army he delivered Athens from the oppression of strangers, and rebuilt its walls. In the 360th year of Rome, he beat the Lacedæmonians in a sea-fight near Cnidus upon the coast of Asia, deprived them of the sovereign rule they had on sea ever since the taking of Athens, and had some other considerable advantage over them: but falling into the hands of Teribazus a Persian, who envied his glory, he was put to death.

CONOPS, in *Zoology*; a genus of insects belonging to the order diptera. See ENTOMOLOGY *Index*.

CONOVIUM, in *Ancient Geography*, a town of the Ordovices, in Britain. From its ruins arose, at the distance of four miles, *Aberconwey*, the mouth of the Conwey, in Caernarvonshire; and on the spot where *Conovium* stood is an hamlet, called *Caerhean*, the old town (Camden).

CONQUEST, in civil jurisprudence, is the acquisition of property in common by a number of persons.

In some countries they confound acquisition with conquest; but, according to the most general acceptation, acquisition is the gaining of unappropriated goods before the establishment of a community: whereas by the term *conquest*, is ordinarily intended whatever is acquired by a number of persons in community; or by some one for all the others. As it is more especially in the union of persons by marriage that a community of property takes place; so it is in reference to them that we frequently use the word *conquest*. There are nevertheless conquests also among other persons who are in a tacit community or society; such as obtain by particular local customs. According to this sense of the word, it has been contended by several, that William I. claimed this kingdom; that is,

is, not by right of arms, but by right of conqueft or acqueft; under promife of fucceffion made by Edward the Confeffor, and a contract entered into by Harold to fupport his pretenfions to that fucceffion; and by old writers, *conqueftus*, *acquifitio*, and *perquifitio*, are frequently ufed as fynonymous terms.

Conquest, in the law of nations, is the acquifition of fovereignty by force of arms, by fome foreign prince; who reduces the vanquifhed under his empire. The right of conqueft is derived from the laws of war; and when a people is fubjected, the conduct of the conqueror is regulated by four kinds of law. Firft, the law of nature, which dictates whatever tends to felf-prefervation; fecondly, our reafon, which teaches us to ufe others as we would be treated ourfelves; thirdly, the laws of political fociety, to which nature has not affigned any precife boundary; laftly, the law which is derived from the particular circumftances attending the conqueft. Thus, a ftate conquered by another will be treated in one of the four methods following: Either the conqueror will continue it under its own laws, and will only claim the exercife of civil and ecclefiaftical fovereignty; or he will impofe a new form of government; or he will deftroy the frame of their fociety, and incorporate the inhabitants with others; or he will exterminate them.

CONRAD II. elected emperor of Germany in 1004. He was obliged to take the field againft moft of the German dukes who had revolted from him; and he put Erneft duke of Suabia under the ban of the empire. This being one of the earlieft inftances of fuch a profcription, the formula is inferted here for its fingularity. "We declare thy wife a widow, thy children orphans; and we fend thee, in the name of the devil, to the four corners of the world." It was in the reign of this prince that the German fiefs became hereditary. He died in 1039.

Conrad III. emperor of Germany in 1338. The duke of Bavaria oppofed his election; and being put under the ban of the empire, and deprived of his duchy, he could not furvive his difgrace. The margrave of Auftria was ordered by the emperor to take poffeffion of Bavaria; but Welft, uncle to the deceafed duke attacked him, and was defeated near the caftle of Winfburgh; the battle fought upon this occafion is famous in hiftory, as having given rife to the party names of *Guelphs* and *Gibbelines*, afterwards affumed in Italy. The parole of the day with the Bavarians was *Welfti*, from the name of their general; that of the Imperialifts *Werblingen* from a fmall village where Frederic duke of Suabia, their commander, had been nurfed: by degrees thefe names ferved to diftinguifh the two parties; and the Italians, who could not accuftom themfelves to fuch rough words, formed from them their Guelphs and Gibbelines. He died in 1152.

Conrad of Lichtenau, or Abbas Ufpergenfis, was author of an Univerfal Chronology from the creation to 1229, continued by an anonymous writer to Cha. V. He collected a fine library, and died about the year 1240.

CONRADIN, or Conrad junior, fon of Conrad IV. was acknowledged emperor by the Gibbelines, who received him in triumph at Rome: but Pope Alexander IV. had publifhed a crufade againft this orphan; and Urban VII. his fucceffor, gave the empire to Charles of Anjou, brother to Louis IX. king of France; and the unfortunate youth, though powerfully fupported even by the Turks, loft a battle, in which he was taken prifoner, and was beheaded, by order of his bafe opponent, publicly at Naples in 1229, in the 18th year of his age. In him ended the race of the dukes of Suabia, which had produced feveral kings and emperors.

CONSANGUINITY, or Kindred, is defined by the writers on thefe fubjects to be, *vinculum perfonarum ab eodem ftipite defcendentium;* "the connexion or relation of perfons defcended from the fame ftock or common anceftor." This confanguinity is either lineal or collateral.

Lineal confanguinity is that which fubfifts between perfons of whom one is defcended in a direct line from the other; as between John Stiles (the *propofitus* in the table of confanguinity) and his father, grandfather, great grandfather, and fo upwards in the direct afcending line; or between John Stiles and his fon, grandfon, great grandfon, and fo downwards in the direct defcending line. Every generation in this direct lineal confanguinity, conftitutes a different degree, reckoning either upwards or downwards: the father of John Stiles is related to him in the firft degree, and fo likewife is his fon; his grandfire and grandfon, in the fecond; his great grandfire and great-grandfon in the third. This is the only natural way of reckoning the degrees in the direct line; and therefore univerfally obtains, as well in the civil and canon, as in the common law.

The doctrine of lineal confanguinity is fufficiently plain and obvious; but it is, at the firft view, aftonifhing to confider the number of lineal anceftors which every man has, within no very great number of degrees: and fo many different bloods is a man faid to contain in his veins, as he hath lineal anceftors. Of thefe he hath two in the firft afcending degree; his own parents: he hath four in the fecond; the parents of his father, and the parents of his mother: he hath eight in the third, the parents of his two grandfathers, and of his two grandmothers; and by the fame rule of progreffion, he hath 128 in the feventh; 1024 in the tenth; and at the 20th degree, or the diftance of 20 generations, every man hath above a million of anceftors, as common arithmetic will demonftrate (A). This lineal confanguinity, we may obferve, falls ftrictly within the definition of *vinculum perfonarum ab eodem ftipite defcendentium;* fince lineal relations are fuch as defcend one from the other, and both of courfe from the fame common anceftors.

Collateral kindred anfwers to the fame defcription: collateral

(A) This will feem furprifing to thofe who are unacquainted with the increafing power of progreffive numbers; but it is palpably evident from the following table of a geometrical progreffion, in which the firft term is 2, and the denominator alfo 2; or, to fpeak more intelligibly, it is evident, for that each of us has two anceftors

Conſanguinity.

collateral relations agreeing with the lineal in this, that they deſcend from the ſame ſtock or anceſtor; but differing in this, that they do not deſcend the one from the other. Collateral kinſmen, then, are ſuch as lineally ſpring from one and the ſame anceſtor, who is the *ſtirps*, or "root," the *ſtipes*, "trunk," or common ſtock, from whence theſe relations are branched out. As if John Stiles hath two ſons, who have each a numerous iſſue; both theſe iſſues are lineally deſcended from John Stiles as their common anceſtor; and they are collateral kinſmen to each other, becauſe they are all deſcended from this common anceſtor, and all have a portion of his blood in their veins, which denominates them *conſanguineous*.

We muſt be careful to remember, that the very being of collateral conſanguinity conſiſts in this deſcent from one and the ſame common anceſtor. Thus Titius and his brother are related; why? becauſe both are derived from one father: Titius and his firſt couſin are related; why? becauſe both deſcend from the ſame grandfather; and his ſecond couſin's claim to conſanguinity is this, that they are both derived from one and the ſame great-grandfather. In ſhort, as many anceſtors as a man has, ſo many common ſtocks he has from which collateral kinſmen may be derived. And as we are taught by holy writ, that there is one couple of common anceſtors belonging to us all, from whom the whole race of mankind is deſcended, the obvious and undeniable conſequence is, that all men are in ſome degree related to one another. For, indeed, if we only ſuppoſe each couple of our anceſtors to have left, one with another, two children; and each of thoſe children to have left, on an average, two more (and without ſuch a ſuppoſition the human ſpecies muſt be daily diminiſhing); we ſhall find that all of us have now ſubſiſting near 270 millions of kindred in the 15th degree, at the ſame diſtance from the ſeveral common anceſtors as we ourſelves are; beſides thoſe that are one or two degrees nearer to our father from the common ſtock, who may amount to as many more (B). And if this calculation ſhould appear incompatible with the number of inhabitants on the earth, it is becauſe, by intermarriages among the ſeveral deſcendants from the ſame anceſtor, a hundred or a thouſand modes of conſanguinity may be conſolidated in one perſon; or he may be related to us a hundred or a thouſand different ways.

The method of computing theſe degrees in the canon law, which we have adopted, is as follows. We begin at the common anceſtor, and reckon downwards; and in whatſoever degree the two perſons, or the moſt remote of them, is diſtant from the common anceſtor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the firſt degree; for from the father to each of them is counted only one: Titius and his nephew are related in the ſecond degree; for the nephew is two degrees removed from the common anceſtor, viz. his own grandfather, the father of Titius: or (to give a more illuſtrious inſtance from the Engliſh annals)

ceſtors in the firſt degree, the number of whom is doubled at every remove; becauſe each of our anceſtors has alſo two immediate anceſtors of his own.

1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576

A ſhorter way of finding the number of anceſtors at any given degree, is by ſquaring the number of anceſtors at half that number of degrees. Thus 16, the number of anceſtors at 4 degrees, is the ſquare of 4, the number of anceſtors at 2; 256 is the ſquare of 16; 65536 of 256; and the number of anceſtors at 40 degrees would be the ſquare of 1,048,576, or upwards of a million of millions.

(B) This will ſwell more conſiderably than the former calculation: for here, though the firſt term is but 1, the denominator is 4; that is, there is *one* kinſman (a brother) in the firſt degree, who makes, together with the *propoſitus*, the two deſcendants from the firſt couple of anceſtors; and in every other degree, the number of kindred muſt be the *quadruple* of thoſe in the degree which immediately precedes it. For ſince each couple of anceſtors

King Henry VII. who flew Richard III. in the battle of Bofworth, was related to that prince in the fifth degree. Let the *propofitus*, therefore, in the table of confanguinity, reprefent King Richard III. and the clafs marked E, King Henry VII. Now their common ftock or anceftor was King Edward III. the *abavus* in the fame table: from him to Edmund duke of York, the *proavus*, is one degree; to Richard earl of Cambridge, the *avus*, two; to Richard duke of York, the *pater*, three; to King Richard III. the *propofitus*, four; and from King Edward III. to John of Gaunt (A) is one degree; to John earl of Somerfet (B) two; to John duke of Somerfet (C) three; to Margaret countefs of Richmond (D) four; to King Henry VII. (E) five. Which laft-mentioned prince, being the fartheft removed from the common ftock, gives the denomination to the degree of kindred in the canon and municipal law. Though according to the computation of the civilians (who count upwards from either of the perfons related, to the common ftock, and then downwards again to the other; reckoning a degree for each perfon both afcending and defcending) thefe two princes were related in the ninth degree: for from King Richard III. to Richard duke of York is one degree; to Richard earl of Cambridge two; to Edmund duke of York three; to King Edward III. the common anceftor, four; to John of Gaunt five; to John earl of Somerfet fix; to John duke of Somerfet feven; to Margaret countefs of Richmond eight; to King Henry VII. nine. See the Table of Confanguinity (Plate CLXIV.), wherein all the degrees of collateral kindred to the *propofitus* are computed, as far as the tenth of the civilians and the feventh of the canonifts inclufive; the former being diftinguifhed by the numeral letters, the latter by the common ciphers.

CONSANGUINITY and *Affinity*, degrees of, forbidden in marriage. See MARRIAGE and LAW *Index*.

CONSANGUINITY and *Affinity*, an objection againft a judge or a witnefs. See LAW *Index*.

CONSCIENCE, a fecret teftimony of the foul, whereby it gives its approbation to things that are naturally good, and condemns thofe that are evil. See MORAL PHILOSOPHY.

A man of integrity will never liften to any reafon, or give way to any meafure, or be mifled by any inducement, againft confcience.—The inhabitants of a great town offered Marfhal de Turenne 100,000 crowns, upon condition he would take another road, and not march his troops their way. He anfwered them, "As your town is not in the road I intend to march, I cannot accept the money you offer me."—The earl of Derby, in the reign of Edward III. making a defcent

---

anceftors has two defcendants who increafe in a duplicate ratio, it will follow, that the ratio in which all the defcendants increafe downwards, muft be double to that in which the anceftors increafe upwards: but we have feen, that the anceftors increafe in a duplicate ratio: therefore, the defcendants muft increafe in a double duplicate; that is, in quadruple ratio.

Collateral Degrees.	*Number of Kindred.*
1	1
2	4
3	16
4	64
5	256
6	1024
7	4096
8	16384
9	65536
10	262144
11	1048576
12	4194304
13	16777216
14	67108864
15	268435456
16	1073741824
17	4294967296
18	17179869184
19	68719476736
20	274877906944

This calculation may alfo be formed by a more compendious procefs, viz. by fquaring the couples, or half the number of anceftors, at any given degree; which will furnifh us with the number of kindred we have in the fame degree, at equal diftance with ourfelves from the common ftock, befides thofe at unequal diftances. Thus in the tenth lineal degree, he number of anceftors is 1024; its half, or the couples, amounts to 512; the number of kindred in the tenth collateral degree amounts therefore to 262144, or the fquare of 512. And, if we will be at the trouble to recollect the ftate of the feveral families within our own knowledge, and obferve how far they agree with this account; that is, whether, on an average, every man has not one brother or fifter, four firft-coufins, fixteen fecond coufins, and fo on, we fhall find, that the prefent calculation is very far from being overcharged

fcent in Guienne, carried by ftorm the town of Bergerac, and gave it up to be plundered. A Welch knight happened by chance to light upon the receiver's office. He found there fuch a quantity of money that he thought himfelf obliged to acquaint his general with it, imagining that fo great a booty naturally belonged to him. But he was agreeably furprifed when the earl told him, with a pleafant countenance, that he wifhed him joy of his good fortune; and that he did not make the keeping of his word to depend upon the great or little value of the thing he had promifed.—In the fiege of Falifci by Camillus general of the Romans, the fchoolmafter of the town, who had the children of the fenators under his care, led them abroad under the pretext of recreation, and carried them to the Roman camp, faying to Camillus, that by this artifice he had delivered Falifci into his hands. Camillus, abhorring this treachery, obferved, "That there were laws for war as well as for peace; and that the Romans were taught to make war with integrity not lefs than with courage." He ordered the fchoolmafter to be ftripped, his hands to be bound behind his back, and to be delivered to the boys to be lafhed back into the town. The Falerians, formerly obftinate in refiftance, ftruck with an act of juftice fo illuftrious, delivered themfelves up to the Romans; convinced that they would be far better to have the Romans for their allies than their enemies.

It is a faying, That no man ever offended his own confcience, but firft or laft it was revenged upon him. The power of confcience indeed has been remarked in all ages, and the examples of it upon record are innumerable. The following is related by Mr Fordyce, in his *Dialogues on Education* *, as a real occurrence which happened in a neighbouring ftate not many years ago. A jeweller, a man of good character and confiderable wealth, having occafion in the way of his bufinefs to travel at fome diftance from the place of his abode, took along with him a fervant, in order to take care of his portmanteau. He had with him fome of his beft jewels, and a large fum of money, to which his fervant was likewife privy. The mafter having occafion to difmount on the road, the fervant watching his opportunity, took a piftol from his mafter's faddle and fhot him dead on the fpot; then rifled him of his jewels and money, and hanging a large ftone to his neck, he threw him into the neareft canal. With this booty he made off to a diftant part of the country, where he had reafon to believe that neither he nor his mafter was known. There he began to trade in a very low way at firft, that his obfcurity might fcreen him from obfervation, and in the courfe of a good many years feemed to rife, by the natural progrefs of bufinefs, into wealth and confideration; fo that his good fortune appeared at once the effect and reward of induftry and virtue. Of thefe he counterfeited the appearance fo well, that he grew into great credit, married into a good family, and by laying out his hidden ftores difcreetly, as he faw occafion, and joining to all an univerfal affability, he was admitted to a fhare of the government of the town, and rofe from one poft to another, till at length he was chofen chief magiftrate. In this office he maintained a fair character, and continued to fill it with no fmall applaufe, both as a governor and a judge; till one day as he fat on the bench with fome of his brethren, a criminal was brought before him who was accufed of murdering his mafter. The evidence came out full, the jury brought in their verdict that the prifoner was guilty, and the whole affembly waited the fentence of the prefident of the court (which he happened to be that day) with great fufpenfe. Meanwhile he appeared to be in unufual diforder and agitation of mind, and his colour changed often; at length he arofe from his feat, and coming down from the bench, placed himfelf juft by the unfortunate man at the bar. "You fee before you (faid he, addreffing himfelf to thofe who had fat on the bench with him), a ftriking inftance of the juft rewards of heaven, which this day, after 30 years concealment, prefents to you a greater criminal than the man juft now found guilty." Then he made an ample confeffion of his guilt, and of all its aggravations. "Nor can I feel, (continued he) any relief from the agonies of an awakened confcience, but by requiring that juftice be forthwith done againft me in the moft public and folemn manner." We may eafily fuppofe the amazement of all the affembly, and efpecially of his fellow-judges. However, they proceeded, upon this confeffion, to pafs fentence upon him, and he died with all the fymptoms of a penitent mind.

* Vol. ii. p. 401.

Courts of CONSCIENCE, are courts for recovery of fmall debts, conftituted by act of parliament in London, Weftminifter, &c. and other populous and trading diftricts.

CONSCIOUSNESS. Metaphyficians, in lieu of the word *confcience*, which feems appropriated to theological or moral matters, ordinarily ufe that of *confcioufnefs*; whereby they mean an inner fentiment of a thing, whereof one may have a clear and diftinct notion. In this fenfe they fay that we do not know our own foul, nor are affured of the exiftence of our own thoughts, otherwife than by felf-confcioufnefs. See METAPHYSICS.

CONSCRIPT, in Roman antiquity, an appellation given to the fenators of Rome, who were called *confcript fathers*, on account of their names being all entered in one regifter.

CONSECRATION, the act of devoting any thing to the fervice and worfhip of God. The Mofaical law ordained, that all the firft-born, both of man and beaft, fhould be fanctified or confecrated to God. We find alfo that Jofhua confecrated the Gibeonites, as Solomon and David did the Nethinims, to the fervice of the temple; and that the Hebrews fometimes confecrated their fields and cattle to the Lord, after which they were no longer in their power.

Among the ancient Chriftians, the confecration of churches was performed with a great deal of pious folemnity. In what manner it was done for the three firft ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Conftantine, churches were everywhere built, and dedicated with great folemnity. Some think the confecration confifted in fetting up the fign of the crofs, or in placing a communion table in the church; and others, that no more was done than preaching a panegyrical fermon in commemoration of the founder, and that then they proceeded to prayers, one of which was compofed on purpofe for the church to be confecrated.

crated. The Romanists have a great deal of pious foppery in the ceremonies of consecration; which they bestow on almost every thing, bells, candles, books, water, oil, ashes, palms, swords, banners, pictures, crosses, agnus dei's, roses, children's clouts, &c.

In England, churches have been always consecrated with particular ceremonies, the form of which was left to the discretion of the bishop. That observed by Bishop Laud, in consecrating St Catherine Creed church, in London, gave great offence.

Consecration, is particularly used for the benediction of the elements in the eucharist.

Consecration, among medalists, is the ceremony of the apotheosis of an emperor, or his translation into heaven and reception among the gods. On medals the consecration is thus represented: on one side is the emperor's head, crowned with laurel, sometimes veiled; and the inscription gives him the title of *divus:* on the reverse is a temple, a bustum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus: at other times the emperor is seen in the air, borne up by the eagle; the inscription always, *consecratio.* These are the usual symbols: yet on the reverse of that of Antoninus is the Antonine column. In the apotheosis of empresses, instead of an eagle there is a peacock. As to the honours rendered these princes after death, they were explained by the words *consecratio, pater, divus,* and *deus.* Sometimes around the temple or altar are put, *memoria felix,* or *memoriæ æternæ:* for princesses, *æternitas* and *sideribus recepta:* on the one side of the head, *dea,* or Θεα.

CONSENT, in a general sense, denotes much the same with Assent.

Consent of Parts, in the animal economy, an agreement or sympathy, whereby when one part is immediately affected, another at a distance becomes affected in the same manner.

This mutual accord or consent is supposed to be effected by the commerce of the nerves, and their artful distribution and ramification throughout the body. The effect is so sensible as even to come under the physician's cognizance: thus, the stone in the bladder, by vellicating the fibres there, will pain and draw them so much into spasms, as to affect the coats of the bowels, in the same manner, by the intermediation of nervous threads, and make a colic there; and also extend their twitches sometimes as far as the stomach, and occasion grievous vomitings; the remedy, therefore, in such cases, is to regard the part originally affected, how remote and grievous soever may be the consequences and symptoms in other places.

The fifth conjugation of nerves branched to the parts of the eye, the ear, those of the mouth, cheeks, præcordia, and parts adjacent, &c. is supposed by naturalists to be the instrument of that particular and extraordinary consent between those parts. Hence it is, that a savoury thing seen or smelled excites the appetite, and affects the glands and parts of the mouth; that a shameful thing seen or heard affects the cheeks with blushes: on the contrary, if it pleases, it affects the præcordia, and excites the muscles of the mouth and face to laughter; if it grieve, it affects the glands of the eyes, so as to occasion tears, and the muscles of the face, putting them into an aspect of crying. Dr Willis, quoted by Mr Derham, imputes the pleasure of kissing, and its effects, to this pair of nerves; which being branched both to the lips and the genital parts, when the former are affected an irritation is occasioned in the latter. See Sympathy.

CONSENTES, the name which the Romans gave to the 12 superior gods, the *Dii majorum gentium.* The word signifies as much as *consentientes;* that is, who consented to the deliberations of Jupiter's council. They were twelve in number, whose names Ennius has briefly expressed in these lines,

Juno, Vesta, Minerva, Ceres, Diana, Venus, Mars,
Mercurius, Jovi, Neptunus, Vulcanus, Apollo.

CONSEQUENCE, in *Logic,* the conclusion or what results from reason or argument. See Conclusion.

The consequence is that other proposition in which the extremes or premises of a syllogism are joined, or separated; and is gained from what was asserted in the premises.

This word, in a more restrained sense, is used for the relation or connection between two propositions, whereof one is inferred from the other.

CONSEQUENT, something deduced or gathered from a former argumentation. But, in a more precise sense, it is used for the proposition which contains the conclusion, considered in itself, without any regard to the antecedent: in which sense the consequent may be true, though the consequence be false. See the preceding article.

CONSERVATOR, an officer ordained for the security and preservation of the privileges of some cities and communities, having a commission to judge of and determine the differences among them.

In most catholic universities there are two conservators; the conservator of royal privileges, or those granted by kings; and the conservator of apostolical privileges, or those granted by the pope. The first takes cognizance of personal and mixed causes between the regents, students, &c. and the latter of spiritual matters between ecclesiastics.

Anciently there were appointed conservators of treaties of peace between princes; which conservators became judges of the infractions made on a treaty, and were charged with procuring satisfaction to be made. These were usually the feudatories of the several powers. In lieu of conservators, princes now have recourse to other indifferent princes to guarantee their treaties.

Conservator of Scots Privileges, at Campvere, was an officer belonging to the royal boroughs of Scotland, who took care of the mercantile affairs of Scotland, agreeable to the staple contract between them and the States-General.

Conservator of the Peace, in the ancient English customs, was a person who had an especial charge, by virtue of his office, to see the king's peace kept. Till the erection of justices of the peace by King Edward III. there were several persons who by common law were interested in keeping the same: some having that charge as incident to other offices; and others simply, or of itself, called *custodes,* or *conservators of the peace.* The chamberlain of Chester is still a conservator

servator in that county; and petty conftables are, by the common law, confervators, &c. in the firft fenfe, within their own jurifdiction: fo are alfo the coroner and the fheriff within their own county. The king is the principal confervator of the peace within all his dominions: the lord chancellor, lord treafurer, lord high fteward, lord marfhal, lord high conftable, all the juftices of the court of king's bench, by their office, and the mafter of the rolls, by prefcription, are general confervators of the peace through the whole kingdom, and may commit breakers of the peace, and bind them in recognifances to keep it.

Conservator *of the Truce, and Safe Conducts*, was an officer appointed in every fea port, under the king's letters patent. His charge was to inquire of all offences committed againft the king's truce, and fafe conducts upon the main fea, out of the franchifes of the cinque-ports, as the admirals were wont to do, and fuch other things as are declared anno 3 Hen. V. cap. 6.

CONSERVATORIOS, are mufical fchools eftablifhed for the inftruction of children in the profeffion of mufic. There are four of thefe at Venice, defigned for the education of girls, and three at Naples, for the education of boys. It has been fuggefted that the operation of caftration was performed in the confervatorios; but the practice is abfolutely prohibited: and the young caftrati are brought from Lucia in Puglia: but before that operation is performed, their voices are tried in a confervatorio. The fcholars of the Venetian confervatorios have been chiefly celebrated for tafte and neatnefs of execution; and thofe of Naples have had the reputation of being the firft *contrapuntifts*, or compofers, in Europe.

CONSERVATORY, a term fometimes ufed for a green-houfe or ice-houfe.

CONSERVE, in *Pharmacy*, a form of medicine contrived to preferve the flowers, herbs, roots, or fruits of feveral fimples, as near as poffible, to what they are when frefh gathered. See Pharmacy.

CONSIGNMENT, in *Law*, the depofiting any fum of money, bills, papers, or commodities, in good hands; either by appointment of a court of juftice, in order to be delivered to the perfons to whom they are adjudged; or voluntarily, in order to their being remitted to the perfons they belong to, or fent to the places they are defigned for.

Consignment *of Goods*, in *Commerce*, is the delivering or making them over to another; thus, goods are faid to be configned to a factor, when they are fent to him to be fold, &c.; or when a factor fends back goods to his principal, they are faid to be configned to im.

CONSISTENCE, in *Phyfics*, that ftate of a body wherein its component particles are fo connected or entangled among themfelves, as not to feparate or recede from each other. It differs from continuity in this, that it implies a regard to motion or reft, which continuity does not, it being fufficient to denominate a thing continuous that its parts are contiguous to each other.

CONSISTENTES, in church-hiftory, a kind of penitents who were allowed to affift at prayers, but who could not be admitted to receive the facrament.

CONSISTORY (*Confiftorium*), fignifies as much as *prætorium*, a tribunal: it is commonly ufed for a council-houfe of ecclefiaftical perfons, or place of juftice in the fpiritual court; a feffion or affembly of prelates. And every archbifhop and bifhop of every diocefe hath a confiftory court held before his chancellor or commiffary in his cathedral church, or other convenient place of his diocefe, for ecclefiaftical caufes. The bifhop's chancellor is the judge of this court, fuppofed to be fkilled in the civil and canon law; and in places of the diocefe far remote from the bifhop's confiftory, the bifhop appoints a commiffary to judge in all caufes within a certain diftrict, and a regifter to enter his decrees, &c.

Consistory, at Rome, denotes the college of cardinals, or the pope's fenate and council, before whom judiciary caufes are pleaded. Du Cange derives the word from *confiftorium*; i. e. *locus ubi confiftitur*; ufed chiefly for a veftibule, gallery, or anti-chamber, where the courtiers wait for admiffion: and fo called *à confiftente multitudine*.

The confiftory is the firft court, or tribunal of Rome: it never meets but when the pope pleafes to convoke it: the pope prefides in it in perfon, mounted on a magnificent throne, and habited in his *pontificalia*; on the right are the cardinal-bifhops and priefts, and on the left the cardinal-deacons. The place where it is held, is a large hall in the apoftolical palace, where princes and ambaffadors of kings are received. The other prelates, prothonotaries, auditors of the rota, and other officers, are feated on the fteps of the throne: the courtiers fit on the ground; ambaffadors on the right, and confiftorial and fifcal advocates behind the cardinals.

Befides the public confiftory, there is alfo a private one, held in a retired chamber, called the *chamber of papegay*; the pope's throne here being only raifed two fteps high. Nobody is here admitted but the cardinals, whofe opinions are collected, and called *fentences*. Here are firft propofed and paffed all bulls for bifhopricks, abbeys, &c. Hence bifhopricks and abbeys are faid to be confiftorial benefices; in regard they muft be propofed in the confiftory, the annates be paid to the pope, and his bulls taken. Anciently they were elective; but by the concordat, which abolifhes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

Consistory was alfo the name of a court under Conftantine, where he fat in perfon, and heard caufes: the members of this court were called *comites*.

Consistory is alfo ufed among the reformed, for a council or affembly of minifters and elders, to regulate their affairs, difcipline, &c.

Consistory, or *Court Chriftian*, in the Englifh laws, is a council of ecclefiaftical perfons, or the place of juftice in an ecclefiaftical or fpiritual court. Every archbifhop and bifhop has a confiftory-court, held before his chancellor or commiffary, either in his cathedral, in fome chapel, aifle, or portico, belonging thereto; or in fome other convenient place of his diocefe, for ecclefiaftical caufes. The fpiritual court was anciently, in the time of the Saxons, joined with the county or hundred court; and the original of the confiftory-court, as divided from thofe courts, is found in a law of the conqueror,

conqueror, quoted by Lord Coke. From this court there lies an appeal to the archbifhop of each province refpectively.

CONSOLATION, one of the places in rhetoric, wherein the orator endeavours to abate and moderate the grief or concern of another.

CONSOLE, in *Architecture*, an ornament cut upon the key of an arch, which has a projecture, and on occafion ferves to fupport little corniches, figures, bufts, and vafes.

CONSOLIDATION, in *Law*, the combining and uniting two benefices into one. The term is borrowed from the civil law; where it properly fignifies an union of the poffeffion, or occupation, with the property. Thus, if a man have by legacy *ufum fructum fundi*, and afterwards buy the property, or fee-fimple, of the heir; this is called a confolidation.

CONSOLIDATION, in *Medicine*, the action of uniting broken bones, or the lips of wounds, by means of *confolidating remedies*, as they are called; which cleanfing with a moderate heat and force, taking corruption out of the wounds, and preferving the temperature of the parts, caufe the nourifhment to be fitly applied to the part affected.

Among the many inftances of the confolidating power of blood and raw flefh, we have a very remarkable one in Bartholine's Medical Obfervations. A man being condemned to have his nofe cut off by the hand of the common executioner, the friends, who were to be prefent, provided a new loaf of warm bread, which was cut in the middle, and the nofe received in it as it fell from the face: the nofe was after this nicely placed on the face again; and being fewed on, the whole in time confolidated, and left no other marks of the ignominy than the fcar round the whole nofe, and the traces of the ftitches.

CONSONANCE, in *Mufic*. See INTERVAL.

CONSONANT, a letter that cannot be founded without fome fingle or double vowel before or after it; as *b*, *c*, *d*, &c.

CONSORT, *Queen Consort*. See QUEEN.

CONSPIRACY, in *Law*, fignifies an agreement between two or more, falfely to indict, or procure to be indicted, an innocent perfon, of felony.

CONSPIRATORS are, by ftatute, defined to be fuch as bind themfelves by oath, covenant, or other alliance, to affift one another falfely and malicioufly to indict perfons, or falfely to maintain pleas.

Confpirators in treafon, are thofe that plot againft the king and the government.

CONSTABLE, according to fome, is a Saxon word, compounded of *coning*, "king," and *ftaple* which fignifies the "ftay or fupport of the king." But as we borrowed the name as well as the office of *Conftable* from the French, Sir William Blackftone is rather inclined to deduce it, with Sir Henry Spelman and Dr Cowel, from that language; wherein it is plainly derived from the Latin *comes ftabuli*, an officer well known in the empire; fo called, becaufe, like the great conftable of France, as well as the lord high conftable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horfeback.—The

Lord High Constable of England is the feventh great officer of the crown; and he, with the earl marfhal of England, were formerly judges of the court of chivalry, called in King Henry IV.'s time *Curia Militaris*, and now the court of honour. It is the fountain of the martial law, and anciently was held in the king's hall. The power of the lord high conftable was formerly fo great, and of which fo improper a ufe was made, that fo early as the 13th of King Richard II. a ftatute paffed for regulating and abridging the fame, together with the power of the earl marfhal of England; and by this ftatute, no plea could be tried by them or their courts, that could be tried by the common law of the realm. The office of conftable exifted before the conqueft. After the conqueft, the office went with inheritance, and by the tenure of the manors of Harlefield, Newman, and Whitenhurft, in Gloucefterfhire, by grand ferjeanty in the family of the Bohuns earl of Hereford and Effex, and afterwards in the line of Stafford as heirs-general to them; but in 1521, this great office became forfeited to the king in the perfon of Edward Stafford duke of Buckingham, who was that year attainted for high treafon; and in confideration of its extenfive power, dignity, and large authority, both in time of war and peace, it has never been granted to any perfon, otherwife than *hac vice*, and that to attend at a coronation, or trial by combat. In France, the fame office was alfo fuppreffed about a century after by an edict of Louis XIII; though it has been exercifed, in the command of the MARSHALS, by the firft officer in the army.

Lord high conftable of Scotland was an office of great antiquity and dignity. The firft upon record is Hugo de Morvelle in the reign of David I. He had two grand prerogatives, viz. Firft, The keeping of the king's fword, which the king, at his promotion, when he fwears fealty, delivers to him naked. Hence the badge of the conftable is a naked fword.—Second, The abfolute and unlimited command of the king's armies while in the field, in the abfence of the king; but this command does not extend to caftles and garrifons. He was likewife judge of all crimes committed within two leagues of the king's houfe, which precinct was called the *Chalmer of Peace*: though his jurifdiction came at laft to be exercifed only as to crimes during the time of parliament, which fome extended likewife to all general conventions. This office was conferred heritably upon the noble family of Errol, by King Robert Bruce; and with them it ftill remains, being exprefsly referved by the treaty of union.

Inferior Constables. From the great office of high conftable is derived that inferior order, fince called the *conftables of hundreds and franchifes*; thefe were firft ordained in the 13th year of Edward I. by the ftatute of Winchefter; which, for the confervation of the peace, and view of armour, appointed that two conftables fhould be chofen in every hundred and franchife. Thefe are what we now call *conftabularii capitales*, or *high conftables*; becaufe continuance of time, and increafe of people, &c. have occafioned others of like nature, but inferior authority, in every town, called *petty conftables*, or *fub-conftabularii*, firft inftituted about the reign of Edward III.

The former, or modern *high conftables*, are appointed at the court-leets of the franchife or hundred over which they prefide; or, in default of that, by the juftices at their quarter-feffions; and are removeable

by the fame authority that appoints them. The *petty conftables* have two offices united in them, the one ancient, and the other modern. Their ancient office is that of head-borough, tithing-man, or borfholder; which is as ancient as the time of King Alfred: their more modern office is that of conftable merely; which was appointed fo lately as the reign of Edward III. in order to affift the high conftable. And in general the ancient head-boroughs, tithing-men, and borfholders, were made ufe of to ferve as petty conftables; though not fo generally, but that in many places they ftill continue diftinct officers from the conftables. They are all chofen by the jury at the court-leet; or, if no court-leet be held, are appointed by two juftices of the peace.

The general duty of all conftables, both high and petty, as well as of the other officers, is to keep the king's peace in their feveral diftricts; and to that purpofe they are armed with very large powers of arrefting and imprifoning, of breaking open houfes, and the like: of the extent of which powers, confidering what manner of men are for the moft part upon thefe offices, it is perhaps very well that they are generally kept in ignorance. One of their principal duties arifing from the ftatute of Winchefter, which appoints them, is to keep watch and ward in their refpective jurifdictions. Ward, guard, or *cuftodia*, is chiefly intended of the day-time, in order, to apprehend rioters, and robbers, on the highways; the manner of doing which is left to the difcretion of the juftices of the peace and the conftable: the hundred being, however, liable for all the robberies committed therein by day-light, for having kept negligent guard. Watch is properly applicable to the night only (being called among the Saxons *wach't* or *wactu*); and it begins when ward ends, and ends when that begins: for, by the ftatute of Winchefter, in walled towns the gates fhall be clofed from fun-fetting to fun-rifing: and watch fhall be kept in every borough and town, efpecially in the fummer feafon, to apprehend all rogues, vagabonds, and night-walkers, and make them give an account of themfelves. The conftable may appoint watchmen at his difcretion, regulated by the cuftom of the place; and thefe, being his deputies, have, for the time being, the authority of their principal.

There are alfo conftables denominated from particular places, as conftable of the Tower, of Dover caftle, of Windfor caftle, of the caftle of Caernarvon and many other of the caftles of Wales; whofe office is the fame with that of the caftellani, or governors of caftles.

Constables of London. The city of London is divided into 26 wards, and the wards into precincts, in each of which is a conftable. They are nominated by the inhabitants of each precinct on St Thomas's day, and confirmed, or otherwife, at the court of wardmote. After confirmation, they are fworn into their offices at a court of aldermen, on the next Monday after Twefth day. Such as are chofen into the office, are obliged to place the king's arms, and the arms of the city, over their doors; and if they refide in alleys, at the ends of fuch alleys toward the ftreets, to fignify that a conftable lives there, and that they may be the more eafily found when wanted.

Constables to Juftices of the Peace, in Scotland, are the proper officers for executing their orders. They have powers to fupprefs tumults, and to apprehend delinquents and thofe who can give no good account of themfelves, and carry them to the next juftice.

CONSTANCE, a ftrong town of Germany, in the circle of Suabia, with a bifhop's fee, whofe bifhop is a prince of the empire. It has a handfome bridge, and feveral fine ftructures, as well facred as profane. It carries on a great trade, and is well fortified: and though it pretends to be an imperial town, the Auftrians keep a garrifon here. It is famous for a council held here in 1514, when there were three popes; but they were all depofed, and Martin V. was elected in their room. This council caufed Jerome of Prague and John Hufs to be burnt, though the emperor Sigifmund had given them a fafe conduct; in purfuance of this maxim, "that no faith is to be kept with heretics." They likewife condemned the doctrine of Wickliff, and ordered his bones to be burned 40 years after he was dead. However, the inhabitants now are Proteftants. It is feated on a lake of the fame name. E. Long. 9. 10. N. Lat. 47. 38.

Constance, one of the moft confiderable and beautiful lakes of Switzerland, which feparates it from Suabia, except that part where the city of Conftance is feated on its fide. It is divided into three parts; the upper or largeft part is called Boden fee, the middle Bodmer fee, and the lower part Zeller fee. The firft is 37 miles long, and its greateft breadth 15 miles. It is deeper in fummer than in winter.

CONSTANCY, in a general fenfe, denotes immutability, or invariablenefs. In ethics, or when applied to the human mind, the term implies refolution or fteadinefs, particularly under fufferings and the trials of adverfity.

It was the faying of a heathen philofopher, That there cannot be imagined upon earth a fpectacle more worthy the regard of the Creator intent on his works, than a brave man fuperior to his fufferings. Nothing indeed can be more noble or honourable than to have courage enough to execute the commands of reafon and confcience; to maintain the dignity of our nature, and the ftation affigned us; and to be proof againft poverty, pain, and death itfelf, fo far as not to do any thing that is fcandalous or finful to avoid them. To be thus, is to be great above title or fortune. This argues the foul of a heavenly extraction, and is worthy the offspring of the Deity.

Of this virtue the following example, related in Englifh hiftory, is here felected, as fuperior perhaps, all circumftances confidered, to any other upon record.

Sir William Afkew of Kelfay, in Lincolnfhire, had feveral daughters. His fecond, named *Anne*, had received a genteel education; which, with an agreeable figure and good underftanding, rendered her a very proper perfon to be at the head of a family. Her father, regardlefs of his daughter's inclination and happinefs, obliged her to marry a gentleman who had nothing to recommend him but his fortune, and who was a moft bigotted Papift. No fooner was he convinced of his wife's regard for the doctrines of the reformation from popery, than, by the inftigation of his priefts,

priests, he violently drove her from his house, though she had born him two children, and her conduct was unexceptionable. Abandoned by her husband, she came up to London, in order to procure a divorce, and to make herself known to that part of the court who either professed or were favourers of Protestantism; but as Henry VIII. with consent of parliament, had just enacted the law of the six articles, commonly called the *bloody statute*, she was cruelly betrayed by her own husband; and, upon his information, taken into custody, and examined concerning her faith. The act above mentioned denounced death against all those who should deny the doctrine of *transubstantiation*; or that the bread and wine made use of in the sacrament was not converted after consecration into the *real* body and blood of Christ; or, maintain the necessity of receiving the sacrament in both kinds; or affirm, that it was lawful for priests to marry; that the vows of celibacy might be broken; that private masses were of no avail; and that auricular confession to a priest was not necessary to salvation. Upon these articles she was examined by the inquisitor, a priest, the lord-mayor of London, and the bishop's chancellor; and to all their queries gave proper and pertinent answers; but not being such as they approved, she was sent back to prison, where she remained eleven days to ruminate alone on her alarming situation, and was denied the small consolation of a friendly visit. The king's council being at Greenwich, she was once more examined by Chancellor Wriothesley, Gardiner bishop of Winchester, Dr Cox, and Dr Robinson; but not being able to convince her of supposed errors, she was sent to the Tower. Mr Strype, from an authentic paper, gives us the following short account of her examination, which may not, perhaps, be unentertaining or useless to the reader: "Sir Martin Bowes (lord mayor) sitting with the council, as most meet for his wisdom, and seeing her stand upon life and death, I pray you, quoth he, my lords, give me leave to talk to this woman? Leave was granted. *Lord Mayor.* Thou foolish woman, sayest thou that the priest cannot make the holy body of Christ? *A. Askew.* I say so, my lord: for I have read that God made man; but that man made God I never read; nor I suppose ever shall read it. *Lord Mayor.* No! Thou foolish woman, after the words of consecration, is it not the Lord's body? *A. Askew.* No: it is but consecrated bread, or sacramental bread. *Lord Mayor.* What if a mouse eat it after consecration; what shall become of this mouse? what sayest thou, thou foolish woman? *A. Askew.* What shall become of her, say you, my lord? *Lord Mayor.* I say, that the mouse is damned. *A. Askew.* Alack, poor mouse!" Perceiving that some could not keep in their laughing, the council proceeded to the butchery and slaughter that they intended before they came there. It was strongly suspected that Mrs Askew was favoured by some ladies of high rank; and that she carried on a religious correspondence with the queen; so that the chancellor Wriothesley, hoping that he might discover something that would afford matter of impeachment against that princess, the earl of Hertford, or his countess, who all favoured reformation, ordered her to be put to the rack: but her fortitude in suffering, and her resolution not to betray her friends, was proof against that diabolical invention. Not a groan, not a word, could be extorted from her. The chancellor, provoked with what he called her obstinacy, augmented her tortures with his own hands, and with unheard-of violence: but her courage and constancy were invincible; and these barbarians gained nothing by their cruelties but everlasting disgrace and infamy. As soon as she was taken from the rack, she fainted away; but being recovered, she was condemned to the flames. Her bones were dislocated in such a manner, that they were forced to carry her in a chair to the place of execution. While she was at the stake, letters were brought her from the lord chancellor, offering her the king's pardon if she would recant. But she refused to look at them; telling the messenger, that "she came not thither to deny her Lord and Master." The same letters were also tendered to three other persons condemned to the same fate; and who, animated by her example, refused to accept them. Whereupon the lord-mayor commanded the fire to be kindled; and with savage ignorance cried out, *Fiat justitia*, "Let justice take its course." The faggots being lighted, she commended her soul, with the utmost composure, into the hands of her Maker; and, like the great founder of the religion she professed, expired, *praying for her murderers*, July 16. 1546, about the 25th year of her age.

CONSTANTIA, a district at the Cape of Good Hope, consisting of two farms, which produce the well-known wine so much prized in Europe, and known by the name of *Cape* or *Constantia* wine. This place is situated at the distance of a mile and a half from Alphen, in a bending formed by and nearly under the ridge of hills, which comes from Meuisenmountain, and just where it strikes off towards Houtbay. One of these farms is called *Little Constantia*. Here the white Constantia wine is made. The other produces the red. According to M. de la Cail's account, not more than 60 siggars of red and 90 of the white Constantia wine are made, each siggar being reckoned at 600 French pints, or about 150 Swedish cans; so that the whole produce amounts to 22,500 cans. As the company are used to keep one-third of this for themselves, the remainder is always bespoke by the Europeans long before it is made. At the Cape this wine is seldom seen at table, partly because it is dear, and partly because it is the produce of the country. The red Constantia wine sells for about 60 rixdollars the half awin; but the white is usually to be purchased at a more reasonable rate. The genuine Constantia wine is undeniably a very racy and delicate dessert wine, and has something peculiarly agreeable in the flavour of it. That its superiority, however, is not owing to any thing peculiar in the manner of procuring it, seems extremely probable; for then, without doubt, a great deal more of it would be made. In fact, Dr Sparmann informs us, that the genuine wine can only be produced from particular soils. The districts that lie next to these yield merely the common Cape wine, notwithstanding that they have been planted with vine stocks taken from this, as well as with some brought from the banks of the Rhine, whence it is supposed that the true Constantia sort originally comes; nay, even though all the vineyards about Constantia seem to have the same soil. We have instances at the Cape, as well as in

in Europe, that good grapes sometimes produce a bad wine; while, on the other hand, bad grapes will yield a good sort of wine: therefore, towards making wine of a certain quality, besides finer materials, there must be certain conditions and circumstances, which, by a diligent and rational investigation, might probably be explored to the great benefit of mankind.

Such as are apprised in what quantities Constantia wine is consumed in Europe, will perhaps think the above calculation of the produce too limited. This, however, Dr Sparmann assures us, is by no means the case; the overplus being the produce of avarice, which, goaded on by the desire of gain, will always hit upon some method of satisfying the demands of luxury and sensuality. The votaries of these, accustomed to be put off with empty sounds, do not seldom drink with the highest relish an imaginary Constantia, with which, however, this liquor has nothing in common besides the mere name. It is therefore advisable, even at the Cape itself, to take care, that whilst one has a genuine sample given one to taste, one is not made to pay for a made-up red Constantia, which otherwise is in general sold for half the price. The rich quality of this wine is, according to Barrow, owing partly to the situation and soil, and partly to the care in the manufacture; for ripe fruit only is used, and always entirely freed from the stalks.

CONSTANTINA, a strong and considerable town of Africa, in the kingdom of Algiers, and capital of a territory of the same name. It is the largest and strongest place in all the eastern parts; and it is seated on the top of a great rock. There is no way to it but by steps cut out of the rock; and the usual way of punishing criminals here is to throw them down the cliff. Here are a great many Roman antiquities, particularly a triumphal arch. E. Long. 7. 12. N. Lat. 36. 4.

CONSTANTINA, a town of Spain, in Andalusia, and capital of a small territory of the same name, with a castle seated on a mountain. W. Long. 5. 35. N. Lat. 37. 40.

CONSTANTINE, a kingdom of Barbary of that name, in Africa. It is bounded on the north by the Mediterranean, on the east by the kingdom of Tunis, on the south by Bildulgerid, and on the west by the river Sufegmar, which separates it from the kingdom of Bugia. The country is the New Numidia of the ancients, and had its own king; but it is now a province of Algiers.

CONSTANTINE the Great, the first emperor of the Romans who embraced Christianity. His father, Constantius Chlorus, rendered himself famous by his victorious expeditions to Germany and Britain: upon the abdication of Dioclesian, he shared the Roman empire with Galerius Maximinus in 305, and was at that time at York, where he died in 306; having first caused his son Constantine the Great to be proclaimed emperor by his army, and the English. Galerius at first refused to admit Constantine to his father's share in the imperial throne; but after having lost several battles, he consented in 308. Maxentius, who succeeded Galerius, opposed him: but was defeated, and drowned himself in the Tyber. The senate then declared Constantine chief or first Augustus, and Licinius his second associate in the empire, in 412. These princes published an edict, in their joint names, in favour of the Christians; but soon after Licinius, jealous of Constantine's renown, conceived an implacable hatred against him, and renewed the persecutions against the Christians. This brought on a rupture between the emperors, and a battle, in which Constantine was victorious. A short peace ensued: but Licinius having shamefully violated the treaty, the war was renewed; when Constantine totally defeating him, he fled to Nicomedia, where he was taken prisoner and strangled in 323. Constantine, now become sole master of the western and eastern empires, immediately formed the plan of establishing Christianity as the religion of the state; for which purpose, he convoked several ecclesiastical councils: but finding he was likely to meet with great opposition from the Pagan interest at Rome, he conceived the design of founding a new city, to be the capital of his Christian empire; see CONSTANTINOPLE. The glory Constantine had acquired by establishing the Christian religion, was tarnished by the part he took in the persecutions carried on by the Arians, towards the close of his reign, against their Christian brethren who differed from them: seduced by Eusebius of Nicomedia, he banished several eminent prelates; soon after which, he died in 337, the 66th year of his age, and 31st of his reign.

As to the character of Constantine, he was chaste, pious, laborious, and indefatigable; a great general, successful in war, and deserving his success by his shining valour and by the brightness of his genius; a protector of arts, and an encourager of them by his beneficence. If we compare him with Augustus, we shall find that he ruined idolatry, by the same precautions and the same address that the other used to destroy liberty. Like Augustus, he laid the foundation of a new empire; but possessed of less political skill, he could not give it the same stability: he weakened the body of the state by adding to it, in some measure, a second head in the foundation of Constantinople; and transporting the centre of motion and strength too near the eastern extremity, he left without heat, and almost without life, the western parts, which soon became a prey to the barbarians. The Pagans were too much his enemies to do him justice. Eutropius says, that in the former part of his reign he was equal to the most accomplished princes, and in the latter to the meanest. The younger Victor, who makes him to have reigned more than 31 years, pretends, that in the first 10 years he was a hero; in the 12 succeeding ones a robber; and in the 10 last a spendthrift. It is easy to perceive, with respect to these two reproaches of Victor's, that the one relates to the riches which Constantine took from idolatry, and the other to those with which he loaded the church.

CONSTANTINE, emperor of the East in 912, left the care of the empire to his wife Helena, who loaded the people with taxes, and sold all the offices in church and state to the highest bidders; while the emperor employed himself in reading, writing, and the fine arts, till he became as good an architect and painter as he was a bad prince: he wrote several biographical and geographical works, which would have done honour to his name, if he had not neglected his duty to compose them. He died in 959.

Constantine, Constantinople.

CONSTANTINE, *Dracoses*, the son of Emmanuel Paleologus, was placed on the throne by Sultan Amurath in 1448. But Mahomet II. his successor, resolving to dethrone him, laid siege to Constantinople by sea and land, and took it by assault in 1453, after it had held out 58 days. The unfortunate emperor seeing the Turks enter the breaches, threw himself into the midst of the enemy, and was cut to pieces; the children of the imperial house were massacred by the soldiers; and the women reserved to gratify the lust of the conqueror; and thus terminated the dynasty of the Constantines, 1123 years after its establishment at Constantinople.

CONSTANTINE, *Robert*, a learned physician, born at Caen, taught polite literature in that city; and acquired great reputation by his skill in the Greek language, in history, and in medicine. He died in 1603 aged 103. He wrote a dictionary in Greek and Latin, and other works, which are esteemed.

1 Removing the imperial seat to this city the cause of the decline of the western empire.

CONSTANTINOPLE, the modern name of the city of BYZANTIUM in Thrace. It was enlarged and beautified by the Roman emperor Constantine the Great, in the year 330. At the same time he transferred thither the seat of the empire; and this removal is generally thought to have been one of the principal causes of the sudden decline of the western empire after this period.

2 Constantine defeats the Goths,

In the year 332, the Sarmatians implored Constantine's assistance against the Goths, who had made an irruption into their territories, and destroyed every thing with fire and sword. The emperor readily granted their request, and gained a complete victory. Near 100,000 of the enemy perished, either in the battle, or after it with hunger and cold. In consequence of this overthrow, the Goths were obliged to sue for peace; but the ungrateful Sarmatians no sooner found themselves delivered from their enemies, than they turned their arms against their benefactor, and ravaged the provinces of Mæsia and Thrace. The emperor, receiving intelligence of this treachery, returned with incredible expedition, cut great numbers of them in pieces, and obliged the rest to submit to what terms he was pleased to impose.

3 and the Sarmatians.

4 Is highly respected.

Constantine seems to have been a prince very highly respected, even by far distant nations. In 333, according to Eusebius, ambassadors arrived at Constantinople from the Blemyes, Indians, Ethiopians, and Persians, courting his friendship. They were received in a most obliging manner; and learning from the ambassadors of Sapor king of Persia, that there were great numbers of Christians in their master's dominions, Constantine wrote a letter in their behalf to the Persian monarch.

Next year, the Sarmatians being again attacked by the Goths, found themselves obliged to set at liberty and arm their slaves against them. By this means they indeed overcame the Goths: but the victorious slaves turning their arms against their masters, drove them out of the country. This misfortune obliged them, to the number of 300,000, to apply for relief to the Roman emperor, who incorporated with his legions such as were capable of service; and gave settlements to the rest in Thrace, Scythia, Macedon, and Italy. This was the last remarkable action of Constantine the Great. He died on May 15. 337, having divided the empire among his children and nephews, in the following manner. Constantine his eldest son, had Gaul, Spain, and Britain: Constantius, the second, had Asia, Syria, and Egypt; and Constans, the youngest, Illyricum, Italy, and Africa. To his nephew Dalmatius, he gave Thrace, Macedon, and Achaia; and to King Annibalianus, his other nephew, Armenia Minor, Pontus, Cappadocia, and the city of Cæsarea, which he desired might be the capital of his kingdom.

5 He takes a number of Sarmatians into his army.

Constantinopolitan history.

6 His death and division of the empire.

7 All his relations murdered except his three sons and two nephews.

After the death of Constantine, the army and senate proclaimed his three sons emperors, without taking any notice of his two nephews, who were soon after murdered, with Julius Constantius the late emperor's brother, and all their friends and adherents. Thus the family of Constantine was at once reduced to his three sons, and two nephews Gallus and Julian, the sons of Julius Constantius; and of these the former owed his life to a malady, from which no one thought he could recover; and the latter to his infancy, being then at most about seven years of age. The three brothers divided among themselves the dominions of the deceased princes; but did not long agree together. In 340, Constantine having in vain solicited Constans to yield part of Italy to him, raised a considerable army; and under pretence of marching to the assistance of his brother Constantius, who was then at war with the Persians, made himself master of several places in Italy. Hereupon Constans detached part of his army against him; and Constantine, being drawn into an ambuscade near Aquileia, was cut off with his whole forces. His body was thrown into the river Ansa; but being afterwards discovered, was sent to Constantinople, and interred there near the tomb of his father.

8 Constantine invades the dominions of Constans.

9 Is defeated and killed.

10 Constans sole master of the west.

By the defeat and death of his brother, Constans remained sole master of all the western part of the empire, in the quiet possession of which he continued till the year 350. This year Magnentius, the son of one Magnus, a native of Germany, finding Constans despised by the army on account of his indolence and inactivity, resolved to murder him, and set up for himself. Having found means to gain over the chief officers of the army to his designs, he seized on the imperial palace at Autun, and distributed among the populace what sums he found there; which induced not only the city, but the neighbouring country, to espouse his cause. But Constans being informed of what had passed, and finding himself unable to resist the usurper, fled towards Spain. He was overtaken, however, by Gaiso, whom Magnentius had sent after him with a chosen body of troops, and despatched with many wounds, at Helena, a small village situated near the foot of the Pyrenees.

11 Magnentius revolts against him.

12 Constans murdered.

Thus Constantius acquired a right to the whole Roman empire; though one-half of it was seized by Magnentius after the murder of Constans. The former had been engaged in a war with the Persians, in which little advantage was gained on either side; but the Persians now giving no more disturbance, the emperor marched against the usurpers in the west. Besides Magnentius, there were at that time two other pretenders to the western empire. Veteranio, general of the foot in Pannonia, had, on the first news of the death of Constans, caused himself to be proclaimed emperor by the legions under his command. He was

13 Three pretenders to the empire.

a native of Upper Mæſia, and advanced in years when he uſurped the ſovereignty; but ſo illiterate, that he then firſt learned to read. The third pretender was Flavius Popilius Nepotianus, ſon of Eutropia, the ſiſter of Conſtantine the Great. Having aſſembled a company of gladiators and men of deſperate fortunes, he aſſumed the purple on the 3d of June 350, and in that attire preſented himſelf before the gates of Rome. The perfect Anicetus, who commanded there for Magnentius, ſallied out againſt him with a body of Romans, who were ſoon driven back into the city. Soon after Nepotianus made himſelf maſter of the city itſelf, which he filled with blood and ſlaughter. Magnentius being informed of what had happened, ſent againſt this new competitor his chief favourite and prime miniſter Marcellinus. Nepotianus received him with great reſolution; a bloody battle enſued between the ſoldiers of Magnentius and the Romans who had eſpouſed the cauſe of Nepotianus; but the latter being betrayed by a ſenator, named Heraclitus, his men were put to flight, and he himſelf killed, after having enjoyed the ſovereignty only 28 days. Marcellinus ordered his head to be carried on the point of a lance through the principal ſtreets of the city; put to death all thoſe who had declared for him; and under pretence of preventing diſturbances, commanded a general maſſacre of all the relations of Conſtantine. Soon after, Magnentius himſelf came to Rome, to make the neceſſary preparations for reſiſting Conſtantius, who was exerting himſelf to the utmoſt in order to revenge the death of his brother. In the city he behaved moſt tyrannically, putting to death many perſons of diſtinction, in order to ſeize their eſtates; and obliged the reſt to contribute half of what they were worth towards the expence of the war. Having by this means raiſed great ſums, he aſſembled a mighty army compoſed of Romans, Germans, Gauls, Franks, Britons, Spaniards, &c. At the ſame time, however, dreading the uncertain iſſues of war, he diſpatched ambaſſadors to Conſtantius with propoſals of accommodation. Conſtantius ſet out from Antioch about the beginning of autumn; and, paſſing through Conſtantinople, arrived at Heraclea, where he was met by the deputies from Magnentius, and others from Veteranio, who had agreed to ſupport each other in caſe the emperor would hearken to no terms. The deputies of Magnentius propoſed in his name a match between him and Conſtantia, or rather Conſtantina, the ſiſter of Conſtantius, and widow of Annibalianus; offering, at the ſame time, to Conſtantius the ſiſter of Magnentius. At firſt the emperor would hearken to no terms; but afterwards, that he might not have to oppoſe two enemies at once, concluded a ſeparate treaty with Veteranio, by which he agreed to take him for his partner in the empire. But when Veteranio aſcended the tribunal along with Conſtantius, the ſoldiers pulled him down from thence, crying out, That they would acknowledge no other emperor than Conſtantius alone. On this Veteranio threw himſelf at the emperor's feet, and implored his mercy. Conſtantius received him with great kindneſs, and ſent him to Pruſſia in Bithynia, where he allowed him a maintenance ſuitable to his quality.

Conſtantius, now maſter of all Illyricum, and of the army commanded by Veteranio, reſolved to march againſt Magnentius without delay. In the mean time, however, on advice that the Perſians were preparing to invade the eaſtern provinces, he married his ſiſter Conſtantina to his couſin-german Gallus; created him Cæſar on the 15th of March; and allotted him for his ſhare not only all the Eaſt, but likewiſe Thrace and Conſtantinople. About the ſame time Magnentius gave the title of Cæſar to his brother Decentius, whom he diſpatched into Gaul to defend that country againſt the barbarians who had invaded it; for Conſtantius had not only ſtirred up the Franks and Saxons to break into that province, by promiſing to relinquiſh to them all the places they ſhould conquer, but had ſent them large ſupplies of men and arms for that purpoſe. On this encouragement the barbarians invaded Gaul with a mighty army, overthrew Decentius in a pitched battle, committed everywhere dreadful ravages, and reduced the country to a moſt deplorable ſituation. In the mean time Magnentius having aſſembled a numerous army, left Italy, and croſſing the Alps, advanced into the plains of Pannonia, where Conſtantius, whoſe main ſtrength conſiſted in cavalry, was waiting for him. Magnentius hearing that his competitor was encamped at a ſmall diſtance, invited him by a meſſenger to the extenſive plains of *Sciſcia* on the Save, there to decide which of them had the beſt title to the empire. This challenge was by Conſtantius received with great joy; but as his troops marched towards Sciſcia in diſorder, they fell into an ambuſcade, and were put to flight with great ſlaughter. With this ſucceſs, Magnentius was ſo elated, that he rejected all terms of peace, which were now offered by Conſtantius; but after ſome time, a general engagement enſued at Murſa, in which Magnentius was entirely defeated, with the loſs of 24,000 men. Conſtantius, though victor, is ſaid to have loſt 30,000, which ſeems improbable. All authors, however, agree, that the battle at Murſa proved fatal to the weſtern empire, and greatly contributed to its ſpeedy decline.

Conſtantinopolitan hiſtory.

19 Conſtantius ſtirs up the Franks to invade Gaul.

20 Is defeated by Magnentius

21 Magnentius defeated at Murſa.

22 This battle fatal to the empire.

After his defeat at Murſa, Magnentius retired into Italy, where he recruited his ſhattered forces as well as he could. But the beginning of the following year, 352, Conſtantius, having aſſembled his troops, ſurpriſed and took a ſtrong caſtle on the Julian Alps, belonging to Magnentius, without the loſs of a man. After this the emperor advanced in order to force the reſt; upon which Magnentius was ſtruck with ſuch terror, that he immediately abandoned Aquileia, and ordered the troops that guarded the other paſſes of the Alps to follow him. Thus Conſtantius entering Italy without oppoſition, made himſelf maſter of Aquileia. From thence he advanced to Pavia, where Magnentius gained a conſiderable advantage over him. Notwithſtanding this loſs, however, Conſtantius reduced the whole country bordering on the Po, and Magnentius's men deſerted to him in whole troops, delivering up to him the places they had garriſoned; by which the tyrant was ſo diſheartened, that he left Italy, and retired with all his forces into Gaul. Soon after this, Africa, Sicily, and Spain, declared for Conſtantius; upon which Magnentius ſent a ſenator, and after him ſome biſhops, to treat of a peace: but the emperor treated the ſenator as a ſpy, and ſent back the biſhops without any anſwer. Magnentius now finding his affairs

deſperate,

deſperate, and that there were no hopes of pardon, recruited his army in the beſt manner he could, and diſpatched an aſſaſſin into the eaſt to murder Gallus Cæſar; hoping that his death would oblige the emperor to withdraw his forces from Gaul, and march in perſon to the defence of the eaſtern provinces, which were threatened by the Perſians. The aſſaſſin gained over ſome of Gallus's guards; but the plot being diſcovered before it could be put in execution, they were all ſeized and executed as traitors.

23 Magnentius attempts to get Gallus murdered.

In 353, the war againſt Magnentius was carried on with more vigour than ever, and at laſt happily ended by a battle fought in the Higher Dauphiny. Magnentius, being defeated, took ſhelter in Lyons; but the few ſoldiers who attended him, deſpairing of any further ſucceſs, reſolved to purchaſe the emperor's favour by delivering up to him his rival, the author of ſo calamitous a war. Accordingly they ſurrounded the houſe where he lodged; upon which the tyrant, in deſpair, ſlew with his own hand his mother, his brother Deſiderius whom he had created Cæſar, and ſuch of his friends and relations as were with him: and then fixing his ſword in a wall, threw himſelf upon it, in order to avoid a more ſhameful death which he had reaſon to apprehend.

24 Magnentius defeated a ſecond time; kills all his family and himſelf.

After the death of Magnentius, his brother Decentius Cæſar, who was marching to his aſſiſtance, and had already reached Sens, finding himſelf ſurrounded on all ſides by the emperor's forces, choſe rather to ſtrangle himſelf than fall alive into the hands of his enemies. Thus Conſtantius was left ſole maſter of the Roman empire. His panegyriſts tell us, that after his victory he behaved with the greateſt humanity, forgiving and receiving into favour his greateſt enemies; but other hiſtorians differ conſiderably from them, and tell us that Conſtantius now became haughty, imperious, and cruel, of which many inſtances are given.

25 Conſtantius ſole maſter of the empire

This year the empire was ſubjected to very grievous calamities. Gaul was ravaged by the barbarians beyond the Rhine, and the diſbanded troops of Magnentius. At Rome, the populace roſe on account of a ſcarcity of proviſions. In Aſia, the Iſaurian robbers overran Lycaonia and Pamphylia; and even laid ſiege to Seleucia, a city of great ſtrength; which, however, they were not able to make themſelves maſters of. At the ſame time the Saracens committed dreadful ravages in Meſopotamia, the Perſians alſo invaded the province of Anthemuſia on the Euphrates. But the eaſtern provinces were not ſo much haraſſed by the barbarians as by Gallus Cæſar himſelf, who ought to have protected them. That prince was naturally of a cruel, haughty, and tyrannical diſpoſition; but being elated with his ſucceſſes againſt the Perſians, he at laſt behaved more like a tyrant and a madman than a governor. His natural cruelty is ſaid to have been heightened by the inſtigations of his wife Conſtantina, who is by Ammianus ſtyled the *Megæra*, or "fury of her ſex:" and he adds, that her ambition was equal to her cruelty. Thus all the provinces and cities in the eaſt were filled with blood and ſlaughter. No man, however innocent, was ſure to live or enjoy his eſtate a whole day; for Gallus's temper being equally ſuſpicious and cruel, thoſe who had any private enemies took care to accuſe them of crimes againſt the ſtate, and with Gallus it was the ſame thing to be accuſed and condemned. At laſt the emperor being informed from all quarters of the evil conduct of his brother-in-law, and being at the ſame time told that he aſpired to the ſovereignty, reſolved upon his ruin. For this end he wrote letters to Gallus and Conſtantina, inviting them both into Italy. Though they had both ſufficient reaſon to fear the worſt, yet they durſt not venture to diſobey the emperor's expreſs command. Conſtantina, who was well acquainted with her brother's temper, and hoped to pacify him by her artful inſinuations, ſet out firſt, leaving Gallus at Antioch: but ſhe had ſcarce entered the province of Bithynia, when ſhe was ſeized with a fever which put an end to her life. Gallus now deſpairing of being able to appeaſe his ſovereign, thought of openly revolting; but moſt of his friends deſerted him on account of his inconſtant and cruel temper, ſo that he was at laſt obliged to ſubmit to the pleaſure of Conſtantius. He advanced, therefore, according to his orders: but at Petavium was arreſted, and ſtripped of all the enſigns of his dignity. From thence he was carried to Fianona, now *Fianone*, in Dalmatia, where he was examined by two of his moſt inveterate enemies. He confeſſed moſt of the crimes laid to his charge; but urged as an excuſe the evil counſels of his wife Conſtantina. The emperor, provoked at this plea which reflected on his ſiſter, and inſtigated by the enemies of Gallus, ſigned a warrant for his execution, which was performed accordingly.

26 Many grievous calamities.

27 Tyranny of Gallus.

28 He is put to death.

All this time the emperor had been engaged in a war with the Germans: he had marched againſt them in perſon: and though he gained an advantage, the barbarians thought proper to make peace with him. This, however, was but ſhort-lived. No ſooner was the Roman army withdrawn, than they began to make new inroads into the empire. Againſt them Conſtantius deſpatched Arbetio with the flower of the army; but he fell into an ambuſcade, and was put to flight with the loſs of a great number of men. This loſs, however, was ſoon retrieved by the valour of Arinthæus, who became famous in the reign of Valens, and of two other officers, who falling upon the Germans, without waiting the orders of their general, put them to flight, and obliged them to leave the Roman territories.

29 War with the Germans.

The tranquillity of the empire, which enſued on this repulſe of the Germans, was ſoon interrupted by a pretended conſpiracy, by which in the end a true one was produced. Sylvanus, a leading man among the Franks, commanded in Gaul, and had there performed great exploits againſt the barbarians. He had been raiſed to this poſt by Arbetio; but only with a deſign to remove him from the emperor's preſence, in order to accompliſh his ruin, which he did in the following manner: One *Dynames*, keeper of the emperor's mules, leaving Gaul, begged of Sylvanus letters of recommendation to his friends at court; which being granted, the traitor eraſed all but the ſubſcription. He then inſerted directions to the friends of Sylvanus for the carrying on a conſpiracy; and delivering theſe forged letters to the prefect Lampidius, they were by him ſhown to the emperor. Thus Sylvanus was forced to revolt, and cauſe himſelf to be proclaimed emperor by the troops under his command.

30 Sylvanus betrayed by Arbetio.

31 He is forced to revolt.

In

Conſtantinopolitan hiſtory.

In the mean time, however, Dynames having thought proper to forge another letter, the fraud was diſcovered, and an inquiry ſet on foot, which brought to light the whole matter. Sylvanus was now declared innocent, and letters ſent to him by the emperor confirming him in his poſt; but theſe were ſcarce gone, when certain news arrived at the court of Sylvanus having revolted, and cauſed himſelf be proclaimed emperor. Conſtantius, thunderſtruck at this news, diſpatched againſt him Urſicinus, an officer of great integrity, as well as valour and experience in war; who forgetting his former character, pretended to be Sylvanus's friend, and thus found means to cut him off by treachery.

32 [illegible]

33 [illegible] ravage [illegible] by the barbarians.

The barbarians, who had been hitherto kept quiet by the brave Sylvanus, no ſooner heard of his death, than they broke into Gaul with greater fury than ever. They took and pillaged above forty cities, and among the reſt Cologne, which they levelled with the ground. At the ſame time the Quadi and Sarmatians entering Pannonia, deſtroyed every thing with fire and ſword. The Perſians alſo, taking advantage of the abſence of Urſicinus, overran, without oppoſition, Armenia and Meſopotamia; Proſper and Mauſonianus, who had ſucceeded that brave commander in the government of the eaſt, being more intent upon pillaging than defending the provinces committed to their care. Conſtantius not thinking it adviſable to leave Italy himſelf, reſolved at laſt to raiſe his couſin Julian, the brother of Gallus, to the dignity of Cæſar. Julian ſeems to have been a man of very extraordinary talents; for though before this time he had been entirely buried in obſcurity, and converſed only with books, no ſooner was he put at the head of an army than he behaved with the ſame bravery, conduct, and experience, as if he had been all his life bred up to the art of war. He was appointed governor of Gaul; but before he ſet out, Conſtantius gave him in marriage his ſiſter Helena, and made him many valuable preſents. At the ſame time, however, the jealous emperor greatly limited his authority; gave him written inſtructions how to behave; ordered the generals who ſerved under him to watch all his actions no leſs than thoſe of the enemy; and ſtrictly enjoined Julian himſelf not to give any largeſſes to the ſoldiery.

34 Julian created Cæſar.

Julian ſet out from Milan on the firſt of December 355, the emperor himſelf accompanying him as far as Pavia, from whence he purſued his journey to the Alps, attended only by 360 ſoldiers. On his arrival at Turin he was firſt acquainted with the loſs of Cologne, which had been kept concealed from the emperor. He arrived at Vienne before the end of the year, and was received by the people of that city and the neighbourhood with extraordinary joy.

35 He ſets out for Gaul.

In 356, the barbarians beſieged *Autun;* to relieve which place, Julian marched with what forces he could raiſe. When he came there, he found the ſiege raiſed: on which he went in purſuit of the barbarians to Auxere, croſſing with no ſmall danger thick woods and foreſts, from Auxerre to *Troies.* On his march he was ſurrounded on all ſides by the barbarians, who moved about the country in great bodies; but he put them to flight with a handful of men, cut great numbers of them in pieces, and took ſome priſoners. From Troies he haſtened to Rheims, where the main body of the army, commanded by Marcellus, waited his arrival. Leaving Rheims, he took his route towards Decempagi, now *Dieuze,* on the Seille in Lorrain, with a deſign to oppoſe the Germans who were buſy in ravaging that province. But the enemy attacking his rear unexpectedly, would have cut off two legions, had not the reſt of the army, alarmed at the ſudden noiſe, turned back to their aſſiſtance. A few days afterwards he defeated the Germans, though with great loſs to his own army; the victory, however, opened him a way to Cologne. This city he found abandoned by the barbarians. They had neglected to fortify it: but Julian commanded the ancient fortifications to be repaired with all poſſible expedition, and the houſes to be rebuilt; after which he retired to Sens, and there took up his winter-quarters. This year alſo Conſtantius entered Germany on the ſide of Rhætia, laid waſte the country far and wide; and obliged the barbarians to ſue for peace, which was readily granted. The ſame year he enacted two laws; by one of which it was declared capital to ſacrifice, or pay any kind of worſhip, to idols; the other, granting the effects of condemned perſons to belong to their children and relations within the third degree, except in caſes of magic and treaſon; but this laſt one he revoked two years after.

36 Defeats the barbarians.

37 Repairs the fortifications of Cologne.

38 Idolatry declared capital by Conſtantius.

In the beginning of the year 357, the barbarians beſieged Julian a whole month in Sens; Marcellus, the commander in chief, never once offering to aſſiſt him. Julian, however, ſo valiantly defended himſelf with the few forces he had, that the barbarians at laſt retired. After this, Conſtantius declared Julian commander in chief of all the forces in Gaul; appointing under him one *Severus,* an officer of great experience, and of a quite different diſpoſition from Marcellus. On his arival in Gaul, Julian received him with great joy, raiſed new troops, and ſupplied them with arms which he luckily found in an old arſenal. The emperor, reſolving at all events to put a ſtop to the terrible devaſtations committed by the barbarous nations, chiefly by the Alemans, wrote to Julian to march directly againſt them. At the ſame time he ſent Barbatio, who had been appointed general in place of Sylvanus, with a body of 25 or 30,000 men, out of Italy, in order to incloſe the enemy between two armies. The Leti, however, a German nation, paſſing between the armies, advanced as far as Lyons, hoping to ſurpriſe that wealthy city; but meeting with a warmer reception than they expected, contented themſelves with ravaging the country all round it. On the firſt notice of this expedition, Julian detached ſtrong parties to guard the paſſages through which he knew the barbarians muſt return. Thus they were all cut off except thoſe who marched near the camp of Barbatio; who was ſo far from cutting off their retreat, that he complained by a letter to Conſtantius of ſome officers for attempting it. Theſe officers, among whom was Valentinian afterwards emperor of the weſt, were, by the orders of Conſtantius, caſhiered for their diſobedience. The other barbarians either fortified themſelves in the countries which they had ſeized, ſtopping up all the avenues with huge trees, or took ſhelter in the iſlands formed by the Rhine. Julian reſolved firſt to attack the latter; and with this view demanded ſome boats of Barbatio: but he, inſtead of complying

39 The Leti cut off by Julian.

Constantinopolitan history.

complying with his just request, immediately burnt all his boats, as he did on another occasion the provisions which had been sent to both armies, after he had plentifully supplied his own. Julian, not in the least disheartened with his unaccountable conduct, persuaded some of the most resolute of his men to wade over to one of the islands. Here they killed all the Germans who had taken shelter in it. They then seized their boats, and pursued the slaughter in several other islands, till the enemy abandoned them all, and retired to their respective countries with their wives and what booty they could carry. On their departure, Barbatio attempted to lay a bridge of boats over the Rhine; but the enemy, apprised of his intention, threw a great number of huge trees into the river, which being carried by the stream against the boats, sunk several of them, and parted the rest. The Roman general then thought proper to retire, but the barbarians falling unexpectedly upon him in his retreat, cut great numbers of his men in pieces, took most of his baggage, laid waste the neighbouring country, and returned in triumph loaded with booty. Elated with this success, they assembled in great numbers under the command of *Chnodomarius*, a prince of great renown among them, and six other kings. They encamped in the neighbourhood of Strasburg. Here they were encountered by Julian; who put them to flight, with the loss of 6000 or 8000 of their men slain in the field, and a vastly greater number drowned in the river; while Julian himself lost only 243 private men and four tribunes. In this action Chnodomarius was taken, and sent to Rome, where he soon after died.

40 He forces the barbarians to abandon the islands of the Rhine.

41 Entirely defeats them at Strasburg.

After the battle, Julian advanced with all his army to Mayence, where he built a bridge over the Rhine and entered Germany, having with difficulty prevailed upon his army to follow him. Here he ravaged the country till the time of the autumnal equinox, when being prevented by snow from advancing any further, he began to repair the fort of Trajan, by some supposed to be the castle of Cromburgh, about three or four leagues from Frankfort. The barbarians were now so much alarmed, that they sent deputies to treat of a peace; but this Julian refused to grant them upon any terms. He consented, however, to a truce for seven months, upon their promising to store with provisions the fort he was building in their country. This year Constantius made some remarkable laws. By one he punished with confiscation such as renounced the Christian for the Jewish religion; and by another, addressed to Felix bishop of Rome, he exempted all merchandising ecclesiastics, with their wives, children, and domestics, from every imposition ordinary and extraordinary: supposing the gains they made to be applied by them to the relief of the poor.

42 He enters Germany and concludes a truce with the barbarians.

43 Remarkable laws of Constantius.

In 358, as soon as the season was fit for action, Julian took the field against the Franks, with a design to conquer them before the truce he had concluded with the Alemans was expired. The Franks were at that time divided into several tribes, the most powerful of which were the Salii and Chamavi. The first of these sent deputies, intreating that he would suffer them to remain as friends to the empire in the country they possessed. But Julian, without paying any regard to this deputation, entered their country, and obliged them to submit; after which he alloted them lands in Gaul, incorporating great numbers of them into his cavalry. He next marched against the Chamavi, whom he defeated and obliged to retire beyond the Rhine. Afterwards he rebuilt three forts on the river Meuse, which had been destroyed by the barbarians; but wanting provisions in a country so often ravaged, he ordered 600 or 800 vessels to be built in Britain for the conveying corn from thence into Gaul. Julian continued in the country of the Chamavi till the expiration of his truce with the Alemans; and then laying a bridge of boats over the Rhine, he entered their country, putting all to fire and sword. At last two of their kings came in person to him to sue for peace: which Julian granted, upon their promising to set at liberty the captives they had taken; to supply a certain quantity of corn when required; and to furnish wood, iron, and carriages, for repairing the cities they had ruined. The prisoners whom he at this time released, amounted to upwards of 20,000.

44 Julian conquers the Franks.

45 Grants a peace to the Germans.

Soon after the vernal equinox of this year, 358, Constantius marched in person against the Quadi and Sarmatians, whose country lay beyond the Danube. Having crossed that river on a bridge of boats, he laid waste the territories of the Sarmatians; who thereupon came in great numbers, together with the Quadi, pretending to sue for peace. Their true design was to surprise the Romans; but the latter suspecting it, fell upon them sword in hand, and cut them all in pieces. This obliged the rest to sue for peace in good earnest, which was granted on the delivery of hostages. The emperor then marched against the *Limigantes*, that is, the slaves who, in 334, had driven the Sarmatians out of their country, and seized it for themselves *. They used the same artifice as the Sarmatians and Quadi had done, coming in great numbers under pretence of submitting, but prepared to fall upon him unexpectedly if opportunity offered. The emperor, observing their surly looks, and distrusting them, caused his troops surround them insensibly while he was speaking. The Limigantes then displeased with the conditions he offered them, laid their hands on their swords: on which they were attacked by the Roman soldiers. Finding it impossible to make their escape, they made with great fury towards the tribunal, but were repulsed by the guards forming themselves into a wedge, and every one of them cut in pieces. After this, the emperor ravaged their country to such a degree, that they were in the end obliged to submit to the only condition he thought proper to allow them, which was to quit their country, and retire to a more distant place. The country was then restored to the Sarmatians, who were its original possessors.

46 Expedition of Constantius against some German nations.

* See No 5.

47 He expels the Limigantes.

This year is also remarkablee for a very haughty embassy from Sapor king of Persia. The ambassador, named *Narses*, brought a letter, in which the Persian monarch styled himself "king of kings, brother of the sun and moon," &c. He acquainted the emperor, that he might lawfully insist on having all the countries beyond the river Strymon in Macedon delivered up to him; but lest his demands should seem unreasonable, he would be contented with Armenia and Mesopotamia, which had been most unjustly taken from his grandfather Narses. He added, that unless justice was done him, he was resolved to assert his right

48 Haughty embassy from Sapor king of Persia.

right by force of arms. This letter was presented to Constantius wrapped up in a piece of white silk; but he, without entering into any negotiation with the ambassador, wrote a letter to Sapor, in which he told him, that as he had maintained the Roman dominions in their full extent, when he was possessed only of the east, he could not suffer them to be curtailed now when he was master of the whole empire. In a few days, however, he sent another letter, with rich presents; being very desirous at least to put off the war till he had secured the northern provinces against the incursions of the barbarians, that he might then employ all the forces of the empire against so formidable an enemy. This embassy proved unsuccessful, as did also another which was sent soon after. The last ambassadors were imprisoned as spies, but afterwards dismissed unhurt. By a law of Constantius dated in 358, all magicians, augurs, astrologers, and pretenders to the art of divination, were declared enemies to mankind; and such of them as were found in the court either of the emperor or of Julian, he commanded to be put to the torture, and specified what torments they were to undergo.

In 359, Julian continued his endeavours for relieving the province of Gaul, which had suffered so much from the incursions of the barbarians. He erected magazines in different places, visited the cities which had suffered most, and gave orders for repairing their walls and fortifications properly. He then crossed the Rhine, and pursued the war in Germany with great success, insomuch that the barbarians submitted to such terms as he pleased to impose. In the mean time, the emperor, having received intelligence that the Limigantes had quitted the country in which he had placed them, hastened to the banks of the Danube, in order to prevent their entering Pannonia. On his arrival he sent deputies, desiring to know what had induced them to abandon the country which had been allotted them. The Limigantes answered, in appearance with the greatest submission imaginable, that they were willing to live as true subjects of the empire in any other place; but that the country he had allotted them was quite uninhabitable, as they could demonstrate if they were but allowed to cross the river, and lay their complaints before him. This request was granted; but while he ascended his tribunal, the barbarians unexpectedly fell upon his guards sword in hand, killed several of them, and the emperor with difficulty saved himself by flight. The rest of the troops, however, soon took the alarm, and surrounding the Limigantes, cut them all off to a man. This year Constantius instituted a court of inquisition against all those who consulted heathen oracles. Paulus Catena, a noted and cruel informer, was dispatched into the east to prosecute them; and Modestus, then count of the east, and equally remarkable for his cruelty, was appointed judge. His tribunal was erected at Scythopolis in Palestine, whither persons of both sexes, and of every rank and condition, were daily dragged in crowds from all parts, and either confined in dungeons, or torn in pieces in a most cruel and barbarous manner by racks, or publicly executed.

In 359, Sapor king of Persia began hostilities, being encouraged thereto by the absence of Ursicinus, whom the emperor had recalled, and appointed in his room one Sabinianus, a person very unfit for such an office. During this campaign, however, he made very little progress; having only taken two Roman forts, and destroyed the city of Amida, the siege of which is said to have cost him 30,000 men. On the first news of the Persian invasion, Constantius had thought proper to send Ursicinus into the east; but his enemies prevented him from receiving the supplies necessary for carrying on the war; so that he found it impossible to take any effectual means for stopping the progress of the Persians. On his return, he was unexpectedly charged with the loss of Amida, and all the disasters that had happened during the campaign. Two judges were appointed to inquire into his conduct; but they, being creatures of his enemies, left the matter doubtful. On this Ursicinus was so much exasperated, that he appealed to the emperor, and in the heat of passion let fall some unguarded expressions, which being immediately carried to the emperor, the general was deprived of all his employments.

Constantius resolved to march next year in person against the Persians; but in the mean time, dreading to encounter so formidable an enemy, he applied himself wholly to the assembling of a mighty army, by which he might be able fully to cope with them. For this purpose he wrote to Julian to send him part of his forces, without considering that by so doing he left the province of Gaul exposed to the ravages of the barbarians. Julian resolved immediately to comply with the emperor's orders; but at the same time to abdicate the dignity of Cæsar, that he might not be blamed for the loss of the province. Accordingly he suffered the best soldiers to be draughted out of his army. They were, however, very unwilling to leave him, and at last proclaimed him emperor. Whether this was done absolutely against Julian's consent or not is uncertain; but he wrote to the emperor, and persuaded the whole army also to send a letter along with his, in which they acquainted Constantius with what had happened, and entreated him to acknowledge Julian as his partner in the empire. But this was positively refused by Constantius, who began to prepare for war. Julian then, designing to be before-hand with the emperor, caused his troops take an oath of allegiance to himself, and with surprising expedition made himself master of the whole country of Illyricum, and the important pass separating that country from Thrace. Constantius was thunderstruck with this news; but hearing that the Persians had retired, he marched with all his force against his competitor. On his arrival at Tarsus in Cilicia, he was seized with a feverish distemper, occasioned chiefly by the uneasiness and perplexity of his mind. He pursued his march, however, to Mosucrene, a place on the borders of Cilicia, at the foot of Mount Taurus. Here he was obliged to stop by the violence of his disorder, which increased every day, and at last carried him off on the 13th of November 361, in the 45th year of his age.

By the death of Constantius, Julian now became master of the whole Roman empire without a rival. He had been educated in the Christian religion; but secretly apostatized from it long before, and as soon as he saw himself master of Illyricum, openly avowed his apostasy, and caused the temples of the gods to be opened.

Constantinopolitan history.

49 A law against magicians, &c.

50 Treachery of the Limigantes.

51 They are all cut off.

52 The heathens cruelly persecuted.

53 The Persians begin hostilities.

54 Constantius marches in person against them.

55 Julian proclaimed emperor.

56 Constantius marches against him, but dies.

57 Julian restores the heathen religion.

Constantinopolitan history.

opened. When the messengers arrived at Naissus in Illyricum, where he then was, to acquaint him with his being sole master of the empire, they found him consulting the entrails of victims concerning the event of his journey. As the omens were uncertain, he was at that time very much embarrassed and perplexed; but the arrival of the messengers put an end to all his fears, and he immediately set out for Constantinople. At Heraclea he was met by almost all the inhabitants of this metropolis, into which he made his public entry on the 11th of December 361, being attended by the whole senate in a body, by all the magistrates, and by the nobility magnificently dressed, every one testifying the utmost joy at seeing such a promising young prince raised to the empire without bloodshed. He was again declared emperor by the senate of Constantinople; and as soon as that ceremony was over, he caused the obsequies of Constantius to be performed with great pomp.

58
Condemns some of the late emperor's ministers.

The first care of Julian was to inquire into the conduct of the late emperor's ministers. Several of these having been found guilty of enormous crimes, were condemned and executed; particulary the noted informer Paulus Catena, and another named *Apodamus*, were sentenced to be burnt alive. Along with these, however, was put to death one Ursula, a man of unexceptionable character, and to whom Julian himself was highly indebted. He had been supplied with money by Ursula, unknown to the emperor, at the time when he was sent into Gaul with the title of Cæsar, but without the money necessary for the support of that dignity. For what reason he was now put to death, historians do not acquaint us. Julian himself tells us, that he was executed without his knowledge.

59
Reforms the court.

The emperor next set about reforming the court. As the vast number of offices was in his time become an intolerable burden, he discharged all those whom he thought useless. He reduced, among the rest, the officers called *agentes in rebus*, from 10,000 to 17; and discharged thousands of cooks, barbers, &c. who by their large salaries drained the exchequer. The *curiosi*, whose office it was to inform the emperor of what had passed in the different provinces, were all discharged, and that employment entirely suppressed. Thus he was enabled to ease the people of the heavy taxes with which they were loaded: and this he did by abating a fifth part of all taxes and imposts throughout the kingdom.

60
Recals the philosophers, magicians, &c.

As to religious matters, Julian, as before observed, was a Pagan, and immediately on his accession to the throne restored the heathen religion. He invited to court the philosophers, magicians, &c. from all parts; nevertheless, he did not raise any persecution against the Christians. On the contrary, he recalled from banishment all the orthodox bishops who had been sent into exile during the former reign; but with a design, as is observed both by the Christian and Pagan writers, to raise disturbances and sow dissensions in the church.

61
Marches against the Persians.

As the Persians were now preparing to carry on the war with vigour, Julian found himself under a necessity of marching against them in person. But before he set out, he enriched the city of Constantinople with many valuable gifts. He formed a large harbour to shelter the ships from the south wind, built a magnificent porch leading to it, and in another porch a stately library, in which he lodged all his books. In the month of May, A. D. 362, he set out for Antioch; and on the first of January renewed in that city the sacrifices to Jupiter for the safety of the empire, which had been so long omitted. During his stay in this city, he continued his preparations for the Persian war, erecting magazines, making new levies, and above all consulting the oracles, aruspices, magicians, &c. The oracles of Delphi, Delos, and Dodona, assured him of victory. The aruspices, indeed, and most of his courtiers and officers, did all that lay in their power to divert him from his intended expedition; but the deceitful answers of the oracles and magicians, and the desire of adding the Persian monarch to the many kings he had already seen humbled at his feet, prevailed over all other considerations. Many nations sent deputies to him, offering their assistance; but these offers he rejected, telling them that the Romans were to assist their allies, but stood in no need of any assistance from them. He likewise rejected, and in a very disobliging manner, the offers of the Saracens; answering them, when they complained of his stopping the pension paid them by other emperors, that a warlike prince had steel, but no gold; which they resenting, joined the Persians, and continued faithful to them to the last. However, he wrote to Arsaces king of Armenia, enjoining him to keep his troops in readiness to execute the orders he should soon transmit to him.

62
Crosses the Euphrates.

Having made the necessary preparations for so important an enterprise, Julian sent orders to his troops to cross the Euphrates, designing to enter the enemy's country before they had the least notice of his march; for which purpose he had placed guards on all the roads. From Antioch he proceeded to Litarba, a place about 15 leagues distant, which he reached the same day. From thence he went to Beræa, where he halted a day, and exhorted the council to restore the worship of the gods: but this exhortation, it seems, was complied with but by few. From Beræa he proceeded to Batnæ; and was better pleased with the inhabitants of the latter, because they had, before his arrival, restored the worship of the gods. There he offered sacrifices; and having immolated a great number of victims, he pursued the next day his journey to Hierapolis, the capital of the province of Euphratesiana, which he reached on the 9th of March. Here he lodged in the house of one for whom he had a particular esteem, chiefly because neither Constantius nor Gallus, who had both lodged in his house, had been able to make him renounce the worship of his idols. As he entered this city, 50 of his soldiers were killed by the fall of a porch. He left Hierapolis on the 13th of March; and having passed the Euphrates on a bridge of boats, came to Batnæ a small city of Osrhoene, about 10 leagues from Hierapolis; and here 50 more of his soldiers were killed by the fall of a stack of straw. From Batnæ he proceeded to Carrhæ; where, in the famous temple of the moon, it is said he sacrificed a woman to that planet.

63
Invades Persia.

While Julian continued in this city, he received advice that a party of the enemies horse had broke into the Roman territories. On this he resolved to leave an army in Mesopotamia, to guard the frontiers of the empire

empire on that side, while he advanced on the other into the heart of the Persian dominions. This army consisted, according to some, of 20,000, according to others, of 30,000 chosen troops. It was commanded by Procopius, and Sebastian a famous Manichean who had been governor of Egypt, and had persecuted there, with the utmost cruelty, the orthodox Christians. These two were to join, if possible, Arsaces king of Armenia, to lay waste the fruitful plains of Media, and meet the emperor in Assyria. To Arsaces Julian himself wrote, but in the most disobliging manner imaginable, threatening to treat him as a rebel if he did not execute, with the utmost punctuality, the orders given him: and at the conclusion told him, that the God he adored would not be able to screen him from his indignation.

There were two roads leading from Carrhæ to Persia; the one to the left by Nisibis; the other to the right through the province of Assyria, along the banks of the Euphrates. Julian chose the latter, but caused magazines to be erected on both roads; and, after having viewed his army, set out on the 25th of March. He passed the Abora, which separated the Roman and Persian dominions, near its conflux with the Euphrates; after which he broke down the bridge, that his troops might not be tempted to desert, seeing they could not return home. As he proceeded on his march, a soldier and two horses were struck dead by a flash of lightning; and a lion of an extraordinary size presenting himself to the army, was in a moment dispatched by the soldiers with a shower of darts. These omens occasioned great disputes between the philosophers and aruspices: the latter looking upon them as inauspicious, advised the emperor to return; but the former refuted their arguments with others more agreeable to Julian's temper.

Having passed the Abora, Julian entered Assyria, which he found very populous, and abounding with all the necessaries of life; but he laid it waste far and near, destroying the magazines and provisions which he could not carry along with him; and thus he put it out of his power to return the same way he came; a step which was judged very impolitic. As he met with no army in the field to oppose him, he advanced to the walls of Ctesiphon, the metropolis of the Persian empire: having reduced all the strong holds that lay in his way. Here, having caused the canal to be cleared, which was formerly dug by Trajan between these two rivers, he conveyed his fleet from the former to the latter. On the banks of the Tigris he was opposed by the enemy. But Julian passed that river in spite of their utmost efforts and drove them into the city with the loss of a great number of their men, he himself, in the mean time, losing only 70 or 75.

Julian had now advanced so far into the enemy's country, that he found it necessary to think of a retreat, as it was impossible for him to winter in Persia. For this reason he made no attempt on Ctesiphon, but began to march back along the banks of the Tigris, soon after he had passed that river. In the mean time the king of Persia was assembling a formidable army, with a design to fall upon the Romans in their march; but being desirous of putting an end to so destructive a war, he sent very advantageous proposals of peace to Julian. These the Roman emperor very imprudently rejected; and soon after, deceived by treacherous guides, he quitted the river, and entered into an unknown country totally laid waste by the enemy; and where he was continually harassed by strong parties, who in a manner surrounded his army, and attacked him sometimes in the front, and sometimes in the rear. A still worse step he was persuaded to take by the treacherous guides already mentioned: and this was to burn his fleet, lest it should fall into the hands of the enemy. As soon as the fleet was set on fire, the whole army cried out, that the emperor was betrayed, and that the guides were traitors employed by the enemy. Julian ordered them immediately to be put to the rack, upon which they confessed the treason; but it was too late. The fleet was already in flames; they could by no means be extinguished; and no part was saved except 12 vessels, which were designed to be made use of in the building of bridges, and for this purpose were conveyed over land in waggons.

The emperor thus finding himself in a strange country, and his army greatly dispirited, called a council of his chief officers, in which it was resolved to proceed to Corduene, which lay south of Armenia, and belonged to the Romans. With this view they had not proceeded far, when they were met by the king of Persia, at the head of a very numerous army, attended by his two sons, and all the principal nobility of the kingdom. Several sharp encounters happened, in which, though the Persians were always defeated, yet the Romans reaped no advantages from their victories, but were reduced to the last extremity for want of provisions. In one of these skirmishes, when the Romans were suddenly attacked, the emperor, eager to repulse the enemy, hastened to the field of battle without his armour, when he received a mortal wound by a dart, which, through his arm and side, pierced his very liver. Of this wound he died the same night, the 26th of June 363, in the 32d year of his age, after having reigned scarce 20 months from the time he became sole master of the Roman empire.

67 Is mortally wounded in a sudden attack by the Persians

68 Jovian raised to the empire.

As Julian had declined naming any successor, the choice of a new emperor devolved on the army. They unanimously chose Jovian, a very able commander, whose father had lately resigned the post of *comes domesticorum*, in order to lead a retired life. The valour and experience of Jovian, however, were not sufficient to extricate the Roman army from the difficulties in which they had been plunged by the imprudence of his predecessor. The famine raged in the camp to such a degree, that not a single man would have been left alive, had not the Persians unexpectedly sent proposals of peace. These were now received with the utmost joy. A peace was concluded for 30 years; the terms of which were, that Jovian should restore to the Persians the five provinces which had been taken from them in the reign of Dioclesian, with several castles, and the cities of Nisibis and Singara. After the conclusion of the treaty, Jovian pursued his march without molestation. When he arrived at Antioch, he revoked all the laws that had been made in the former reign against Christianity and in favour of Paganism. He espoused also the cause of the orthodox Christians against the Arians; and he called all those who had been formerly banished, particularly Athanasius,

69 Concludes a peace with the Persians.

Constantinopolitan history.

fius, to whom he wrote a very obliging letter, with his own hand. It is generally believed also that Athanafius, at the defire of Jovian, now compofed the creed which ftill goes by his name, and is fubfcribed by all the bifhops in Europe. But this emperor did not live to make any great alterations, or even to vifit his capital as emperor; for in his way to Conftantinople he was found dead in his bed, on the 16th or 17th of February 364, after he had lived 33 years, and reigned feven months and 40 days.

70 His death.

71 Valentinian chofen emperor, choofes Valens for his partner.

After the death of Jovian, Valentinian was chofen emperor. Immediately on his acceffion, the foldiers mutinied, and with great clamour required him to choofe a partner in the fovereignty. Though he did not inftantly comply with his demand, yet in a few days he chofe his brother Valens for his partner; and, as the empire was threatened on all fides with an invafion of the barbarous nations, he thought proper to divide it. This famous partition was made at Mediana in Dacia. Valens had for his fhare the whole of Afia, Egypt, and Thrace; and Valentinian all the Weft; that is, Illyricum, Italy, Gaul, Spain, Britain, and Africa.

72 Procopius revolts.

After this partition, Valens returned to Conftantinople; where the beginning of his reign was difturbed by the revolt of Procopius, a relation of Julian. On the death of that emperor, he had fled into Taurica Cherfonefus for fear of Jovian; but not trufting the barbarians who inhabited that country, he returned in difguife into the Roman territories, where having gained over an eunuch of great wealth, by name *Eugenius*, lately difgraced by Valens, and fome officers who commanded the troops fent againft the Goths, he got himfelf proclaimed emperor. At firft he was joined only by the loweft of the people, but at length he was acknowledged by the whole city of Conftantinople. On the news of this revolt, Valens would have abdicated the fovereignty, had he not been prevented by the importunities of his friends. He therefore difpatched fome troops againft the ufurper; but thefe were gained over, and Procopius continued for fome time to gain ground. It is probable he would finally have fucceeded, had he not become fo much elated with his good fortune that he grew tyrannical and infupportable to his own party. In confequence of this alteration in his difpofition, he was firft abandoned by fome of his principal officers; and foon after defeated in battle, taken prifoner, and put to death.

73 Is defeated and put to death.

74 War with the Goths.

This revolt produced a war betwixt Valens and the Goths. The latter, having been folicited by Procopius, had fent 3000 men to his affiftance. On hearing the news of the ufurper's death, they marched back; but Valens detached againft them a body of troops, who took them all prifoners notwithftanding the vigorous refiftance they made. Athanaric, king of the Goths, expoftulated on this proceeding with Valens; but that emperor proving obftinate, both parties prepared for war. In 367 and 369, Valens gained great advantages over his enemies; and obliged them to fue for peace, which was concluded upon terms very advantageous to the Romans. The reft of his reign contains nothing remarkable, except the cruelty with which Valens perfecuted the orthodox clergy. The latter fent 80 of their number to him, in order to lay their complaints before him; but he, inftead of giving them any relief, determined to put them all to death. But the perfon who was ordered to execute this fentence, fearing left the public execution of fo many ecclefiaftics might raife difturbances, ordered them all to be put on board a fhip, pretending that the emperor had ordered them only to be fent into banifhment; but when the veffel was at fome diftance from the land, the mariners fet fire to it, and made their own efcape in the boat. The fhip was driven by a ftrong wind into a harbour, where it was confumed and all that were in it. A perfecution was alfo commenced againft magicians, or thofe who had books of magic in their cuftody. This occafioned the deftruction of many innocent perfons; for books of this kind were often conveyed into libraries, unknown to the owners of them, and this was certainly followed by death and confifcation of goods. Hereupon perfons of all ranks were feized with fuch terror that they burnt their libraries, left books of magic fhould have been fecretly conveyed in amongft the others. In 378, the Goths, whom Valens had admitted into Thrace, advanced from that province to Macedon and Theffaly, where they committed dreadful ravages. They afterwards blocked up the city of Conftantinople, plundered the fuburbs, and at laft totally defeated and killed the emperor himfelf. The day after the battle, hearing that an immenfe treafure was lodged in Adrianople, the barbarians laid fiege to that place: but being quite ftrangers to the art of befieging towns, they were repulfed with great flaughter; upon which they dropped that enterprife, and returned before Conftantinople. But here great numbers of them were cut in pieces by the Saracens, whom Maria their queen had fent to the affiftance of the Romans; fo that they were obliged to abandon this defign likewife, and retire from the neighbourhood of that city.

75 Eighty orthodox ecclefiaftics put to death.

76 Magicians perfecuted.

77 Valens defeated and killed by the Goths.

78 Gratian takes Theodofius for his partner.

By the death of Valens the empire once more fell into the hands of a fingle perfon. This was Gratian, who had held the empire of the Weft, after the death of Valentinian. He repulfed many barbarous nations who threatened the empire at that time with diffolution; but finding himfelf preffed on all fides, he foon refolved to take a colleague, in order to eafe him of fome part of the burden. Accordingly on the 19th of January 379, he declared Theodofius his partner in the empire, and committed to his care all the provinces which had been governed by Valens.

Theodofius is greatly extolled by the hiftorians of thofe ages on account of his extraordinary valour and piety: and for thefe qualifications has been honoured with the furname of *the Great*. From the many perfecuting laws, however, made in his time, it would feem that his piety was at leaft very much mifguided; and that if he was naturally of a humane and compaffionate difpofition, fuperftition and paffion had often totally obfcured it. He certainly was a man of great conduct and experience in war; and indeed the prefent ftate of the empire called for an exertion of all his abilities. The provinces of Dacia, Thrace, and Illyricum, were already loft; the Goths, Taifali, Alans, and Huns, were mafters of the greateft part of thefe provinces, and had ravaged and laid wafte the reft. The Iberians, Armenians, and Perfians, were likewife up in arms, and ready to take advantage of the diftracted ftate of the empire. The few foldiers who had

79 Miferable ftate of the empire at his acceffion.

had furvived the late defeat, kept within the ftrong holds of Thrace, without daring fo much as to look abroad, much lefs face the victorious enemy, who moved about the country in great bodies. But notwithftanding this critical fituation, the hiftorians of thofe times give us no account of the tranfactions of the year 379. Many great battles indeed are faid to have been fought, and as many victories obtained by Theodofius; but the accounts of thefe are fo confufed and contradictory, that no ftrefs can be laid upon them.

In the month of February 380, Theodofius was feized with a dangerous malady, fo that Gratian found himfelf obliged to carry on the war alone. This emperor, apprehending that the neighbouring barbarians might break into fome of the provinces, concluded a peace with the Goths, which was confirmed by Theodofius on his recovery. The treaty was very advantageous to the barbarians; but they difregarding all their engagements, no fooner heard that Gratian had left Illyricum, than they paffed the Danube, and breaking into Thrace and Pannonia, advanced as far as Macedon, deftroying all with fire and fword. Theodofius, however, drawing together his forces, marched againft them; and, according to the moft refpectable authorities, gained a complete victory; though Zofimus relates, that he was utterly defeated.

The following year, Athanaric, the moft powerful of all the Gothic princes, being driven out by a faction at home, recurred to Theodofius, by whom he was received with great tokens of friendfhip. The emperor himfelf went out to meet him, and attended him with his numerous retinue into the city. The Gothic prince died the fame year; and Theodofius caufed him to be buried after the Roman manner with fuch pomp and folemnity, that the Goths, who attended him in his flight, returned home with a refolution never to moleft the Romans any more. Nay, out of gratitude to the emperor, they took upon them to guard the banks of the Danube, and prevent the empire from being invaded on that fide.

In 383, one Maximus revolted againft Gratian in Britain; and in the end, having got the unhappy emperor into his power, caufed him to be put to death, and affumed the empire of the Weft himfelf. Gratian had divided his dominions with his brother Valentinian, whom he allowed to reign in Italy and Weft Illyricum, referving the reft to himfelf. Maximus, therefore, immediately after his ufurpation, fent deputies to Theodofius, affuring him that he had no defigns on the dominions of Valentinian. As Theodofius at that time found himfelf in danger from the barbarians, he not only forbore to attack Maximus after this declaration, but even acknowledged him for his partner in the empire. It was not long, however, before the ambition of the ufurper prompted him to break his promife. In 387, he paffed the Alps on a fudden; and meeting with no oppofition, marched to Milan where Valentinian ufually refided. The young prince fled firft to Aquileia; and from thence to Theffalonica, to implore the protection of Theodofius. The latter, in anfwer to Valentinian's letter, informed him, that he was not at all furprifed at the progrefs Maximus had made, becaufe the ufurper had protected, and Valentinian had perfecuted, the orthodox Chriftians. At laft he prevailed on the young prince to renounce the Arian herefy which he had hitherto maintained; after which Theodofius promifed to affift him with all the forces of the Eaft. At firft, however, he fent meffengers to Maximus, earneftly exhorting him to reftore the provinces he had taken from Valentinian, and content himfelf with Gaul, Spain, and Britain. But the ufurper would hearken to no terms. This very year he befieged and took Aquileia, Quaderna, Bononia, Mutina, Rhegium, Placentia, and many other cities in Italy. The following year he was acknowledged in Rome, and in all the provinces of Africa. Theodofius, therefore, finding a war inevitable, fpent the remaining months of this and the beginning of the following year in making the neceffary preparations. His army confifted chiefly of Goths, Huns, Alans, and other barbarians, whom he was glad to take into the fervice in order to prevent their raifing difturbances on the frontiers. He defeated Maximus in two battles, took him prifoner, and put him to death. The ufurper had left his fon Victor, whom he created Auguftus, in Gaul, to awe the inhabitants in his abfence. Againft him the emperor defpatched Arbogaftes, who took him prifoner after having difperfed the troops that attended him, and put him to death. The victory was ufed afterwards by Theodofius with great clemency and moderation.

Conftantinopolitan hiftory.

83 His fuccefs.

84 Defeated and put to death by Theodofius.

In 389, Theodofius took a journey to Rome; and, according to Prudentius, at this time converted the fenate and people from idolatry to Chriftianity. The next year was remarkable for the deftruction of the celebrated temple of Serapis in Alexandria; which, according to the defcription of Ammianus Marcellinus, furpaffed all others in the world, that of Jupiter Capitolinus alone excepted. The reafon of its being now deftroyed was as follows. Theophilus, bifhop of Alexandria, having begged and obtained of the emperor an old temple, formerly confecrated to Bacchus, but then ruined and forfaken, with a defign to convert it into a church, the workmen found among the rubbifh feveral obfcene figures, which the bifhop, to ridicule the fuperftition of the Heathens, caufed to be expofed to public view. This provoked the Pagans to fuch a degree, that they flew to arms; and falling unexpectedly upon the Chriftians, cut great numbers of them in pieces. The latter, however, foon took arms in their own defence; and being fupported by the few foldiers who were quartered in the city, began to repel force by force. Thus a civil war was kindled, and no day paffed without fome encounter. The Pagans ufed to retire to the temple of Serapis; and thence fallying out unexpectedly feized on fuch Chriftians as they met, and dragging them into the temple, either forced them by the moft exquifite torments to facrifice to their idol, or, if they refufed, racked them to death. As foon as they expected to be attacked by the emperor's troops, they chofe a philofopher named *Olympus* for their leader, with a defign to defend themfelves to the laft extremity. The emperor, however, would not fuffer any punifhment to be inflicted upon them for the lives of thofe they had taken away, but readily forgave them; however, he ordered all the temples of Alexandria to be immediately pulled down, and commanded the bifhop to fee his orders put in execution. The Pagans no fooner heard that the

85 The temples in Alexandria, and throughout all Egypt deftroyed.

Constantinopolitan history.

emperor was acquainted with their proceedings than they abandoned the temple, which was in a ſhort time deſtroyed by Theophilus; nothing being left except the foundations, which could not be removed on account of the extraordinary weight and ſize of the ſtones. Not ſatisfied with the deſtruction of the Alexandrian temples, the zealous biſhop encouraged the people to pull down all the other temples, oratories, chapels, and places ſet apart for the worſhip of the Heathen gods throughout Egypt, and the ſtatues of the gods themſelves to be either burnt or melted down. Of the innumerable ſtatues which at that time were to be found in Egypt, he is ſaid to have ſpared but one, viz. that of an ape, in order to expoſe the Pagan religion to ridicule. On his return to Conſtantinople, Theodoſius ordered ſuch temples as were yet ſtanding to be thrown down, and the Arians to be everywhere driven out of the cities.

86 Valentinian murdered by Arbogaſtes, who raiſes Eugenius to the empire.

In 392, Valentinian, emperor of the Weſt, was treacherouſly murdered by Arbogaſtes his general; who, though he might afterwards have eaſily ſeized on the ſovereignty himſelf, choſe to confer it upon one Eugenius, and to reign in his name. This new uſurper, though a Chriſtian, was greatly favoured by the Pagans, who were well appriſed that he only bore the title of emperor, while the whole power lodged in Arbogaſtes, who pretended to be greatly attached to their religion. The aruſpices began to appear anew, and informed him that he was deſtined to the empire of the whole world; that he would ſoon gain a complete victory over Theodoſius, who was as much hated as Eugenius was beloved by the gods, &c. But though Eugenius ſeemed to favour the Pagans, yet in the very beginning of his reign he wrote to St Ambroſe. The holy man did not anſwer his letter till he was preſſed by ſome friends to recommend them to the new prince; and then he wrote to this infamous uſurper with all the reſpect due to an emperor. Soon after his acceſſion to the empire, Eugenius ſent deputies to Theodoſius; and they are ſaid to have been received by him in a very obliging manner. He did not, however, intend to enter into any alliance with this uſurper, but immediately began his military preparations. In 394, he ſet out from Conſtantinople, and was at Adrianople on the 15th of June that year. He bent his march through Dacia, and the other provinces between Thrace and the Julian Alps, with a deſign to force the paſſes of theſe mountains, and break into Italy before the army of Eugenius was in a condition to oppoſe him. On his arrival at the Alps, he found theſe paſſes guarded by Flavianus prefect of Italy, at the head of a conſiderable body of Roman troops. Theſe were utterly defeated by Theodoſius, who thereupon croſſed the Alps and advanced into Italy. He was ſoon met by Eugenius; and a bloody battle enſued, without any deciſive advantage on either ſide. The next day the emperor led his troops in perſon againſt the enemy, utterly defeated them, and took their camp. Eugenius was taken priſoner by his own men, and brought to Theodoſius, who reproached him with the murder of Valentinian, with the calamities he had brought on the empire by his unjuſt uſurpation, and with putting his confidence in Hercules, and not in the true God; for on his chief ſtandard he had diſplayed the image of that fabulous hero. Eugenius begged earneſtly for his life: but while he lay proſtrate at the emperor's feet, his own ſoldiers cut off his head, and carrying it about on the point of a ſpear, ſhowed it to thoſe in the camp, who had not yet ſubmitted to Theodoſius. At this they were all thunderſtruck; but being informed that Theodoſius was ready to receive them into favour, they threw down their arms and ſubmitted.

87 Eugenius defeated, taken priſoner, and put to death.

88 Arbogaſtes lays violent hands on himſelf.

After this, Arbogaſtes, deſpairing of pardon, fled to the mountains; but being informed that diligent ſearch was made for him, he laid violent hands on himſelf. His children, and thoſe of Eugenius, took ſanctuary in churches; but the emperor not only pardoned, but took the opportunity of converting them to Chriſtianity, reſtored them to their paternal eſtates, and raiſed them to conſiderable employments in the ſtate. Soon after this, Theodoſius appointed his ſon Honorius emperor of the weſt, aſſigning him for his ſhare Italy, Gaul, Spain, Africa, and Weſt Illyricum. The next year, as he prepared for his return to Conſtantinople, he was ſeized with a dropſy, owing to the great fatigues he had undergone during the war. As ſoon as he perceived himſelf to be in danger, he made his will; by which he bequeathed the empire of the eaſt to Arcadius, and confirmed Honorius in the poſſeſſion of the weſt. He likewiſe confirmed the pardon which he had granted to all thoſe who had borne arms againſt him, and remitted a tribute which had proved very burdenſome to the people; and charged his two ſons to ſee theſe points of his will executed. He died at Milan on the 17th of January 395, in the 16th year of his reign and 50th of his age.

89 Theodoſius dies.

90 Empire uſurped by Baſiliſcus.

From the time of Theodoſius to the time when the Roman empire in the weſt was totally deſtroyed by the Goths, we find but very little remarkable in the hiſtory of Conſtantinople. At this time the eaſtern empire was uſurped by Baſiliſcus, who had driven out Zeno the lawful emperor; being aſſiſted in his conſpiracy by the empreſs Verina his ſiſter. Zeno fled into Iſauria, whither he was purſued by Illus and Trecondes, two of the uſurper's generals; who having eaſily defeated the few troops he had with him, forced the unhappy prince to ſhut himſelf up in a caſtle, which they immediately inveſted. But in a ſhort time Baſiliſcus having diſobliged the people by his cruelty, avarice, and other bad qualities, for which he was no leſs remarkable than his predeceſſor had been, his generals joined with Zenò, whom they reſtored to the throne. After his reſtoration, Zeno having got Baſiliſcus into his power, confined him in a caſtle of Cappadocia together with his wife Zenonides, where they both periſhed with hunger and cold. This happened in the year 467, after Baſiliſcus had reigned about 20 months. During the time of this uſurpation a dreadful fire happened at Conſtantinople, which conſumed great part of the city, with the library containing 120,000 volumes; among which were the works of Homer, written, as is ſaid, on the great gut of a dragon 120 feet long.

91 Is ſtarved to death.

92 Great fire at Conſtantinople.

The misfortunes which Zeno had undergone did not work any reformation upon him. He ſtill continued the ſame vicious courſes which had given occaſion to the uſurpation of Baſiliſcus. Other conſpiracies were formed agaiſt him, but he had the good fortune to eſcape them. He engaged in a war with the

the Oftrogoths, in which he proved unfuccefsful, and was obliged to yield the provinces of Lower Dacia and Mœfia to them. In a fhort time, however, Theodoric their king made an irruption into Thrace, and advanced within 15 miles of Conftantinople, with a defign to befiege that capital: but the following year, 485, they retired in order to attack Odoacer king of Italy; of which country Theodoric was proclaimed king in 493. The emperor Zeno died in the year 491, in the 65th year of his age, and 17th of his reign.

The Roman empire had now for a long time been on the decline: the ancient valour and military difcipline which had for fuch a long time rendered the Romans fuperior to other nations, had greatly degenerated; fo that they were now by no means fo powerful as formerly. The tumults and diforders which had happened in the empire from time to time by the many ufurpations, had contributed alfo to weaken it very much. But what proved of the greateft detriment was the allowing vaft fwarms of barbarians to fettle in the different provinces, and to ferve in the Roman empire in feparate and independent bodies. This had proved the immediate caufe of the diffolution of the weftern empire; but as it affected the eaftern parts lefs, the Conftantinopolitan empire continued for upwards of 900 years after the weftern one was totally diffolved. The weak and imprudent adminiftration of Zeno, and Anaftafius who fucceeded him, had reduced the eaftern empire ftill more; and it might poffibly have expired in a fhort time after the weftern one, had not the wife and vigorous conduct of Juftin, and his partner Juftinian, revived in fome meafure the ancient martial fpirit which had originally raifed the Roman empire to its higheft pitch of grandeur.

Juftin afcended the throne in 518. In 521 he engaged in a war with the Perfians, who had all along been very formidable enemies to the Roman name. Againft them he employed the famous Belifarius; but of him we hear nothing remarkable till after the acceffion of Juftinian. This prince was the nephew of Juftin, and was by him taken as his partner in the empire in 527; and the fame year Juftin died, in the 77th year of his age and 9th of his reign. Juftinian being now fole mafter of the empire, bent his whole force againft the Perfians. The latter proved fuccefsful in the firft engagement; but were foon after utterly defeated by Belifarius on the frontiers of Perfia, and likewife by another general named *Dorotheus* in Armenia. The war continued with various fuccefs during the firft five years of Juftinian's reign. In the fixth year a peace was concluded upon the following terms: 1. That the Roman emperor fhould pay to Cofrhoes, the king of Perfia, 1000 pounds weight of gold. 2. That both princes fhould reftore the places they had taken during the wars. 3. That the commander of the Roman forces fhould no longer refide at Daras on the Perfian frontiers, but at a place called *Conftantina* in Mefopotamia, as he had formerly done. 4. That the Iberians, who had fided with the Romans, fhould be at liberty either to return to their own country or to remain at Conftantinople. This peace, concluded in 532, was ftyled *eternal*; but in the event proved of very fhort duration.

About this time happened at Conftantinople the greateft tumult mentioned in hiftory. It began among the different factions in the circus; but ended in an open rebellion. The multitude, highly diffatisfied with the conduct of John the *prefectus prætorio*, and of Trebonianus then queftor, forced Hypatius, nephew to the emperor Anaftafius, to accept the empire, and proclaimed him with great folemnity in the forum. As the two above-mentioned minifters were greatly abhorred by the populace on account of their avarice, Juftinian immediately difcharged them, hoping by that means to appeafe the tumult: but this was fo far from anfwering the purpofe, that the multitude only grew the more outrageous upon it; and moft of the fenators joining them, the emperor was fo much alarmed, that he had thoughts of abandoning the city and making his efcape by fea. In this dilemma the emprefs Theodora encouraged and perfuaded him rather to part with his life than the kingdom; and he at laft refolved to defend himfelf to the utmoft, with the few fenators who had not yet abandoned him. In the mean time, the rebels having attempted in vain to force the gates of the palace, carried Hypatius in triumph to the circus; where, while he was beholding the fports from the imperial throne, amidft the fhouts and acclamations of the people, Belifarius, who had been recalled from Perfia, entered the city with a confiderable body of troops. Being then apprifed of the ufurpation of Hypatius, he marched ftraight to the circus; fell fword in hand upon the difarmed multitude; and with the affiftance of a band of Heruli, headed by Mundus governor of Illyricum, cut about 30,000 of them in pieces. Hypatius the ufurper, and Pompeius another of the nephews of Anaftafius, were taken prifoners and carried to the emperor, by whofe orders they were both beheaded, and their bodies caft into the fea. Their eftates were confifcated, and likewife the eftates of fuch fenators as had joined with them; but the emperor caufed great part of their lands and effects to be afterwards reftored, together with their honours and dignities, to their children.

Conftantinopolitan hiftory.

96
Great tumult in Conftantinople.

Juftinian having now no other enemy to contend with, turned his arms againft the Vandals in Africa, and the Goths in Italy; both which provinces he recovered out of the hands of the barbarians*. But before his general Belifarius had time to eftablifh fully the Roman power in Italy, he was recalled in order to carry on the war againft Cofrhoes king of Perfia, who, in defiance of the treaty formerly concluded in 532, entered the Roman dominions at the head of a powerful army. The fame year, however, a peace was concluded between the two nations upon the following conditions: 1. That the Romans fhould, within two months, pay to the Perfian king 5000 pounds weight of gold, and an annual penfion of 500. 2. That the Perfians fhould relinquifh all claim to the fortrefs of Daras, and maintain a body of troops to guard the Cafpian gates, and prevent the barbarians from breaking into the empire. 3. That upon payment of the above-mentioned fum, Cofrhoes fhould immediately withdraw his troops from the Roman dominions. The treaty being figned, and the ftipulated fum paid, Cofrhoes began to march back again; but by the way plundered feveral cities as if the war had ftill continued. Hereupon Juftinian refolved to purfue the war with the utmoft vigour; and for that purpofe defpatched

* See *Barbary* and *Goths*.

97
Another war with the Perfians.

Constantinopolitan history.

patched Belisarius into the east. But soon after he was obliged to recal him in order to oppose the Goths who had gained great advantages in Italy after his departure. The Persian war was then carried on with indifferent success till the year 558, when a peace was concluded upon the emperor again paying an immense sum to the enemy. The same year the Huns, passing the Danube in the depth of winter, marched in two bodies directly for Constantinople; and laying waste the countries through which they passed, came, without meeting the least opposition, within 150 furlongs of the city. But Belisarius marching out against them with a handful of men, put them to flight; the emperor, however, to prevent them from invading the empire anew, agreed to pay them an annual tribute, upon their promising to defend the empire against all other barbarians, and to serve in the Roman armies when required. This was the last exploit performed by Belisarius, who on his return to Constantinople was disgraced, stripped of all his employments, and confined to his house, on pretence of a conspiracy against the emperor *. In the year 565 a real conspiracy was formed against Justinian, which he happily escaped, and the conspirators were executed; but the emperor did not long survive it, being carried off by a natural death in 566, in the 39th year of his reign.

98 Peace concluded.

* See *Belisarius*.

During the reign of Justinian, the majesty of the Roman empire seemed to revive. He recovered the provinces of Italy and Africa out of the hands of the barbarians, by whom they had been held for a number of years; but after his death they were soon lost, and the empire tended fast to dissolution. In 569 Italy was conquered by the Lombards, who held it for the space of 200 years. Some amends, however, was made for the loss by the acquisition of *Persarmenia*; the inhabitants of which, being persecuted by the Persians on account of the Christian religion which they professed, revolted to the Romans. This produced a war between the two nations, who continued to weaken each other, till at last the Persian monarchy was utterly overthrown, and that of the Romans greatly reduced by the Saracens †. These new enemies attacked the Romans in the year 632, and pursued their conquests with incredible rapidity. In the space of four years they reduced the provinces of Egypt, Syria, and Palestine. In 648 they were also masters of Mesopotamia, Phœnicia, Africa, Cyprus, Aradus, and Rhodes; and having defeated the Roman fleet, commanded by the emperor Constans in person, they concluded a peace on condition of keeping the vast extent of territory they had seized, and paying for it 1000 nummi a-year.

99 Decline of the empire after Justinian.

† See *Arabia*.

An expedition against the Lombards was about this time undertaken, but with very little success, a body of 20,000 Romans being almost entirely cut off by one of the Lombard generals. In 671 the Saracens ravaged several provinces, made a descent in Sicily, took and plundered the city of Syracuse, and overran the whole island, destroying every thing with fire and sword. In like manner they laid waste Cilicia; and having passed the winter at Smyrna, they entered Thrace in the winter of the year 672, and laid siege to Constantinople itself. Here, however, they were repulsed with great loss: but next spring they renewed their attempt, in which they met with the same bad success; many of their ships being burnt by the *sea-fire*, as it was called, because it burnt under water; and in their return home their fleet was wrecked off the Scyllæan promontory. At last a peace was concluded for 30 years, on condition that the Saracens should retain all the provinces they had seized; and that they should pay to the emperor and his successors 3000 pounds weight of gold, 50 slaves, and as many choice horses.

100 Unsuccessful expedition against the Lombards.

101 Constantinople besieged by the Saracens.

This peace was scarce concluded, when the empire was invaded by a new enemy, who proved very troublesome for a long time. These were the Bulgarians; who breaking into Thrace, defeated the Roman army sent against them, and ravaged the country far and wide. The emperor consented to pay them an annual pension, rather than continue a doubtful war; and allowed them to settle in Lower Mœsia, which from them was afterwards called *Bulgaria*. In 687, they were attacked by Justinian II. who entered their country without provocation, or regarding the treaties formerly concluded with them. But they falling suddenly upon him, drove him out of their country, and obliged him to restore the towns and captives he had taken. In 697, this emperor was deposed; and in his exile fled to Trebelis king of the Bulgarians, by whom he was kindly entertained, and by whose means he was restored to his throne; but soon forgetting this favour, he invaded the country of the Bulgarians, with a design to wrest from them those provinces which he had yielded to them. He was attended in this expedition by no better success than his ingratitude deserved, his army being utterly defeated, and he himself obliged to make his escape in a light vessel to Constantinople. The Bulgarians continued their inroads and ravages at different times, generally defeating the Romans who ventured to oppose them, till the year 800, the seventh of the reign of Nicephorus, when they surprised the city of Sardica in Mœsia, and put the whole garrison, consisting of 6000 men, to the sword. The emperor marched against them with a considerable army: but the enemy retired at his approach; and he, instead of pursuing them, returned to Constantinople. Two years after he entered Bulgaria at the head of a powerful army, destroying every thing with fire and sword. The king offered to conclude a peace with him upon honourable terms; but Nicephorus, rejecting his proposals, continued to waste the country, destroying the cities, and putting all the inhabitants without distinction of sex or age, to the sword. The king was so much affected with these cruelties which were exercised on his subjects, that he sent a second embassy to Nicephorus, offering to conclude a peace with him upon any terms, provided he would quit his country. But Nicephorus dismissing the ambassadors with scorn, the Bulgarian monarch attacked unexpectedly the Roman camp, forced it, and cut off almost the whole army, with the emperor himself, and a great number of patricians. His successor Michael likewise engaged in a war with the Bulgarians; but being utterly defeated, he was so grieved that he resigned the empire. After this the Bulgarians continued to be very formidable enemies to the empire, till the year 979, when they were attacked by Basilius II. The Bulgarians were at that time governed by a king named *Samuel*; who having ravaged the Roman territories,

101 Empire invaded by the Bulgarians

103 They defeat Justinian II.

104 Their country cruelly ravaged by Nicephorus.

105 Who is cut off with his whole army.

106 Their country invaded by Basilius II.

Constantinopolitan history.

tories, as was the common practice of his nation, Basilius sent against him one Nicephorus Uranus at the head of a powerful army. Uranus, leaving his baggage at Lariffa, reached by long marches the Sperchius, and encamped with his whole army over against the enemy, who lay on the opposite bank. As the river was greatly swelled with the heavy rains that had lately fallen, Samuel, not imagining the Romans would attempt to pass it, suffered his troops to roam in large parties about the country in quest of booty. But Uranus having at length found out a place where the river was fordable, passed it in the dead of the night without being perceived. He then fell upon the Bulgarians who were left in the camp, and lay for the most part asleep; cut great numbers of them in pieces; took a great number of prisoners, with all their baggage; and made himself master of their camp. Samuel and his son were dangerously wounded; and would have been taken, had they not all that day concealed themselves among the dead. The next night they stole away to the mountains of Ætolia, and from thence made their escape into Bulgaria. The following year the emperor entered Bulgaria at the head of a numerous and well-disciplined army; defeated Samuel in a pitched battle, and took several strong cities. The emperor himself, however, at last, narrowly escaped being cut off with his whole army; being unexpectedly attacked by the Bulgarians in a narrow pass. From this danger he was relieved by the arrival of Nicephorus Xiphias, governor of Philippopolis, with a considerable body of troops; who falling upon the enemies rear, put them to flight. Basilius pursued them close; and having taken an incredible number of captives, caused their eyes to be pulled out, leaving to every hundred a guide with one eye, that he might conduct them to Samuel. This shocking spectacle so affected the unhappy king, that he fell into a deep swoon, and died two days after. The Roman emperor pursued his conquests, and in the space of two years made himself master of most of the enemies strong holds. He defeated also the successor of Samuel in several engagements; and having at last killed him in battle, the Bulgarians submitted themselves without reserve. The vast treasures of their princes were by Basilius distributed among his soldiers by way of donative. Soon after, the widow of the late king, with her six daughters and three of her sons, surrendered themselves to the Roman emperor, by whom they were received with the utmost civility and respect. This obliging behaviour encouraged the three other sons of the late king, and most of the princes of the blood, who had taken shelter in the mountains, to submit, and throw themselves in the emperor's mercy.

[107 His ... cruelty] [108 The country ... subdued.]

[109 Ibatzes ... holds out]

Ibatzes, however, a person nearly allied to the royal family, who had distinguished himself in a very eminent manner during the whole course of the war, refused to submit, and fled to a steep and craggy mountain with a design to defend himself there to the last extremity. Basilius endeavoured to cause him submit by fair means, but he equally despised both threats and promises. At last Eustathius Daphnomelus, whom Basilius had lately appointed governor of Achridus, the chief city of Bulgaria, undertook to secure him by a most desperate and improbable scheme. Without communicating his design to any, he repaired, with two persons in whom he could confide, to the mountain on which Ibatzes had fortified himself. He hoped to pass undiscovered among the many strangers who flocked thither to celebrate the approaching feast of the Virgin Mary, for whom Ibatzes had a particular veneration. In this he found himself mistaken; for he was known by the guards, and carried before the prince. To him he pretended to have something of importance to communicate; but as soon as Ibatzes had retired with him into a remote place, Daphnomelus threw himself suddenly upon him, and with the assistance of the two men whom he had brought with him, pulled out both his eyes, and got safe to an abandoned castle on the top of the hill. Here they were immediately surrounded by the troops of Ibatzes; but Daphnomelus exhorting them now to submit to the emperor, by whom he assured them they would be well received, they congratulated Daphnomelus on his success, and suffered him to conduct the unhappy Ibatzes a prisoner to Basilius. The emperor was no less surprised than pleased at the success of the bold attempt; and rewarded Daphnomelus with the government of Dyrrhachium, and all the rich moveables of his prisoner. After this, having accomplished the entire reduction of Bulgaria, he returned to Constantinople with an incredible number of captives, where he was received by the senate and people with all possible demonstrations of joy.

[110 He taken by stratagem.]

111 The empire invaded by the Turks.

All this time the Saracens had at intervals invaded the Roman diminions, and even attempted to make themselves masters of Constantinople. Their internal divisions, however, rendered them now much less formidable enemies than they had formerly been; so that some provinces were even recovered for a time out of their hands; though the weak and distracted state of the empire rendered it impossible to preserve such conquests. But in 1041, the empire was invaded by an enemy, not very powerful at that time indeed, but who by degrees gathered strength sufficient to overthrow both the Roman and Saracen empires. These were the Turks; who having quitted their ancient habitations in the neighbourhood of Mount Caucasus, and passed the Caspian straits, settled in Armenia Major, about the year 844. There they continued an unknown and despicable people, till the intestine wars of the Saracens gave them an opportunity of aggrandizing themselves. About the year 1030, Mohammed the son of Sambrael sultan of Persia, not finding himself a match for Pisaris sultan of Babylon, with whom he was at war, had recourse to the Turks, who sent him 3000 men under the command of Tangrolipix, a leading man among them. By their assistance Mohammed defeated his adversary; but when the Turks desired leave to return home, he refused to part with them. Upon this they withdrew without his consent to a neighbouring desert; and being there joined by several discontented Persians, began to make frequent inroads into the sultan's territories. Against them Mohammed immediately dispatched an army of 20,000 men; who being surprised in the night, were utterly defeated by Tangrolipix. The fame of this victory drew multitudes to him from all parts; so that in a short time Tangrolipix saw himself at the head of 50,000 men. Upon this Mohammed marched against them in person,

112 Account of them.

Conſtan-tinopolitan hiſtory.

ſon, but was thrown from his horſe in the beginning of the engagement, and killed by the fall; upon which his men threw down their arms, and ſubmitted to Tangrolipix.

After this victory the Turkiſh general made war upon the ſultan of Babylon; whom he at length ſlew, and annexed his dominions to his own. He then ſent his nephew, named *Cutlu-Moſes*, againſt the Arabians; but by them he was defeated, and forced to fly towards Media. Through this province he was denied a paſſage by Stephen the Roman governor; upon which Cutlu-Moſes was obliged to force a paſſage by encountering the Roman army. Theſe he put to flight, took the governor himſelf priſoner, and without any further oppoſition reached the confines of Perſia, where he ſold Stephen for a ſlave. Returning from thence to Tangrolipix, he excuſed, in the beſt manner he could, his defeat by the Arabians; but at the ſame time acquainted him with his victory over the Romans in Media, encouraging him to invade that fertile country, which he ſaid might be eaſily conquered, as it was inhabited by none but *women*, meaning the Romans. At that time Tangrolipix, did not hearken to his advice, but marched againſt the Arabians at the head of a numerous army. He was, however, attended with no better ſucceſs than his nephew had been; and therefore began to reflect on what he had told him. Soon after he ſent Aſan his brother's ſon with an army of 20,000 men to reduce Media. Purſuant to his orders, the young prince entered that country, and committed everywhere dreadful ravages; but being in the end drawn into an ambuſh by the Roman generals, he was cut off with his whole army. Tangrolipix, no way diſcouraged by this misfortune, ſent a new army into Media near 100,000 ſtrong; who, after having ravaged the country without oppoſition, laid ſiege to Artza a place of great trade, and therefore reckoned the moſt wealthy in thoſe parts. Not being able to reduce it by any other means, they ſet it on fire; and thus in a ſhort time it was utterly deſtroyed: the buildings being reduced to aſhes, and 150,000 of the inhabitants periſhed either by the flames or the ſword. After this Abraham Halim, half-brother to Tangrolipix, hearing that the Romans, reinforced with a body of troops under the command of Liparites governor of Iberia, had taken the field, marched againſt them, and offered them battle; which they not declining, the two armies engaged with incredible fury. The victory continued long doubtful; but at length inclined to the Romans; who nevertheleſs did not think proper to purſue the fugitives, as their general Liparites was taken priſoner. The emperor, greatly concerned for the captivity of Liparites, diſpatched ambaſſadors with rich preſents, and a large ſum of money to redeem him, and at the ſame time to conclude an alliance with Tangrolipix. The ſultan received the preſents; but generouſly returned them together with the money to Liparites, whom he ſet at liberty without any ranſom; only requiring him, at his departure, never more to bear arms againſt the Turks. Not long after, Tangrolipix ſent a perſon of great authority among the Turks, with the character of ambaſſador, to Conſtantinople; who having arrogantly exhorted the emperor to ſubmit to his maſter, and acknowledge himſelf his tributary, was ignominiouſly driven out of the city.

113 They defeat the Romans.

114 A Turkiſh army entirely cut off.

115 They again invade the empire.

116 An obſtinate engagement.

Tangrolipix, highly affronted at the reception his ambaſſador had met with, entered Iberia while the emperor Conſtantine Monomachus was engaged in a war with the Patzinacæ, a Scythian nation. Having ravaged that country, he returned from thence to Media, and laid ſiege to Mantzichierta, a place defended by a numerous garriſon, and fortified with a triple wall and deep ditches. However, as it was ſituated in an open plain country, he hoped to be maſter of it in a ſhort time. But finding the beſieged determined to defend themſelves to the laſt extremity, he reſolved to raiſe the ſiege, after he had continued it 30 days. One of his officers, however, named *Alcan*, prevailed on him to continue it but one day longer, and to commit the management of the attacks to him. This being granted, Alcan diſpoſed his men with ſuch ſkill and ſo encouraged them by his example, that, notwithſtanding the vigorous oppoſition they met with, the place would have probably been taken, had not Alcan been ſlain as he was mounting the wall. The beſieged, knowing him by the richneſs of his armour, drew him by the hair into the city, and cutting off his head threw it over the wall among the enemy; which ſo diſheartened them, that they gave over the aſſault and retired. The next ſpring Tangrolipix returned, and ravaged Iberia with the utmoſt cruelty, ſparing neither ſex nor age. But on the approach of the Roman army he retired to Tauris, leaving 30,000 men behind him to infeſt the frontiers of the empire. This they did with great ſucceſs, the borders being through the avarice of Monomachus unguarded. Till the time of this emperor, the provinces bordering on the countries of the barbarians had maintained, at their own charge, forces to defend them; and were on that account exempted from paying tribute; but as Monomachus exacted from them the ſame ſums that were paid by others, they were no longer in a condition to defend themſelves.

Conſt. tinopol. hiſtor.

117 The Tu. beſiege Mantzi. erta.

118 The ſie. raiſed.

In 1062 died the emperor Conſtantine Ducas, having left the empire to his three ſons, Michael, Andronicus, and Conſtantine; but as they were all very young, he appointed the empreſs Eudocia, regent during their minority, after having required of her an oath never to marry; which oath was with great ſolemnity lodged in the hands of the patriarch. He likewiſe obliged the ſenators ſolemnly to ſwear that they would acknowledge none for their ſovereign but his three ſons. No ſooner, however, was he dead, than the Turks, hearing that the empire was governed by a woman, broke into Meſopotamia, Cilicia, and Cappadocia, deſtroying all with fire and ſword. The empreſs was no way in a condition to oppoſe them, the greater part of the army having been diſbanded in her huſband's life-time, and the troops that were ſtill on foot being undiſciplined, and altogether unfit for ſervice. The concern which this gave the empreſs was aggravated by the ſeditious ſpeeches of a diſcontented party at home, who repeated on all occaſions that the preſent ſtate of affairs required a man of courage and addreſs at the helm, inſtead of a weak and helpleſs woman; and as they imagined the empreſs would never think of marrying, in conſequence of the oath ſhe had

11[9] The em. preſs E. cia for. to ſwe. that ſh. will n. marry.

had taken, they hoped by theſe ſpeeches to induce the people to revolt, and chooſe a new emperor. This Eudocia was aware of; and therefore determined to prevent the evils that threatened herſelf and her family, by marrying ſome perſon of merit who was capable of defeating her enemies both at home and abroad. At this time one Romanus Diogenes, a perſon of a moſt beautiful aſpect, extraordinary parts, and illuſtrious birth, being accuſed of aſpiring to the empire, tried and convicted, was brought forth to receive ſentence of death. But the empreſs, touched with compaſſion at his appearance, gently upbraided him with his ambition, ſet him at liberty, and ſoon after appointed him commander in chief of all her forces. In this ſtation he acquitted himſelf ſo well, that the empreſs reſolved to marry him if ſhe could but recover the writing in which her oath was contained out of the hands of the patriarch. In order to this, ſhe applied to a favourite eunuch; who going to the patriarch, told him that the empreſs was ſo taken with his nephew named *Bardaſs*, that ſhe was determined to marry and raiſe him to the empire, provided the patriarch abſolved her from the oath ſhe had taken, and convinced the ſenate of the lawfulneſs of her marriage. The patriarch, dazzled with the proſpect of his nephew's promotion, readily undertook to perform both. He firſt obtained the conſent of the ſenate by repreſenting to them the dangerous ſtate of the empire, and exclaiming againſt the raſh oath which the jealouſy of the late emperor had extorted from the empreſs. He then publicly diſcharged her from it; reſtored the writing to her; and exhorted her to marry ſome deſerving object, who being entruſted with an abſolute authority, might be capable of defending the empire. The empreſs, thus diſcharged from her oath, married a few days after Romanus Diogenes; who was thereupon proclaimed emperor, to the great diſappointment of the patriarch.

As the new emperor was a man of great activity and experience in war, he no ſooner ſaw himſelf veſted with the ſovereign power, than he took upon him the command of the army, and paſſed over into Aſia with the few forces he could aſſemble, recruiting and inuring them on his march to military diſcipline, which had been utterly neglected in the preceding reigns. On his arrival in that continent, he was informed that the Turks had ſurpriſed and plundered the city of Neocæſarea, and were retiring with their booty. On this news he haſtened after them at the head of a choſen body of light-armed troops, and came up with them on the third day. As the Turks were marching in diſorder, without the leaſt apprehenſion of an enemy, Romanus cut great numbers of them in pieces, and eaſily recovered the booty; after which he purſued his march to Aleppo, which he retook from them, together with Hierapolis, where he built a ſtrong caſtle.

As he was returning to join the forces he had left behind him, he was met by a numerous body of Turks who attempted to cut off his retreat. At firſt he pretended to decline an engagement through fear; but attacked them afterwards with ſuch vigour when they leaſt expected it, that he put them to flight at the firſt onſet, and might have gained a complete victory had he thought proper to purſue them. After this, ſeveral towns ſubmitted to him; but the ſeaſon being now far ſpent, the emperor returned to Conſtantinople. The following year he paſſed over into Aſia early in the ſpring; and being informed that the Turks had ſacked the rich city of Iconium, beſides gaining other conſiderable advantages, he marched in perſon againſt them. But the Turks, not thinking it adviſable to wait his coming, retired in great haſte. The Armenians, however, encouraged by the approach of the emperor's army, fell upon the enemy in the plains of Tarſus, put them to flight, and ſtripped them both of their baggage and the booty they had taken. The ſpring following the emperor once more entered Aſia at the head of a conſiderable army which he had raiſed, and with incredible pains diſciplined during the winter. When the two armies drew near to each other, Axan, the Turkiſh ſultan, and ſon of the famous Tangrolipix, ſent propoſals to Romanus for a laſting and honourable peace. Theſe were imprudently rejected, and a deſperate engagement enſued, when, in ſpite of the utmoſt efforts of the emperor, his army was routed, and he himſelf wounded and taken priſoner. When this news was brought to Axan, he could ſcarcely believe it; but being convinced by the appearance of the royal captive in his preſence, he tenderly embraced him, and addreſſed him in an affectionate manner: "Grieve not (ſaid he), moſt noble emperor, at your misfortune; for ſuch is the chance of war, ſometimes overwhelming one, and ſometimes another; you ſhall have no occaſion to complain of your captivity; for I will not uſe you as my priſoner, but as an emperor." The Turk was as good as his word. He lodged the emperor in a royal pavilion; aſſigned him attendants with an equipage ſuitable to his quality; and diſcharged ſuch priſoners as he deſired. After he had for ſome days entertained his royal captive with extraordinary magnificence, a perpetual peace was concluded betwixt them, and the emperor diſmiſſed with the greateſt marks of honour imaginable. He then ſet out with the Turkiſh ambaſſador for Conſtantinople, where the peace was to be ratified; but by the way he was informed that Eudocia had been driven from the throne by John the brother of Conſtantine Ducas, and Pſellus a leading man in the ſenate, who had confined her to a monaſtery, and proclaimed her eldeſt ſon, Michael Ducas, emperor. On this intelligence, Romanus retired to a ſtrong caſtle near Theodoſiopolis, where he hoped in a ſhort time to be joined by great numbers of his friends and adherents. But in the mean time John, who had taken upon him to act as guardian to the young prince, deſpatched Andronicus with a conſiderable army againſt him. Andronicus having eaſily defeated the ſmall army which Romanus had with him, obliged him to fly to Adana a city in Cilicia, where he was cloſely beſieged, and at laſt obliged to ſurrender. Andronicus carried his priſoner into Phrygia, where he fell dangerouſly ill, being, as was ſuſpected, ſecretly poiſoned. But the poiſon being too ſlow in its operation, John ordered his eyes to be put out; which was done with ſuch cruelty that he died ſoon after, in the year 1067, having reigned three years and eight months.

Axan was no ſooner informed of the tragical end of his friend and ally, than he reſolved to invade the empire

Conſtantinopolitan hiſtory.

126 They are again defeated.

127 The Romans defeated and the emperor taken.

128 Eudocia depoſed and confined in a monaſtery.

129 Romanus put to death.

130 The Turks again invade the empire.

Constantinopolitan history.

empire anew; and that not with a design only to plunder as formerly, but to conquer, and keep what he had once conquered. The emperor dispatched against him Isaac Comnenus, with a considerable army; but he was utterly defeated and taken prisoner by Axan. Another army was quickly set off under the command of John Ducas the emperor's uncle. He gained at first some advantages, and would probably have put a stop to their conquests, had not one Ruselius, or Urselius, revolted with the troops he had under his command, caused himself to be proclaimed emperor, and reduced several cities in Phrygia and Cappadocia. Against him John marched with all his forces, suffering the Turks in the mean time to pursue their conquests; but coming to an engagement with the rebels, his army was entirely defeated and himself taken prisoner. Notwithstanding this victory, Ruselius was so much alarmed at the progress of the Turks, that he not only released his prisoner, but joined with him against the common enemy, by whom they were both defeated and taken prisoners. Axan, however, was for some time prevented from pursuing his conquest by Cutlu-Moses, nephew to the late Tangrolipix. He had revolted against his uncle; but being defeated by him in a pitched battle, had taken refuge in Arabia, whence he now returned at the head of a considerable army in order to dispute the sovereignty with Axan. But while the two armies were preparing to engage, the caliph of Babylon, who was still looked upon as the successor of the great prophet, interposed his authority. He represented the dangers of their intestine dissensions; and by his mediation, an agreement was at last concluded, on condition that Axan should enjoy undisturbed the monarchy lately left him by his father, and Cutlu-Moses should possess such provinces of the Roman empire as he or his sons should in process of time conquer.

131 They defeat the Romans.

132 They gain a second victory.

133 They conquer several provinces.

After this agreement, both the Turkish princes turned their forces against the empire; and before the year 1077, made themselves masters of all Media, Lycaonia, Cappadocia, and Bithynia, fixing the capital city of their empire at Nice in the latter province. During all this time, the emperors of Constantinople, as well as their subjects, seemed to be in a manner infatuated. No notice was taken of the great progress made by these barbarians. The generals were ambitious only of seizing the tottering empire, which seemed ready to fall a prey to the Turks; and, after it was obtained, spent their time in oppressing their subjects, rather than in making any attempts to repulse the enemy.

134 Alexius Comnenus stops their progress.

At last Alexius Comnenus, having wrested the empire from Nicephorus Botoniates, in 1077, began to prepare for opposing so formidable an enemy. But before he set out, as his soldiers had committed great outrages on his accession to the empire, he resolved to make confession of his sins, and do open penance for those he had suffered his army to commit. Accordingly he appeared in the attire of a penitent before the patriarch and several other ecclesiastics, acknowledged himself guilty of the many disorders that had been committed by his soldiers, and begged of the patriarch to impose upon him a penance suitable to the greatness of his crimes. The penance enjoined him and his adherents by the patriarch was to fast, lie upon the ground, and practise several other austerities for the space of 40 days. This command was religiously obeyed, and the emperor then began to prepare for war with so much vigour, that Solyman, the Turkish sultan, son and successor to Cutlu-Moses, dispatched ambassadors to Alexius with proposals of peace. These were at first rejected; but the emperor was at last glad to accept them, on certain advice that Robert Guischard, duke of Puglia and Calabria, was making great preparations against him in the west.

135 Robert Guischard's expedition against the emperor.

To this expedition Robert was incited by Michael Ducas. That prince had been deposed by Nicephorus Botoniates, and towards the end of the usurper's reign fled into the west, where he was received by Robert, who was prevailed upon to favour his cause. For this purpose, Robert made great preparations; and these were continued even after the deposition of Botoniates. He sailed with all his forces from Brundusium; and landing at Buthrotum in Epirus, made himself master of that place, while his son Bohemond with part of the army reduced Aulon, a celebrated port and city in the country now called *Albania*. From thence they advanced to Dyrrhachium, which they invested both by sea and land; but met with a most vigorous opposition from George Paleologus, whom the emperor had entrusted with the defence of that important place. In spite of the utmost efforts of the enemy, this commander held out till the arrival of the Venetian fleet, by whom Robert's navy, commanded by Bohemond, was utterly defeated, the admiral himself having narrowly escaped being taken prisoner. After the victory, the Venetians landed without loss of time, and being joined by Paleologus's men, fell upon Robert's troops with such fury, that they destroyed their works, burnt their engines, and forced them back to their camp in great disorder. As the Venetians were now masters at sea, the besieged were supplied with plenty of provisions, while a famine began to rage in the camp of the enemy; and this calamity was soon followed by a plague, which in the space of three months is said to have destroyed ten thousand men. Notwithstanding all these disasters, however, Robert did not abandon the siege: having found means to supply his famished troops with provisions, he continued it with such vigour, that the courage of the besieged began at last to fail them; and Paleologus sent repeated messages to the emperor, acquainting him that he would be obliged to surrender unless very speedily assisted. On this Alexius marched in person to the relief of the city, but was defeated with great loss by Robert. The whole right wing of Alexius's army, finding themselves hard pressed by the enemy, fled to a church dedicated to St Michael, imagining they would there find themselves in a place of safety; but the victorious army pursuing them, set fire to the church, which was burnt to ashes with all who were in it. The emperor himself with great difficulty made his escape, leaving the enemy masters of his camp and all his baggage. Soon after this defeat, the city surrendered; and Alexius being destitute of resources for carrying on the war, seized on the wealth of churches, and monasteries, which gave much offence to the clergy, and had like to have occasioned great disturbances in the imperial city. At the same time, Alexius entering into an alliance with Henry emperor of Germany, persuaded

136 He passes over into Epirus and besieges Dyrrhachium.

persuaded him to invade the dominions of Robert in Italy. At first Henry met with great success; but was soon overcome, and driven out of that country by Robert. Bohemond, in the mean time, reduced several places in Illyricum; and, having defeated Alexius in two pitched battles, entered Thessaly, and sat down before Larissa. This place, being defended by an officer of great courage and experience in war, held out till the emperor came to its relief. Soon after his arrival, he found means to draw a strong party of Bohemond's men into an ambuscade, and cut them off almost entirely. However, in the battle which was fought a few days after, Bohemond had the advantage; but his troops mutinying and refusing to carry on the war, he was obliged to return to Italy. Alexius taking advantage of his absence, recovered several cities; and being informed that Robert was making great preparations against him, he had recourse once more to the Venetians. By them he was assisted with a powerful fleet, which defeated that of Robert in two engagements; but being soon after surprised by him, they were defeated with the loss of almost their whole navy. Robert is said to have used his victory with great barbarity, putting many of his prisoners to death with unheard-of torments. The Venetians equipped a second fleet; and joining that of the emperor, fell unexpectedly upon Robert's navy, who were riding without the least apprehensions in Buthrotum, sunk most of his ships, and took a great number of prisoners, his wife and younger sons having narrowly escaped falling into their hands. Robert made great preparations to revenge this defeat; but was prevented by death from executing his designs; and, after his decease, his son Roger did not think proper to pursue so dangerous and expensive a war. He therefore recalled his troops, and the places which had been conquered by Robert and Bohemond submitted anew to the emperor.

This war was scarce ended, when the Scythians passing the Danube laid waste great part of Thrace, committing everywhere the greatest barbarities. Against them the emperor dispatched an army under the command of Pacurianus and Branas. The latter insisted upon engaging the enemy, contrary to the opinion of his colleague; and his rashness caused the loss of the greater part of the army, who were cut off by the Scythians, together with the two generals. *Talicius*, an officer who had signalized himself on many occasions, was appointed to command the army in their room. He fell upon the enemy as they lay securely in the neighbourhood of Philippopolis, cut great numbers of them in pieces, and obliged the rest to retire in great confusion. The following spring, however, they returned in such numbers, that the emperor resolved to march against them in person. Accordingly he set out for Adrianople, and from thence to a place called *Lardea*. Here, contrary to the advice of his best officers, he ventured a battle; in which he was utterly defeated with the loss of vast numbers of his men, he himself escaping with the utmost difficulty. The next year he was attended with no better success, his army being entirely defeated with the loss of his camp and baggage. In the year following, 1084, the emperor retrieved his credit; and gave the Scythians such an overthrow, that very few escaped the general slaughter.

Notwithstanding this disaster, however, they again invaded the empire in 1093. To this they were encouraged by an impostor called *Leo*, who pretended to be the eldest son of Romanus Diogenes. The young prince had been slain in a battle with the Turks; but as the Scythians only wanted a pretence to renew the war, they received the impostor with joy. By a stratagem, however, Leo was murdered; and the Scythians being afterwards overthrown in two great battles, were obliged to submit on the emperor's own terms.

142 The Holy War.

Since the year 1083, the war had been carried on with the Turks with various success; but now an association was formed in the west against these infidels, which threatened the utter ruin of the Turkish nation. This was occasioned by the superstition of the Christians, who thought it a meritorious action to venture their lives for the recovery of the Holy Land, possessed at that time by the Turks and Saracens. Had the western princes been properly assisted by the emperors of the East in this undertaking, the Turks had undoubtedly been unable to resist them; but so far from this, the Latins were looked upon by them as no less enemies than the Turks; and indeed whatever places they took from the infidels, they never thought of restoring to the emperors of Constantinople, to whom they originally belonged, but erected a number of small independent principalities; which neither having sufficient strength to defend themselves, nor being properly supported by one another, soon became a prey to the Turks. In the year 1203, happened a dreadful fire at Constantinople, occasioned by some Latin soldiers. These had plundered a mosque, which the Turks residing in Constantinople had been suffered to build there. For this reason they were attacked by the infidels; who being much superior to them in number, the Latins found themselves obliged to set fire to some houses, in order to make their escape with safety. The flame spreading in an instant from street to street, reduced in a short time great part of the city to ashes, with the capacious store-houses which had been built at a vast expence on the quay. The late emperor Isaac Angelus who had been restored to his throne by the Latins, died soon after their departure from Constantinople, leaving his son Alexius sole master of the empire. The young prince, to discharge the large sums he had promised the French and Venetians for their assistance, was obliged to lay heavy taxes on his subjects; and this, with the great esteem and friendship showed to his deliverers, raised a general discontent among the people of Constantinople, who were sworn enemies to the Latins. This encouraged John Ducas, surnamed *Murtzuphlus*, from his joined and thick eyebrows, to attempt the sovereignty. Unhappily he found means to put his treacherous designs in execution; and strangled the young prince with his own hands. After this he presented himself to the people; told them what he had done, which he pretended was in order to secure their liberties; and earnestly intreated them to choose an emperor who had courage enough to defend them against the Latins that were ready to oppress and enslave them. On this he was instantly saluted emperor by the inconstant multitude; but this usurpation proved the ruin of the city. The Latins immediately resolved to revenge the death of the

143 Dreadful fire at Constantinople.

144 Murtzuphlus strangles the emperor.

Constantinopolitan history.

the young prince; and, as they had been so often betrayed and retarded in their expeditions to the Holy Land by the emperors of Constantinople, to make themselves masters of that city, and seize the empire for themselves. In consequence of this resolution they mustered all their forces in Asia, and having crossed the straits, laid siege to Constantinople by sea and land. The tyrant, who was a man of great courage and experience in war, made a vigorous defence. The Latins, however, after having battered the walls for several days together with an incredible number of engines, gave a general assault on the 8th of April 1204. The attack lasted from break of day till three in the afternoon, when they were forced to retire, after having lost some of their engines, and a great number of men. The assault was nevertheless renewed four days after; when, after a warm dispute, the French planted their standard on one of the towers; which the Venetians observing, they quickly made themselves masters of four other towers, where they likewise displayed their ensigns. In the mean time three of the gates being broken down by the battering rams, and those who had scaled the walls having killed the guards, and opened the gates between the towers they had taken, the whole army entered, and drew up in battle array between the walls. The Greeks fled up and down in the greatest confusion; and several parties were by the Latins dispatched to scour the streets, who put all they met to the sword, without distinction of age or condition. Night put a stop to the dreadful slaughter, when the princes sounding the retreat, placed their men in different quarters of the city, with orders to be upon their guard, not doubting but they should be attacked early next morning. They were surprised, however, at that time by the entire submission of the Greeks; to whom they promised their lives, but at the same time ordering them to retire to their houses, they gave up the city to be plundered by the soldiers for that day. They strictly enjoined their men to abstain from slaughter, to preserve the honour of the women, and to bring the whole booty into one place, that a just distribution might be made according to the rank and merit of each individual. The Greeks had undoubtedly concealed their most valuable effects during the night; many persons of the first rank had escaped, and carried along with them immense treasures; the soldiers had propably, as is usual in all such cases, reserved things of great value for themselves, notwithstanding all prohibitions to the contrary; and yet the booty, without the statues, pictures, and jewels, amounted to a sum almost incredible. As for Murtzuphlus, he made his escape in the night; embarking in a small vessel with *Euphrosyne*, the wife of *Alexius Angelus* a late usurper, and her daughter *Eudoxia*, for whose sake he had abandoned his lawful wife.

145 The city taken and plundered by the Latins.

146 The Latins expelled.

Constantinople continued subject to the Latins till the year 1261, when they were expelled by one *Alexius Strategopulus*. He was a person of an illustrious family; and, for his eminent services, distinguished with the title of *Cæsar*. He had been sent against Alexius Angelus despot of Epirus, who now attempted to recover some places in Thessaly and Greece from Michael Paleologus, one of the Greek emperors, that since the capture of Constantinople, had kept their court at Nice; and to try whether he could on his march surprise the imperial city itself. Alexius, having passed the straits, encamped at a place called *Rhegium*, where he was informed by the natives that a strong body of the Latins had been sent to the siege of *Daphnusa*, that the garrison was in great want of provisions, and that it would be no difficult matter to surprise the city. Hereupon the Greek general resolved at all events to attempt it: in which he was encouraged by some of the inhabitants, who, coming privately to his camp, offered themselves to be his guides. He approached the walls in the dead of the night, which some of his men scaled without being observed; and, killing the sentries, whom they found asleep, opened one of the gates to the rest of the army. The Greeks rushing in, put all they met to the sword; and at the same time, to create more terror, set fire to the city in four different places. The Latins, concluding from thence that the enemy's forces were far more numerous than they really were, did not so much as attempt either to drive them out or to extinguish the flames. In this general confusion, the emperor Baldwin, quitting the ensigns of majesty, fled with Justinian the Latin patriarch, and some of his intimate friends, to the sea-side; and there, embarking in a small vessel, sailed first to Eubœa, and afterwards to Venice, leaving the Greeks in full possession of Constantinople. When news of this surprising and altogether unexpected success of Alexius were first brought to Paleologus, he could scarce give credit to it; but receiving soon after letters from Alexius himself, with a particular account of so memorable an event, he ordered public thanks to be returned in all the churches, appeared in public in his imperial robes, attended by the nobility in their best apparel, and ordered couriers to be dispatched with the agreeable news into all parts of the empire.

147 Entry of Michael Paleologus into the city.

Soon after, having settled his affairs at Nice, he set out for Constantinople with the empress, his son Andronicus, the senate, and nobility, to take possession of the imperial city, and fix his residence in that place that had originally been designed for the seat of the eastern empire. Having passed the straits, he advanced to the *golden gate*, and continued some days without the walls, while the citizens were busied in making the necessary preparations to receive him with a magnificence suitable to the occasion. On the day appointed, the golden gate, which had been long shut up, was opened, and the emperor entering it amidst the repeated acclamations of the multitude, marched on foot to the great palace. He was preceded by the bishop of *Cyzicus*, who carried an image of the Virgin Mary, supposed to have been done by St Luke, and followed by all the great officers, nobility, and chief citizens, pompously dressed. Public thanks were again returned in the church of St Sophia, at which the emperor assisted in person, with the clergy, the senate, and nobility. These exercises were succeeded by all sorts of rejoicings; after which the emperor carefully surveyed the imperial city. This survey greatly allayed his joy. He saw the stately palaces and other magnificent buildings of the Roman emperors lying in ruins; the many capacious buildings that had been erected by his predecessors, at an immense charge, destroyed by fire, and other unavoidable accidents of war;

148 He resolves to restore it to its former grandeur.

war; ſeveral ſtreets abandoned by the inhabitants, and choked up with rubbiſh, &c. Theſe objects gave the emperor no ſmall concern, and kindled in him a deſire of reſtoring the city to its former luſtre. In the meantime, looking upon Alexius as the reſtorer of his country, he cauſed him to be clad in magnificent robes; placed with his own hand a crown on his head; ordered him to be conducted through the city, as it were in triumph; decreed that for a whole year the name of Alexius ſhould be joined in the public prayers with his own; and to perpetuate the memory of ſo great and glorious an action, he commanded his ſtatue to be erected on a ſtately pillar of marble before the church of the Apoſtles. His next care was to re-people the city, many Greek families having withdrawn from it while it was held by the Latins, and the Latins now preparing to return to their reſpective countries. The former were recalled home; and the latter, in regard of the great trade they carried on, were allowed many valuable privileges, which induced them not to remove. The Greeks were allowed to live in one of the moſt beautiful quarters of the city, to be governed by their own laws and magiſtrates, and to trade without paying cuſtoms or taxes of any kind. Great privileges were likewiſe granted to the natives of Venice and Piſa, which encouraged them to lay aſide all thoughts of removing; and the trade they carried on proved afterwards highly advantageous to the ſtate.

It was not long, however, before theſe regulations were altered. The emperor being ſoon after informed that Baldwin, lately expelled from Conſtantinople, had married his daughter to Charles king of Sicily, and given him, by way of dowry, the imperial city itſelf, he ordered the Genoeſe, who were become very numerous, to remove firſt to Heraclia, and afterwards to Galata, where they continued. As for the Piſans and Venetians, who were not ſo numerous and wealthy, they were allowed to continue in the city. Paleologus, though he had cauſed himſelf to be proclaimed emperor, and was poſſeſſed of abſolute ſovereignty, was as yet only guardian to the young emperor John Laſcaris, then about 12 years of age. But having now ſettled the ſtate, and having gained the affections both of natives and foreigners, he began to think of ſecuring himſelf and his poſterity in the full enjoyment of the empire; and for this reaſon cruelly ordered the eyes of the young prince to be put out, pretending that none but himſelf had any right to the city or empire of Conſtantinople, which he alone had recovered out of the hands of the Latins.

This piece of treachery and inhumanity involved him in great troubles. The patriarch immediately excommunicated him: and he would in all probability have been driven from the throne by a combination of the weſtern princes, had he not engaged Pope Urban IV. to eſpouſe his cauſe, by promiſing to ſubmit himſelf and his dominions to the Latin church. Thus, indeed, he diverted the preſent ſtorm; but this proceeding cauſed the greateſt diſturbances, not only in Conſtantinople, but throughout the whole empire, nor was Paleologus able to reconcile his ſubjects to this union.

In 1283 Michael died, and was ſucceeded by his ſon Andronicus. His firſt ſtep was to reſtore the ancient Greek ceremonies, thinking he could not begin his reign with a more popular act. But thus he involved himſelf in difficulties ſtill greater than before. Though Michael had not been able fully to reconcile his Greek ſubjects to the Latin ceremonies, yet he had in ſome degree accompliſhed his purpoſe. The Latins had got a conſiderable footing in the city, and defended their ceremonies with great obſtinacy; ſo that the empire was again thrown into a ferment by this imprudent ſtep.

152
War with the Turks.

All this time the Turks had been continuing their encroachments on the empire, which, had it not been for the cruſades publiſhed againſt them by the pope, they would in all probability have made themſelves maſters of before this time. They were now, however, very ſucceſsfully oppoſed by Conſtantine the emperor's brother: but his valour rendered him ſuſpected by the emperor; in conſequence of which he was thrown into priſon, along with ſeveral perſons of great diſtinction. On the removal of this brave commander, the Turks, under the famous Othoman, made themſelves maſters of ſeveral places in Phrygia, Caria, and Bithynia; and, among the reſt, of the city of Nice. To put a ſtop to their conqueſts, the emperor diſpatched againſt them Philanthropenus and Libadarius, two officers of great experience in war. The former gained ſome advantages over the enemy; but being elated with his ſucceſs, cauſed himſelf to be proclaimed emperor. This rebellion, however, was ſoon ſuppreſſed, Philanthropenus being betrayed by his own men; but the Turks taking advantage of theſe inteſtine commotions, not only extended their dominions in Aſia, but conquered moſt of the iſlands in the Mediterranean; and, being maſters at ſea, infeſted the coaſts of the empire, to the utter ruin of trade and commerce.

From this time the Roman empire tended faſt to diſſolution. After the revolt of Philanthropenus, the emperor could no longer truſt his ſubjects, and therefore hired the Maſſagetes to aſſiſt him: but they, behaving in a careleſs manner, were firſt defeated by their enemies, and afterwards turned their arms againſt thoſe they came to aſſiſt. He next applied to the Catalans, who behaved in the ſame manner; and having ravaged the few places left the emperor in Aſia, returned into Europe, and called the Turks to their aſſiſtance.

153
Their firſt appearance in Europe.

This happened in the year 1292, and was the firſt appearance of the Turks in Europe. This enterpriſe, however, was unſucceſsful. Having loaded themſelves with booty, they offered to depart quietly if they were allowed a ſafe paſſage, and ſhips to tranſport them to Aſia. To this the emperor, willing to get rid of ſuch troubleſome gueſts, readily conſented, and ordered the veſſels to be got ready with all poſſible expedition. But the Greek officers obſerving the immenſe booty with which they were loaded, reſolved to fall upon them in the night, and cut them all off at once. This ſcheme, however, was not managed with ſuch ſecrecy but that the Turks had notice of it, and therefore prepared for their defence. They firſt ſurpriſed a ſtrong caſtle in the neighbourhood, and then found means to acquaint their countrymen in Aſia with their dangerous ſituation. Their brethren, enticed with the hopes of booty, were not long in coming to their aſſiſtance; and having croſſed the Helleſpont in great numbers, ravaged

Constantinopolitan history.

ravaged the adjacent country, making excurſions to the very gates of Conſtantinople. At laſt the emperor determined to root them out; and accordingly marched againſt them with all his forces, the country people flocking to him from all quarters. The Turks at firſt gave themſelves over for loſt; but finding the Greeks negligent of diſcipline, they attacked their army unexpectedly, utterly defeated it, and made themſelves maſters of the camp. After this unexpected victory, they continued for two years to ravage Thrace in the moſt terrible manner. At laſt, however, they were defeated; and being afterwards ſhut up in the Cherſoneſus, they were all cut in pieces or taken.

154 They are all cut in pieces or taken.

Soon after new commotions took place in this unhappy empire, of which the Turks did not fail to take the advantage. In 1327 they made themſelves maſters of moſt of the cities on the Mæander; and, among the reſt, of the ſtrong and important city of Pruſa in Bithynia. The next year, however, Othoman, who may juſtly be ſtyled the founder of the Turkiſh monarchy, being dead, the emperor laid hold of that opportunity to recover Nice, and ſome other important places, from the infidels. But theſe were loſt the year following, together with Abydus and Nicomedia; and in 1330 a peace was concluded upon condition that they ſhould keep all their conqueſts. This peace they obſerved no longer than ſerved their own purpoſes; for new commotions breaking out in the empire, they purſued their conqueſts, and by the year 1357 had reduced all Aſia. They next paſſed the Helleſpont under the conduct of Solyman the ſon, or, as others will have it, the brother of Orchane, the ſucceſſor of Othoman, and ſeized on a ſtrong caſtle on the European ſide. Soon after the Turkiſh ſultan died, and was ſucceeded by Amurath. He extended the conqueſts of his predeceſſors, and in a ſhort time reduced all Thrace, making Adrianople the ſeat of his empire. Amurath was ſlain by treachery in a little time after, and was ſucceeded by his ſon Bajazet. This prince greatly enlarged his dominions by new conqueſts. In a ſhort time he reduced the countries of Theſſaly, Macedon, Phocis, Peloponneſus, Myſia, and Bulgaria, driving out the deſpots or petty princes who ruled there. Elated with his frequent victories, he began to look upon the Greek emperor, to whom nothing was now left but the city of Conſtantinople and the neighbouring country, as his vaſſal. Accordingly he ſent him an arrogant and haughty meſſage, commanding him to pay a yearly tribute, and ſend his ſon Manuel to attend him in his military expeditions. This demand the emperor was obliged to comply with, but died ſoon after, in the year 1392.

155 Adrianople taken by the Turks.

Manuel no ſooner heard of his father's death than he haſtened to Conſtantinople, without taking leave of the ſultan, or acquainting him with the reaſon of his ſudden departure. At this Bajazet was ſo highly offended, that he paſſed with great expedition out of Bithynia into Thrace, ravaged the country adjoining to Conſtantinople, and at laſt inveſted the city itſelf, both by ſea and land. In this extremity Manuel had recourſe to the weſtern princes; who ſent him an army of 130,000 men, under the command of Sigiſmund king of Hungary, and John count of Nevers. But though the weſtern troops proved at firſt ſucceſsful, they were in the end defeated with great ſlaughter by Bajazet, who then returned to the ſiege with greater vigour than ever. As he found, however, that the citizens were determined to hold out to the laſt, he applied to John, the ſon of Manuel's elder brother, who had a better title to the crown than Manuel himſelf. With him he entered into a private agreement, by virtue of which Bajazet was to place John upon the throne of Conſtantinople; on the other hand, John was to deliver up the city to the Turks, and remove the imperial city to Peloponneſus, which the ſultan promiſed to relinquiſh to him and his poſterity. At the ſame time, he ſent deputies to the inhabitants of Conſtantinople, offering to withdraw his army, and ceaſe from further hoſtilities, provided they expelled Manuel and placed John upon the throne. This propoſal rent the city into two factions; but Manuel prevented the miſchiefs which were ready to enſue, by a voluntary reſignation, upon condition that he ſhould be allowed to retire to whatever place he thought proper with his wife and children.

156 Bajazet beſieges Conſtantinople.

With this condition John readily complied; and Manuel having received him into the city, and conducted him to the palace, ſet ſail for Venice. From thence he went to the courts of all the weſtern princes, to ſolicit their aſſiſtance againſt the Turks, whoſe power was grown formidable to all Europe. He was everywhere received with the greateſt demonſtrations of eſteem, and promiſed large ſupplies; all Chriſtendom being now alarmed at the progreſs of the infidels.

In the mean time, Bajazet did not fail to put John in mind of his promiſe; but the citizens refuſing to comply with ſuch a ſcandalous treaty, the ſiege was renewed, and the city aſſaulted with more fury than ever. When it was already reduced to the laſt extremity, news were brought the ſultan that Tamerlane, the victorious Tartar, having overrun all the eaſt with incredible celerity, had now turned his arms againſt the Turks, and was preparing to break into Syria. Bajazet, alarmed at the danger that threatened him, raiſed the ſiege in great haſte, and advanced againſt Tamerlane with a very numerous and well-diſciplined army; but the Tartar totally defeated and took him priſoner, after having cut moſt of his men in pieces: and thus Conſtantinople was preſerved for the preſent.

157 He is defeated and taken priſoner by Tamerlane.

But this relief was of ſhort duration. In 1424 the city was again beſieged by Amurath II. The inhabitants defended themſelves with great bravery; but muſt in the end have ſubmitted, had not the emperor prevailed upon the prince of Caramania to countenance an impoſtor and pretender to the Turkiſh throne. This obliged Amurath to raiſe the ſiege, and march with all his forces againſt the uſurper, whom he ſoon reduced. Having then no other enemies to contend with, he entered Macedon at the head of a powerful army; and having ravaged the country far and near, he took and plundered Theſſalonica, as he did alſo moſt of the cities of Ætolia, Phocis, and Bœotia. From Greece he marched into Servia; which country he ſoon reduced. He next broke into the dominions of the king of Hungary, and beſieged the ſtrong city of Belgrade; but here he met with a vigorous repulſe, no fewer than 15,000 Turks being ſlain by the Chriſtians in one ſally, which obliged the ſultan to drop the enterpriſe and retire.

158 Amurath beſieges Conſtantinople.

159 The ſiege raiſed.

In

In his retreat he was attacked by the celebrated John Hunniades, who cut great numbers of his men in pieces, and obliged the reft to fly with precipitation. Not long after he gained a ftill more complete victory over the enemy in the plains of Tranfylvania, with the lofs of only 3000 of his own men, whereas 20,000 of the Turks were killed on the field of battle, and almoft an equal number in the purfuit. Amurath, who was then at Adrianople, fent an army into Tranfylvania far more numerous than the former; but they were attended with no better fuccefs, being cut off almoft to a man by the brave Hungarian. He gained feveral other victories no lefs remarkable; but was at laft entirely defeated in 1448; and with this defeat ended all hopes of preferving the Roman empire. The unhappy emperor was now obliged to pay an annual tribute of 300,000 afpers to the fultan; and to yield up to him fome ftrong holds which he ftill held on the Euxine fea. However, as he doubted not but Amurath would foon attempt to become mafter of the city itfelf, he renewed the union between the Greek and Latin churches, hoping that this would induce the weftern princes to affift him in the defence of the city againft the Turks. This union produced great difturbances, which the emperor did not long furvive, but died in 1448, leaving the empire, now confined within the walls of Conftantinople, to his brother Conftantine.

Amurath the Turkifh fultan died in 1450, and was fucceeded by his fon Mohammed. In the beginning of his reign he entered into an alliance with Conftantine, and pretended a great defire to live in friendfhip with him and the other Chriftian princes; but no fooner had he put an end to a war in which he was engaged with Ibrahim king of Caramania, than he built a ftrong fort on the European fide of the Bofphorus, oppofite to another in Afia; in both of which he placed ftrong garrifons. Thefe two caftles commanded the ftraits: and the former being but five miles from the city, kept it in a manner blocked up. This foon produced a mifunderftanding between him and the emperor, which ended in the fiege of the city. The fiege commenced on the fixth of April 1453, Mohammed's numerous forces covering the plains before it on the land-fide, and a fleet of 300 fail blocking it up by fea. The emperor, however, had taken care to fecure the haven, in which were three large fhips, 20 fmall ones, and a great number of galleys, by means of a chain drawn acrofs the entrance. Mohammed began the fiege by planting batteries as near the city as he could, and raifing mounts in feveral places as high as the walls themfelves, whence the befieged were inceffantly galled with fhowers of arrows. He had in his camp a piece of ordnance of prodigious fize, which is faid to have carried a ball of 100 pounds weight made of hard black ftone brought from the Euxine fea. With this vaft piece the enemy made feveral breaches in the walls; which, however, were repaired with incredible expedition by the befieged. But Mohammed, the better to carry on the fiege, caufed new levies to be made through his extenfive dominions, by which his army was foon increafed to near 400,000 men; while the garrifon confifted only of 9000 regular troops, viz. 6000 Greeks and 3000 Genoefe and Venetians. As the enemy continued to batter the walls day and night without intermiffion, a great part of them was at laft beaten down; but while the Turks were bufy in filling up the ditch, in order to give the affault, a new wall was built. This threw the tyrant into a prodigious rage, which was greatly heightened when he faw his whole fleet worfted by five fhips, four of which were laden with corn from Peloponnefus, and the other with all manner of provifions from the ifle of Chios. Thefe opened themfelves a way through the whole Turkifh fleet; and, to the inexpreffible joy of the Chriftians, at laft got fafe into the harbour.

163
He conveys 80 galleys over land into the haven.

The Turks attempted feveral times to force the haven; but all their efforts proving ineffectual, Mohammed formed a defign of conveying 80 galleys over land for the fpace of eight miles into it. This he accomplifhed by means of certain engines, the contrivance of a renegado; and having then either taken or funk all the fhips contained in it, he caufed a bridge to be built over it with furprifing expedition. By this means the city was laid open to an affault from that fide likewife. The place was now affaulted on all fides; and Conftantine being well apprifed that he could not long hold out againft fuch a mighty fleet and fo numerous an army, fent deputies to Mohammed offering to acknowledge himfelf his vaffal, by paying him yearly what tribute he fhould think proper to impofe, provided he raifed the fiege and withdrew. The tyrant anfwered that he was determined at all events to become mafter of the city: but if the emperor delivered it up forthwith, he would yield up to him Peloponnefus, and other provinces to his brothers, which they fhould enjoy peaceably as his friends and allies: but if he held out to the laft extremity, and fuffered it to be taken by affault, he would put him and the whole nobility to the fword, abandon the city to be plundered by his foldiers, and carry the inhabitants into captivity.

164
A mutiny in the Turkifh camp.

This condition was rafhly rejected by the emperor; who thereby involved himfelf and all his fubjects in the moft terrible calamity. The fiege was renewed with more vigour than ever, and continued till the 25th of May; when a report being fpread in the Turkifh camp that a mighty army was advancing in full march to the relief of the city under the conduct of the celebrated John Hunniades, the common foldiers, feized with a panic, began to mutiny, and prefs Mohammed in a tumultuous manner to break up the fiege. Nay, they openly threatened him with death, if he did not immediately abandon the enterprife and retire from before the city, which they defpaired of being able to reduce before the arrival of the fuppofed fuccours. Mohammed was upon the point of complying with their demand, when he was advifed by Zagan, a Turkifh officer of great intrepidity, and an irreconcileable enemy to the Chriftian name, to give without lofs of time a general affault. To this he faid the foldiery, however mutinous, would not be averfe, provided the fultan folemnly promifed to abandon the city to be plundered by them. As fuch an advice beft fuited the humour of Mohammed, he readily embraced it; and caufed a proclamation to be publifhed throughout the camp, declaring that he gave up to his foldiers all the wealth of that opulent city, requiring to himfelf only the empty houfes.

The

Constantinopolitan history.

The desire of plunder soon got the better of that fear which had seized the Turkish army; and they unanimously desired to be led on to the attack. Hereupon Constantine was summoned for the last time to deliver up the city, with a promise of his life and liberty; but to this he answered, that he was unalterably determined either to defend the city or to perish with it. The attack began at three in the morning on Tuesday the 29th of May; such troops were first employed as the sultan valued least, and designed them for no other purpose than to tire the Christians, who made a prodigious havock of that disorderly multitude. After the carnage had lasted some hours, the Janizaries and other fresh troops advanced in good order, and renewed the attack with incredible vigour. The Christians, summoning all their courage and resolution, twice repulsed the enemy: but being in the end quite spent, they were no longer able to stand their ground; so that the enemy in several places broke into the city. In the mean time Justiniani, the commander of the Genoese and a select body of Greeks, having received two wounds, one in the thigh, and the other in the hand, was so disheartened, that he caused himself to be conveyed to Galata, where he soon after died of grief. His men, dismayed at the sudden flight of their general, immediately quitted their posts and fled in the utmost confusion. However, the emperor, attended with a few of the most resolute among the nobility, still kept his post, striving with unparalleled resolution to oppose the multitude of barbarians that now broke in from every quarter. But being in the end overpowered with numbers, and seeing all his friends lie dead on the ground, "What! (cried he aloud) is there no Christian left alive to strike off my head?" He had scarce uttered these words, when one of the enemy, not knowing him, gave him a deep cut across the face with his sabre; and at the same time, another coming behind him, with a blow on the back part of his head laid him dead on the ground. After the death of the emperor, the few Christians that were left alive betook themselves to flight; and the Turks, meeting with no further opposition, entered the city, which they filled with blood and slaughter. They gave no quarter, but put all they met to the sword, without distinction. Many thousands took refuge in the church of St Sophia, but they were all massacred in their asylum by the enraged barbarians; who, prompted by their natural cruelty, the desire of revenge, and love of booty, spared no place nor person. Most of the nobility were, by the sultan's orders, cut off, and the rest kept for purposes more grievous than death itself. Many of the inhabitants, among whom were some men of great learning, found means to make their escape while the Turks were busied in plundering the city. These embarking on five ships then in the harbour, arrived safe in Italy; where, with the study of the Greek tongue, they revived the liberal sciences, which had long been neglected in the west. After the expiration of three days, Mohammed commanded his soldiers to forbear all further hostilities on pain of death: and then put an end to as cruel a pillage and massacre as any mentioned in history. The next day he made his public and triumphal entry into Constantinople, and chose it for the seat of the Turkish empire, which it has continued to be ever since.

165 A general assault given.

166 Bravery of the emperor.

167 He is killed.

168 The town plundered, and the inhabitants massacred.

Constantinopolitan history, Constat.

169 Present state of the city.

This city is now called by the Turks *Istampol*, and by the Greeks *Istampoli* or *Stampoli*. It is seated at the eastern extremity of Romania, on a small neck of land which advances towards Natolia, from which it is separated by a channel of a mile in breadth. The sea of Marmora washes its walls on the south, and a gulf of the channel of Constantinople does the same on the north. It is delightfully situated between the Black sea and the Archipelago, from whence it is supplied with all necessaries. The grand seignior's palace, called the *Seraglio*, is seated on the sea-side, and is surrounded with walls flanked with towers, and separated from the city by canals. It is said the harbour will easily hold 1200 ships. The number of houses must needs be prodigious, since one fire has burnt down 30,000 in a day, without greatly changing the aspect of the city. However, in general, they are but mean, especially on the outside, where there are few or no windows; and the streets being narrow, gives them a melancholy look. They reckon that there are 3770 streets, small and great: but they are seldom or never clean; and the people are infested with the plague almost every year. The inhabitants are half Turks, two-thirds of the other half Christians, and the rest Jews. Here are a great number of ancient monuments still remaining, and particularly the superb temple of Sophia, which is turned into a mosque, and far surpasses all the rest. The street called *Adrianople* is the longest and broadest in the city; and the bazars, or besteins, are the markets for selling all sorts of merchandise. The old and the new are pretty near each other; and are large square buildings, covered with domes, and supported by arches and pilasters. The new is the best, and contains all sorts of goods which are there exposed to sale. The market for slaves of both sexes, is not far off; and the Jews are the principal merchants, who bring them here to be sold. There are a great number of young girls brought from Hungary, Greece, Candia, Russia, Mingrelia, and Georgia, for the service of the Turks, who generally buy them for their seraglios. The great square, near the mosque of Sultan Bajazet, is the place for public diversions, where the jugglers and mountebanks play a great variety of tricks. The circumference of this city is by some said to be 15 miles, and by Mr Tournefort 23 miles; to which if we add the suburbs, it may be 34 miles in compass. The suburb called *Pera* is charmingly situated; and is the place where the ambassadors of England, France, Venice, and Holland reside. This city is built in the form of a triangle; and as the ground rises gradually, there is a view of the whole town from the sea. The public buildings, such as the palaces, the mosques, bagnios, and caravansaries for the entertainment of strangers, are many of them very magnificent. E. Long. 29. 20. N. Lat. 41. 4.

CONSTAT, in *Law*, the name of a certificate which the clerk of the pipe and auditors of the exchequer make at the request of any person who intends to plead or move in that court for the discharge of any thing; and the effect of it is, the certifying what does *constare* upon record touching the matter in question.

—A

—A conftat is held to be fuperior to a certificate; becaufe this may err or fail in its contents; that cannot, as certifying nothing but what is evident upon record.

Alfo the exemplification under the great feal of the inrolment of any letters patent is called a *conftat*.

CONSTELLATION, in *Aftronomy*, a fyftem of feveral ftars that are feen in the heavens near to one another. Aftronomers not only mark out the ftars, but, that they may better bring them into order, they diftinguifh them by their fituation and pofition in refpect to each other; and therefore they diftribute them into afterifms or conftellations, allowing feveral ftars to make up one conftellation: and for the better diftinguifhing and obferving them, they reduce the conftellations to the forms of animals, as men, bulls, bears, &c.; or to the images of fome things known, as of a crown, a harp, a balance, &c.; or give them the names of thofe whofe memories, in confideration of fome notable exploit, they had a mind to tranfmit to future ages.

The divifion of the ftars by images and figures is of great antiquity, and feems to be as old as aftronomy itfelf: for in the moft ancient book of Job, Orion, Arcturus, and the Pleiades, are mentioned: and we meet with the names of many of the conftellations in the writings of the firft poets, Homer and Hefiod.

The ancients, in their divifion of the firmament, took in only fo much as came under their notice, diftributing it into 48 conftellations; but the modern aftronomers comprehend the whole ftarry firmament, dividing it into three regions. See ASTRONOMY *Index*.

CONSTERNATION is defined by ethical writers to be an excefs of horror, owing to the ill government of our admiration and fear: or fuch an immoderate degree of fear as confounds the faculties, and incapacitates a perfon for confultation and execution.

CONSTIPATION, in *Medicine*, a hardnefs of the belly, with great coftivenefs. See COSTIVENESS.

CONSTITUENT PART, in *Phyfiology*, an effential part in the compofition of any thing, differing little from what is otherwife called *element* or *principle*.

CONSTITUTION, in matters of policy, fignifies the form of government eftablifhed in any country or kingdom.

CONSTITUTION alfo denotes an ordinance, decifion, regulation, or law, made by authority of any fuperior, ecclefiaftical or civil.

Apoftolical CONSTITUTIONS, a collection of regulations attributed to the Apoftles, and fuppofed to have been collected by St Clement, whofe name they likewife bear.

It is the general opinion, however, that they are fpurious, and that St Clement had no hand in them. They appeared firft in the 4th age, but have been much changed and corrupted fince that time. They are divided into eight books, confifting of a great number of rules and precepts, relating to the duties of Chriftians, and particularly the ceremonies and difcipline of the church. Mr Whifton, in oppofition to the general opinion, afferts them to be a part of the facred writings, dictated by the Apoftles in their meetings, and written down from their own mouths by St Clement; and intended as a fupplement to the New Teftament, or rather as a fyftem of Chriftian faith and polity. The reafon why the Conftitutions are fufpected by the orthodox, and perhaps the reafon alfo why their genuinenefs is defended by Mr Whifton, is, that they feem to favour Arianifm.

CONSTITUTION, in a phyfical fenfe, fignifies the particular temperature of the body.

It is curious to obferve, fays Dr Percival, the revolution which hath taken place, within this century, in the conftitutions of the inhabitants of Europe. Inflammatory difeafes more rarely occur, and, in general, are much lefs rapid and violent in their progrefs than formerly (A); nor do they admit of the fame antiphlogiftic method of cure that was practifed with fuccefs 100 years ago. The experienced Sydenham makes 40 ounces of blood the mean quantity to be drawn in the acute rheumatifm; whereas this difeafe, as it now appears in the London hofpitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without venefection; which is a proof that at prefent they are accompanied with fewer fymptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous clafs of nervous ailments, in a great meafure unknown to our anceftors; but which now prevail univerfally, and are complicated with almoft every other diftemper. The bodies of men are enfeebled and enervated; and it is not uncommon to obferve very high degrees of irritability, under the external appearance of great ftrength and robuftnefs. The hypochondria, palfies, cachexies, dropfies, and all thofe difeafes which arife from laxity and debility, are in our days endemic everywhere; and the hyfterics, which ufed to be peculiar to the women, as the name itfelf indicates, now attack both fexes indifcriminately. It is evident that fo great a revolution could not be effected without a concurrence of many caufes; but amongft thefe (according to Dr Percival), the prefent general ufe of tea * holds the firft and principal rank. The fecond place may perhaps be allowed to excefs in fpirituous liquors. This pernicious cuftom, in many inftances at leaft, owes its rife to the former, which, by the lownefs and depreffion of fpirits it occafions, renders it almoft neceffary to have recourfe to fomething cordial and exhilarating. And hence proceed thofe odious and difgraceful habits of intemperance, with which many of the fofter fex are now, alas! chargeable.

* See *Tea*.

CONSTRICTOR, an appellation given to feveral mufcles,

(A) The decreafe in the violence of inflammatory difeafes may perhaps in part be afcribed to the prefent improved method of treating them. Moderate evacuations, cool air, acefcent diet, and the liberal ufe of faline and antimonial medicines, are better adapted to check the progrefs of fevers, than copious bleedings, ftimulating purgatives, and profufe fweats excited by theriaca and mithridate.

muſcles, on account of their conſtringing or cloſing ſome of the orifices of the body.

CONSTRUCTION, in *Geometry*, is the drawing ſuch lines, ſuch a figure, &c. as are previouſly neceſſary for making any demonſtration appear more plain and undeniable.

Construction of Equations. See EQUATIONS.

Construction, in *Grammar;* ſyntax, or the arranging and connecting the words of a ſentence according to the rules of the language. See Grammar and Language.

The conſtruction is generally more ſimple, eaſy, and direct, in the modern tongues than in the ancient: we have very few of thoſe inverſions which occaſion ſo much embarraſſment and obſcurity in the Latin; our thoughts are uſually delivered in the ſame order wherein the imagination conceives them: the nominative caſe, for inſtance, always precedes the verb, and the verb goes before the oblique caſes it governs.

The Greeks and Latins, M. St Evremont obſerves, uſually end their periods, where, in good ſenſe and reaſon, they ſhould have begun; and the elegance of their language conſiſts, in ſome meaſure, in this capricious arrangement, or rather in this tranſpoſal and diſorder of the words. See Language.

Construction of Statutes, among lawyers. See Law *Index*.

CONSUALIA, in antiquity, feaſts which were held among the ancients, in honour of the god Conſus, i. e. Neptune; different from thoſe other feaſts of the ſame deity called *Neptunalia*. They were introduced with a magnificent cavalcade, or proceſſion on horſeback; becauſe Neptune was reputed to have firſt taught men the uſe of horſes; whence his ſurname of Ἵππιος, *Equeſtris*.

Evander is ſaid to have firſt inſtituted this feaſt: it was re-eſtabliſhed by Romulus, under the name of *Conſus;* becauſe it was ſome god under the denomination of Conſus that ſuggeſted to him the rape of the Sabines. It is ſaid, that it was with a view to this rape that he made that eſtabliſhment. This, however, is certain, that it was to this feaſt all his neighbours were invited; when, taking advantage of the ſolemnities and ſacrifices, he ſeized the women. To draw the greater concourſe of people, he gave out, that he had found an altar hid under ground, which he intended to conſecrate, with ſacrifices to the god to whom it had been originally erected. Thoſe who take upon them to explain the myſteries of the heathen theology, ſay, that the altar hid under ground is a ſymbol of the ſecret deſign of Romulus to ſeize his neighbours wives.

The conſualia were of the number of feaſts called ſacred; as being conſecrated to a divinity. Originally they were not diſtinguiſhed from thoſe of the circus; whence it is, that Valerius Maximus ſays, that the rape of the Sabines was effected at the games of the circus.

Plutarch obſerves, that during the days of this ſolemnity, horſes and aſſes were left at reſt, and were dreſſed up with crowns, &c. on account of its being the feaſt of Neptunus Equeſtris. Feſtus ſays, the cavalcade was performed with mules; it being an opinion, that this was the firſt animal uſed to draw the car.

Servius gives us to underſtand, that the conſualia fell on the 13th of Auguſt; Plutarch, in the life of Romulus, placed them on the 18th, and the old Roman kalendar on the 21ſt of that month.

CONSUBSTANTIAL, in *Theology*, a term of like import with co-eſſential; denoting ſomething of the ſame ſubſtance with another. The orthodox believe the Son of God to be conſubſtantial with the Father.

The term ὁμοούσιος, *conſubſtantial*, was firſt adopted by the fathers of the councils of Antioch and Nice, to expreſs the orthodox doctrine the more preciſely, and to ſerve as a barrier and precaution againſt the errors and ſubtleties of the Arians; who owned every thing excepting the conſubſtantiality.

The Arians allowed, that the Word was God, as having been made God; but they denied that he was the ſame God, and of the ſame ſubſtance with the Father: accordingly they exerted themſelves to the utmoſt to aboliſh the uſe of the word. The emperor Conſtantine uſed all his authority with the biſhops to have it expunged out of the ſymbols; but it ſtill maintained itſelf, and is at this day, as it was then, the diſtinguiſhing criterion between an Athanaſian and an Arian.

Sandius will have it, that the word conſubſtantial was unknown till the time of the council of Nice; but it is certain it had been before propoſed to the council of Antioch, wherein Paulus Samoſatenus had been condemned; though it had there the fortune to be rejected. Curcellæus, on the other hand, maintains that it was an innovation in doctrine in the council of Nice, to admit an expreſſion, the uſe whereof had been aboliſhed by the council of Antioch.

According to St Athanaſius, the word conſubſtantial was only condemned in the council of Antioch, inaſmuch as it implied the idea of a pre-exiſtent matter, prior to the things formed thereof; now, in this ſenſe, it is certain, the Father and the Son are not conſubſtantial, there having been no pre-exiſtent matter.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the euchariſt. The divines of that profeſſion maintain, that after conſecration, the body and blood of our Saviour are ſubſtantially preſent, together with the ſubſtance of the bread and wine, which is called *conſubſtantiation*, or *impanation*.

CONSUL, the chief magiſtrate of the Roman commonwealth, inveſted with regal authority for the ſpace of one year. They were two in number, called conſuls *à conſulendo*, and annually choſen in the Campus Martius. The two firſt conſuls were L. Jun. Brutus, and L. Tarquinius Collatinus, choſen in the year of Rome 244, after the expulſion of the Tarquins. In the firſt times of the republic the two conſuls were always choſen from patrician families or nobleman, but the people obtained the privilege in the year of Rome 388, of electing one of the conſuls from their own body, and ſometimes both were plebeians. The firſt conſul among the plebeians was L. Sextius. It was required that every candidate for the conſulſhip ſhould be 43 years of age, called *legitimum tempus*. He was always to appear at the election as a private man without a retinue,

retinue, and it was requisite before he canvassed for the office to have discharged the functions of quæstor, edile, and prætor. Sometimes these qualifications were disregarded. Val. Corvinus was made a consul in his 23d year, and Scipio in his 24th. Young Marius, Pompey, and Augustus, were also under the proper age, when they were invested with the office, and Pompey had never been quæstor or prætor. The power of the consuls was unbounded, and they knew no superior but the gods and the laws; but after the expiration of their office their conduct was minutely scrutinized by the people, and misbehaviour was often punished by the laws. The badge of their office was the *prætexta*, a robe fringed with purple, afterwards exchanged for the *toga picta* or *palmata*. They were preceded by 12 lictors carrying the *fasces* or bundles of sticks, in the middle of which appeared an axe. The axe, as being the characteristic rather of tyranny than of freedom, was taken away from the *fasces* by Valerius Poplicola, but it was restored by his successor. They took it by turns monthly to be preceded by the lictors while at Rome, lest the appearance of two persons with the badges of royal authority should raise apprehensions in the multitude. While one appeared publicly in state, only a crier walked before the other, and the lictors followed behind without the fasces. Their authority was equal; yet the Valerian law gave the right of priority to the older, and the Julian law to him who had most children; and he was generally called *consul major* or *prior*. As their power was absolute, they presided over the senate, and could convene and dismiss it at pleasure. The senators were their counsellors; and among the Romans the manner of reckoning their years was by the name of the consuls, and by *M. Tull. Cicerone et L. Antonio Consulibus*, for instance, the year of Rome 689 was always understood. This custom lasted from the year of Rome 244 till 1294, or the 541st year of the Christian era. In public assemblies the consuls sat in ivory chairs, and held in their hand an ivory wand called *scipio eburneus*, which had an eagle on its top as a sign of dignity and power. When they had drawn by lot the provinces over which they were to preside during their consulship, they went to the capitol to offer their prayers to the gods, and intreat them to protect the republic; after this they departed from the city arrayed in their military dress and preceded by the lictors. Sometimes the provinces were assigned them without drawing by lot, by the will and appointment of the senators. At their departure they were provided by the state with whatever was requisite during their expedition. In their provinces they were both attended by the 12 lictors, and equally invested with regal authority. They were not permitted to return to Rome without the special command of the senate; and they always remained in the province till the arrival of their successor. At their return they harangued the people, and solemnly protested that they had done nothing against the laws or interest of their country, but had faithfully and diligently endeavoured to promote the greatness and welfare of the state. No man could be consul two following years; yet this institution was sometimes broken, and we find Marius re-elected consul after the expiration of his office during the Cimbrian war. The office of consul, so dignified during the times of the commonwealth, became a mere title under the emperors, and retained nothing of its authority but the useless ensigns of original dignity. Even the duration of the office, which was originally annual, was reduced to two or three months by Julius Cæsar; but they who were admitted on the first of January denominated the year, and were called *ordinarii*. Their successors during the year were distinguished by the name of *suffecti*. Tiberius and Claudius abridged the time of the consulship; and the emperor Commodus made no less than 25 consuls in one year. Constantine the Great renewed the original institution, and permitted them to be a whole year in office.

CONSUL, at present, is an officer established by virtue of a commission from the king and other princes, in all foreign countries of any considerable trade, to facilitate and dispatch business, and protect the merchants of the nation. The consuls are to keep up a correspondence with the ministers of England residing in the courts whereon their consulate depends. They are to support the commerce and the interest of the nation; to dispose of the sums given and the presents made to the lords and principals of places, to obtain their protection, and prevent the insults of the natives on the merchants of the nation.

CONSUMMATION, the end, period, or completion of any work. Thus, we say, the *consummation* of all things, meaning the end of the world. By the incarnation, all the prophecies are said to be *consummated*. See PROPHECY and ACCOMPLISHMENT.

CONSUMMATION of Marriage, denotes the last act of marriage, which makes its accomplishment; or the most intimate union between the married pair, &c.

CONSUMPTION, in *Medicine*, a word of very extensive signification, implies all disorders that bring any decay or waste upon the constitution; but is most commonly used for the *phthisis pulmonalis*. See MEDICINE *Index*.

CONSUMPTION, in *Farriery*. See FARRIERY *Index*.

CONSUS, the pagan god of counsel. He had an altar under ground in the great circus at Rome, to show that counsel ought to be kept secret. See CONSUALIA.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that do thus touch are called the *points* or *places of contact*.

CONTAGION, in *Physic*, the communicating a disease from one body to another. In some diseases it is only effected by an immediate contact or touch, as in syphilis; in others it is conveyed by infected clothes; and in others it is supposed to be transmitted through the air at a considerable distance, by means of steams or effluvia arising from the sick, as in the plague and other pestilential disorders, in which case the air is said to be contagious, though this has been disputed.

No attempts which have yet been made to investigate the nature of contagion, or to ascertain the properties of contagious matter, have proved successful. But from the means which have been effectually employed either to abate its virulence or to destroy it entirely, this matter may be fairly inferred to be of a chemical nature. We have already detailed the effects of the fumes of muriatic acid in purifying the cathedral of Dijon, which were successfully used by Morveau in 1773.

Contagion.

1773. Purfuing this hint, no doubt, Dr Carmichael Smyth propofed the fumes of nitric acid. This was tried on board different fhips at Sheernefs about the year 1796; and being found to anfwer the purpofe of deftroying the contagion which then prevailed, Dr Smyth afterwards received a liberal reward from government for his difcovery. Thefe experiments were conducted on board the Union hofpital fhip by Mr Menzies furgeon of the Difcovery, and Mr Baffan furgeon of the Union. The wards at this time were very much crowded with patients; and of 200 fick on board, 150 were in different ftages of a malignant contagious fever, which made a very rapid progrefs, and produced very fatal effects on the attendants and fhip's company.

The materials and apparatus employed in the procefs were the following: A quantity of fine fand, two dozen quart earthen pipkins, as many common tea-cups, fome long flips of glafs to be ufed as fpatulas, a quantity of concentrated fulphuric acid, and a quantity of faltpetre (nitrate of potafh).

The procefs was conducted in the following manner: 1ft, All the ports and fcuttles were fhut up; the fand, previoufly heated in iron pots, was fcooped out into the pipkins with an iron laddle; and in this heated fand, in each pipkin, a fmall tea-cup was immerfed, containing about half an ounce of fulphuric acid, to which, after it had acquired a proper degree of heat, an equal quantity of nitrate of potafh in powder was gradually added, and the mixture ftirred with a glafs fpatula till the vapour arofe from it in confiderable quantity. The pipkins were then carried through the wards by the nurfes and convalefcents, who kept walking about with them in their hands, occafionally putting them under the cradles of the fick, and in every corner where any foul air was fufpected to lodge. In this manner they continued fumigating, until the whole fpace between decks, fore and aft, was filled with the vapour, which appeared like a thick haze.

The vapour at firft excited coughing among the patients, which gradually ceafed as it became more generally diffufed through the wards: part of this effect, however, was to be attributed to the inattention of thofe who carried the pipkins, in putting them too near the faces of the fick; which caufed them to inhale the ftrong vapour as it immediately iffued from the cups.

The body-clothes and bed-clothes of the fick were, as much as poffible, expofed to the nitrous vapour during the fumigation; and all the foul linen removed from them was immediately immerfed in a tub of cold water, afterwards carried on deck, rinfed out, and hung up till nearly dry, and then fumigated before it was taken to the wafh-houfe: a precaution extremely neceffary in every cafe of infectious diforder. Proper attention was alfo paid to cleanlinefs and ventilation.

Three hours were at firft found neceffary to fumigate the fhip. In about an hour after, the vapour having entirely fubfided, the ports and fcuttles were thrown open for the admiffion of frefh air. It could plainly be perceived that the air of the hofpital was greatly fweetened even after this firft fumigation. The procefs was repeated again next morning; and the people employed, being now more expert, finifhed the whole in about an hour's time. In an hour afterwards, the vapour having entirely fubfided, the frefh air was freely admitted into the hofpital as before. Fewer pipkins were employed for the evening fumigations than for thofe of the mornings, as the frefh air could not be admitted fo freely after the former as the latter.

The pleafing and immediate effect of the fumigation in deftroying the offenfive and difagreeable fmell, arifing from fo many fick crowded together, was now very perceptible, even to the attendants; the confequence of which was, that they began to place fome degree of confidence in its efficacy, and approached the cradles of the infected with lefs dread of being attacked with the diforder: thus the fick were better attended, and the duty of the hofpital was more regularly and more cheerfully performed.

From the 26th of November 1795, when the fumigation was firft reforted to, till the 25th of December, not a perfon on board was attacked with the fever, though, in the three months preceding, more than one-third of all the people in the fhip had been feized with the diftemper, and of thefe more than one in four were carried off by it; and the probability is, that the ficknefs and mortality would have gone on, increafing in proportion to the diffufion of the contagion, and to the increafing defpondency of the people, who confidered themfelves as fo many devoted victims.

The advantage of the fumigation was not felt by the fhip's company and attendants alone, whom it preferved from the baneful effects of the fever: the fick and convalefcents derived almoft an equal benefit from it. The fymptoms of the difeafe became milder, and loft much of their malignant appearance; and the advantage of a pure and fweet air to convalefcents muft be obvious.

Great confidence is always dangerous. It proved fo on the prefent occafion. On the 17th of December they imagined themfelves fo fecure, that they difcontinued the cuftom of fumigating morning and evening, thinking that once a-day was fufficient. On the 25th, one of the nurfes fuffered a flight attack; and on the 26th a marine, who, for a week before, had been in a ftate of intoxication, was feized with the fever, and died. Thefe two accidents gave immediate alarm: they returned again to the practice of fumigating twice a-day; and from that time to the extermination of the diforder, there was not an inftance of a perfon fuffering from contagion on board the fhip.

The fuccefs of the experiment was not confined to the Union: the power of the nitrous vapour to deftroy contagion was equally difplayed on board fome Ruffian fhips then in the Downs. The fafety, too, with which it may be employed, in any fituation, without inconvenience or rifk of fire, is another great recommendation in its favour.

It will not be difficult from this defcription to employ this kind of fumigation. It is only neceffary to obferve, for the fake of thofe who may not be verfant in chemical purfuits, that the ingredients ought to be pure, and neither metal veffels nor rods fhould be ufed. Any kind of metal getting among the ingredients would caufe the vapour to be very noxious inftead of falutary. The fumes that rife fhould be white; if they are of a red colour, there is reafon to fufpect the purity of the ingredients.

The importance of this difcovery need not be infifted on:

on: it is equally applicable to every ſpecies of putrid contagion, even to the plague itſelf. It ſhould therefore be uſed in all hoſpitals and pariſh workhouſes; and ſhould be conſtantly reſorted to by the proprietors of all large works, on the firſt appearance of infectious diſeaſe among the people employed in them:—indeed, it ſhould be employed even as a preventive in all ſituations where a number of people, from the nature of their buſineſs, are obliged to be crowded together, or where, from local circumſtances, there are reaſons for ſuſpecting that the purity of the air is injured by noxious exhalations or other cauſes. If there be any circumſtances in which its utility may be called in queſtion, it can only be in caſes of inflammatory diſeaſes: for, in ſuch, ſuper-oxygenation has been found hurtful.

CONTEMPLATION, an act of the mind, whereby it applies itſelf to conſider and reflect upon the works of God, nature, &c.

CONTEMPORARY, or COTEMPORARY, a perſon or thing that exiſted in the ſame age with another. Thus, Socrates, Plato, and Ariſtophanes, were contemporaries.

CONTEMPT, in a general ſenſe, the act of deſpiſing, or the ſtate of being deſpiſed.

CONTEMPT, in *Law*, is a diſobedience to the rules and orders of a court, which hath power to puniſh ſuch offence; and as this is ſometimes a greater, and ſometimes a leſſer offence, ſo it is puniſhed with greater or leſs puniſhment, by fine, and ſometimes by impriſonment.

CONTENT, in *Geometry*, the area or quantity of matter or ſpace included in certain bounds.

CONTESSA, a port-town of Turkey in Europe, in the province of Macedonia, ſituated on a bay of the Archipelago, about 200 miles weſt of Conſtantinople. E. Long. 25. 0. N. Lat. 41. 0.

CONTEXT, among divines and critics, that part of Scripture or other writing which lies about the text, before or after it, or both. To take the full and genuine ſenſe of the text, the context ſhould be regarded.

CONTEXTURE, a word frequently uſed in ſpeaking both of the works of nature and art; and denoting the diſpoſition and union of the conſtituent parts with reſpect to one another.

CONTI, a town of Picardy in France, with the title of a principality. It is ſeated on the river Seille, in E. Long. 2. 17. N. Lat. 49. 54.

CONTIGUITY, in *Geometry*, is when the ſurface of one body touches that of another.

CONTIGUOUS, a relative term underſtood of things diſpoſed ſo near each other, that they join their ſurfaces, or touch. The houſes in ancient Rome were not contiguous as ours are, but all inſulated.

CONTINENCE, in *Ethics*, a moral virtue, by which we reſiſt concupiſcence. It ſhould ſeem that there is this diſtinction between chaſtity and continence, in that it requires no effort to be chaſte, which reſults from conſtitution; whereas continence appears to be the conſequence of a victory gained over ourſelves. The verb *continere*, in the Latin, ſignifies "to reſtrain." The term, however, is moſt uſually applied to men; as *chaſtity* is to women. See CHASTITY.

Continence is a virtue that makes but an inconſiderable figure in our days. However, we ought not to loſe our ideas of things, though we have debauched our true reliſh in our practice: for, after all, ſolid virtue will keep its place in the opinion of the wiſe and ſenſible part of mankind. And though cuſtom has not made it ſo ſcandalous as it ought to be to inſnare innocent women, and triumph in the falſehood; ſuch actions as we ſhall relate muſt be accounted true gallantry, and riſe higher in our eſteem the farther they are removed from our imitation.

Livy, Val. Maximus, &c.

1. Scipio the younger, when only 24 years of age, was appointed by the Roman republic to the command of the army againſt the Spaniards. His wiſdom and valour would have done honour to the moſt experienced general. Determined to ſtrike an important blow, he forms a deſign of beſieging Carthagena, then the capital of the Carthaginian empire in Spain. His meaſures were ſo judiciouſly concerted, and with ſo much courage and intrepidity purſued both by ſea and land, that notwithſtanding a bold and vigorous defence, the capital was taken by ſtorm. The plunder was immenſe. Ten thouſand free-men were made priſoners; and above 300 more, of both ſexes, were received as hoſtages. One of the latter, a very ancient lady, the wife of Mandonius, brother of Indibilis king of the Ilergetes, watching her opportunity, came out of the crowd, and throwing herſelf at the conqueror's feet, conjured him, with tears in her eyes, to recommend to thoſe who had the ladies in their keeping to have regard to their ſex and birth. Scipio, who did not underſtand her meaning at firſt, aſſured her that he had given orders that they ſhould not want for any thing. But the lady replied, "Thoſe conveniences are not what affect us. In the condition to which fortune hath reduced us, with what ought we not to be contented! I have many other apprehenſions, when I conſider, on one ſide, the licentiouſneſs of war; and on the other, the youth and beauty of the princeſſes which you ſee here before us: for as to me, my age protects me from all fear in this reſpect." She had with her the daughters of Indibilis, and ſeveral other ladies of high rank, all in the flower of youth, who conſidered her as their mother. Scipio then comprehending what the ſubject of her fear was, "My own glory (ſays he) and that of the Roman people, are concerned, in not ſuffering that virtue, which ought always to be reſpected wherever we find it, ſhould be expoſed in my camp to a treatment unworthy of it. But you give me a new motive for being more ſtrict in my care of it, in the virtuous ſolicitude you ſhow in thinking only of the preſervation of your honour, in the midſt of ſo many other objects of fear." After this converſation, he committed the care of the ladies to ſome officers of experienced prudence, ſtrictly commanding that they ſhould treat them with all the reſpect they could pay to the mothers, wives, and daughters, of their allies and particular friends. It was not long before Scipio's integrity and virtue were put to the trial. Being retired in his camp, ſome of his officers brought him a young virgin of ſuch exquiſite beauty, that ſhe drew upon her the eyes and admiration of every body. The young conqueror ſtarted from his ſeat with confuſion and ſurpriſe; and, like one thunderſtruck, ſeemed to be robbed of that preſence of mind and ſelf-poſſeſſion ſo neceſſary in a general, and for which

which Scipio was remarkably famous. In a few moments, having rallied his ſtraggling ſpirits, he inquired of the beautiful captive, in the moſt civil and polite manner, concerning her country, birth, and connections; and finding that ſhe was betrothed to a Celtiberian prince named Allucius, he ordered both him and the captive's parents to be ſent for. The Spaniſh prince no ſooner appeared in his preſence, than, even before he ſpake to the father and mother, he took him aſide; and, to remove the anxiety he might be in on account of the young lady, he addreſſed him in theſe words: "You and I are young, which admits of my ſpeaking to you with more liberty. Thoſe who brought me your future ſpouſe, aſſured me, at the ſame time, that you loved her with extreme tenderneſs; and her beauty left me no room to doubt it. Upon which reflecting, that if, like you, I had thought on making an engagement, and were not wholly engroſſed with the affairs of my country, I ſhould deſire that ſo honourable and legitimate a paſſion ſhould find favour, I think myſelf happy in the preſent conjuncture to do you this ſervice. Though the fortune of war has made me your maſter, I deſire to be your friend. Here is your wife: take her, and may the gods bleſs you with her. One thing, however, I would have you be fully aſſured of, that ſhe has been amongſt us as ſhe would have been in the houſe of her father and mother. Far be it from Scipio to purchaſe a looſe and momentary pleaſure at the expence of virtue, honour, and the happineſs of an honeſt man. No; I have kept her for you, in order to make you a preſent worthy of you and of me. The only gratitude I require of you for this ineſtimable gift is, that you would be a friend to the Roman people." Allucius's heart was too full to make him any anſwer; but throwing himſelf at the general's feet, he wept aloud. The captive lady fell into the ſame poſture: and remained ſo, till the father burſt out into the following words: "Oh! divine Scipio! the gods have given you more than human virtue! Oh! glorious leader! Oh! wondrous youth! does not that obliged virgin give you, while ſhe prays to the gods for your proſperity, raptures above all the tranſports you could have reaped from the poſſeſſion of her injured perſon?"

The relations of the young lady had brought with them a very conſiderable ſum for her ranſom: but when they ſaw that ſhe was reſtored to them in ſo generous and godlike a manner, they intreated the conqueror, with great earneſtneſs, to accept that ſum as a preſent; and declared, by his complying, that new favour would complete their joy and gratitude. Scipio, not being able to reſiſt ſuch warm and earneſt ſolicitation, told them that he accepted the gift; and ordered it to be laid at his feet: then addreſſing himſelf to Allucius, "I add (ſays he) to the portion which you are to receive from your father-in-law this ſum; which I deſire you to accept as a marriage-preſent."

If we conſider that Scipio was at this time in the prime of life, unmarried, and under no reſtraint, we cannot but acknowledge, that the conqueſt he made of himſelf was far more glorious than that of the Carthaginian empire: and though his treatment of this captive prince was not more delicate and generous than what might juſtly be expected from a perſon endowed with reaſon and reflection; yet conſidering how few there are in his circumſtances who would have acted as he did, we cannot but applaud his conduct, and propoſe him as a ſuitable example to future ages. Nor was his virtue unrewarded. The young prince, charmed with the liberality and politeneſs of Scipio, went into his country to publiſh the praiſes of ſo generous a victor. He cried out, in the tranſports of his gratitude, "That there was come into Spain a young hero like the gods, who conquered all things leſs by the force of his arms than the charms of his virtue and the greatneſs of his beneficence." Upon this report all Celtiberia ſubmitted to the Romans; and Allucius returned in a ſhout to Scipio, at the head of 1400 choſen horſe, to facilitate his future conqueſts. To render the marks of his gratitude ſtill more durable, Allucius cauſed the action we have juſt related to be engraven on a ſilver ſhield, which he preſented to Scipio, a preſent infinitely more eſtimable and glorious than all his treaſures and triumphs. This buckler, which Scipio carried with him when he returned to Rome, was loſt, in paſſing the Rhone, with part of the baggage. It continued in that river till the year 1665, when ſome fiſhermen found it. It was, before the revolution, in the king of France's cabinet.

2. The circumſtance which raiſes Alexander the Great above many conquerors, and, as it were, above himſelf, is the uſe he made of his victory after the battle of Iſſus. This is the moſt beautiful incident in his life. It is the point of view in which it is his intereſt to be conſidered; and it is impoſſible for him not to appear truly great in that view. By the victory of Iſſus he became poſſeſſed of the whole Perſian empire; not only Syſigambis, Darius's mother, was his captive, but alſo his wife and daughters, princeſſes whoſe beauty was not to be equalled in all Aſia. Alexander, like Scipio, was in the bloom of life, a conqueror, free, and not yet engaged in matrimony: nevertheleſs, his camp was to thoſe princeſſes a ſacred aſylum, or rather a temple, in which their chaſtity was ſecured as under the guard of virtue itſelf; and ſo highly revered, that Darius, in his expiring moments, hearing the kind treatment they had met with, could not help lifting up his dying hands towards heaven, and wiſhing ſucceſs to ſo wiſe and generous a conqueror, who could govern his paſſions at ſo critical a time. Plutarch informs us more particularly, that the princeſſes lived ſo retired in the camp, according to their own deſire, that they were not ſeen by any perſon except their own attendants; nor did any other perſon dare to aproach their apartments. After the firſt viſit, which was a reſpectful and ceremonious one, Alexander, to avoid expoſing himſelf to the dangers of human frailty, made a ſolemn reſolution never to viſit Darius's queen any more. He himſelf informs us of this memorable circumſtance, in a letter written by him to Parmenio, in which he commanded him to put to death certain Macedonians who had forced the wives of ſome foreign ſoldiers. In this letter was the following paragraph: "For as to myſelf, it will be found that I neither ſaw nor would ſee the wife of Darius; and did not ſuffer any one to ſpeak of her beauty before me."

Plutarch.

3. Iſocrates informs us, that Nicocles, king of Salamin, gloried in never having known any woman beſides

fides his wife; and was amazed that all other contracts of civil society should be treated with due regard, whilst that of marriage, the most sacred and inviolable of obligations, was broken through with impunity; and that men should not blush to commit an infidelity with respect to their wives, of which, should their wives be guilty, it would throw them into the utmost anguish and fury.

4. Henry VI. king of England, though unhappy in his family and government, was nevertheless possessed of many virtues. He was so remarkable for his chastity, that before his marriage he would not allow any lady of a suspicious character and unguarded conduct to frequent the court: and having observed one day some ladies with their bosoms uncovered, he turned away his eyes from the indecent object, and reprimanded them smartly in the simple dialect of the times: "Fy, fy (said he), for shame; forsooth ye be to blame."

5. In the reign of King Charles II. when licentiousness was at its height in Britain, a yeoman of the guards refused the mistress of a king. The lady, who was dissatisfied with her royal lover, had fixed her eyes upon this man, and thought she had no more to do than speak her pleasure. He got out of her way. He refused to understand her; and when she pressed him further, he said, "I am married." The story reached the king, with all its circumstances; but they who expected an extravagant laugh upon the occasion were disappointed. He sent for the person: he found him a gentleman, though reduced to that mean station; and "Odds fish, man (says he), though I am not honest enough to be virtuous myself, I value them that are." He gave him an appointment, and respected him for life.

6. In many parts the poorest people are the most virtuous and honest in this respect. In the Swede's dominion, towards the pole, there is no name for adultery. They thought it an offence man could not commit against man; and have no word to express it in their language. The unpolished Lapland peasant, with these thoughts, is, as a human creature, much more respectable than the gay Briton, whose heart is stained with vices, and estranged from natural affection; and he is happier. The perfect confidence mutually reposed between him and the honest partner of his breast, entails a satisfaction even in the lowest poverty. It gilds the humble hearth, and lights the cabin; their homely meal is a sacrifice of thanks, and every breath of smoke arises in incense. If hand be laid upon hand, it is sure affection; and if some infant plays about their knees, they look upon him and upon each other with a delight that greatness seldom knows, because it feels distrust.

CONTINENT, in general, an appellation given to things continued without interruption; in which sense we say, *continent fever*, &c.

CONTINENT, in *Geography*, a great extent of land not interrupted by seas, in contradistinction to island and peninsula, &c. See GEOGRAPHY. Sicily is said to have been anciently torn from the continent of Italy; and it is an old tradition, which some of our antiquaries still have a regard to, that Britain was formerly a part of the continent of France.

The world is usually divided into two great continents, the old and the new. Whether there exists in the southern hemisphere another continent, or the whole be only an immense watery region, is a question that for near three centuries has engaged the attention of the learned as well as the commercial world, and given rise to many interesting voyages and discoveries; concerning which, see the article *South-Sea*.

CONTINGENT, something casual or unusual.—Hence future contingent denotes a conditional event which may or may not happen, according as circumstances fall out.

CONTINGENT, is also a term of relation for the quota that falls to any person upon a division. Thus each prince of Germany in time of war is to furnish so many men, so much money, and munition, for his contingent.

CONTINUED, or CONTINUAL, in a general sense, means incessant, or proceeding without interruption.

Continued Fever, is such a one as sometimes remits, but never intermits or goes entirely off till its period.

Continued Bass, in *Music*, thus called, says Rousseau, because it is continued through the whole piece. Its principal use, besides that of regulating the harmony, is to support the voice, and preserve the tone.—They pretend that it was one Ludovico Viana, of whom a treatise still remains, who towards the end of the last century first put the continued bass in practice.

Continued Proportion, in *Arithmetic*, is that where the consequent of the first ratio is the same with the antecedent of the second; as 4 : 8 :: 8 : 16; in contradistinction to discrete proportion.

CONTINUITY, is defined by some schoolmen the immediate cohesion of parts in the same quantum: by others, a mode of body, whereby its extremities become one; and by others, a state of body resulting from the mutual implication of its parts. There are two kinds of continuity, mathematical and physical. The first is merely imaginary, since it supposes real or physical parts where there are none. The other, or physical continuity, is that state of two or more particles, in which their parts are so mutually implicated as to constitute one uninterrupted quantity or continuum.

CONTINUO, in *Music*, signifies the thorough bass, as *basso continuo* is the continual or thorough bass, which is sometimes marked in music-books by the letters B. C.

CONTOBABDITES, a sect in the sixth century. Their first leader was Severus of Antioch; who was succeeded by John the grammarian surnamed Philoponus, and one Theodosius whose followers were also called *Theodosians*. Part of them, who were willing to receive a book composed by Theodosius on the Trinity, made a separate body, and were called *Contobabdites*, from some place, which Nicephorus does not mention, but which must apparently have been the place where they held their assemblies. The Contobabdites allowed of no bishops; which is the only circumstance given us concerning them.

CONTOR, CONDOR, or CUNDUR, the American name

name of a ſpecies of VULTURE. See ORNITHOLOGY *Index*.

CONTORSION, in general, ſignifies the action of twiſting or wreſting a member of the body out of its natural ſituation. Rope-dancers accuſtom themſelves to contorſions of their limbs from their youth, to render the fibres of their articulations lax, and ſupple to all kinds of poſtures.

CONTORSION, in *Medicine*, has many ſignifications. 1. It denotes the iliac paſſion. 2. An incomplete diſlocation, when a bone is in part, but not entirely, forced from its articulation. 3. A diſlocation of the vertebræ of the back ſidewiſe, or crookedneſs of theſe vertebræ. And, 4. A diſorder of the head, in which it is drawn towards one ſide, either by a ſpaſmodic contraction of the muſcles on the ſame ſide, or a palſy of the antagoniſt muſcles on the other.

CONTORTÆ, the name of the 30th order in Linnæus's Fragments of a natural method, conſiſting of plants which have a ſingle petal, which is twiſted or bent to one ſide. This order contains the following genera, viz. echites, cerbera, gardenia, genipa, microcnemum, nerium, periploca, rawolfia, tabernæmontana, vinca, apocynum, aſclepias, comeraria, ceropegia, cynanchum, plumeria, ſtapelia. See BOTANY *Index*.

CONTOUR, in *Painting*, the outline, or that which defines a figure.

A great part of the ſkill of the painter lies in managing the contours well. Contour, with the Italian painters, ſignifies the lineaments of the face.

CONTOURNE, in *Heraldry*, is uſed when a beaſt is repreſented ſtanding or running with its face to the ſiniſter ſide of the eſcutcheon, they being always ſuppoſed to look to the right, if not otherwiſe expreſſed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lathe. This ſort of work ſeems to have had its origin in Greece; and to have been deſigned to perpetuate the memories of great men, particularly thoſe who had borne away the prize at the ſolemn games. Such are thoſe remaining of Homer, Solon, Euclid, Pythagoras, Socrates, and ſeveral athletæ.

CONTRA-HARMONICAL *Proportion*, is that relation of three terms, in which the difference of the firſt and ſecond is to the difference of the ſecond and third, as the third is to the firſt. Thus, for inſtance, 3, 5, and 6, are numbers contra-harmonically proportional; for 2 : 1 :: 6 : 3.

CONTRA-Mure, in *Fortification*, is a little wall built before another partition wall, to ſtrengthen it, ſo that it may receive no damage from the adjacent buildings.

CONTRABAND, in *Commerce*, a prohibited commodity or merchandiſe, bought or ſold, imported or exported, in prejudice to the laws and ordinances of a ſtate, or the public prohibitions of the ſovereign. Contraband goods are not only liable to confiſcation themſelves, but alſo ſubject all other allowed merchandiſe found with them in the ſame box, bale, or parcel, together with the horſes, waggons, &c. which conduct them. There are contrabands likewiſe, which, beſides the forfeiture of the goods, are attended with ſeveral penalties and diſabilities.

CONTRACT, in a general ſenſe, a mutual conſent of two or more parties, who voluntarily promiſe and oblige themſelves to do ſomething; pay a certain ſum, or the like. All donations, exchanges, leaſes, &c. are ſo many different contracts.

CONTRACT is particularly uſed, in common law, for an agreement or covenant between two, with a lawful conſideration or cauſe. As, if I ſell my horſe for money; or covenant, in conſideration of 20l. to make you a leaſe of a farm; theſe are good contracts, becauſe there is *quid pro quo*.

Uſurious CONTRACT, is a contract to pay more intereſt for money than the law allows. See USURY.

Thoſe contracts are ſaid to be *null* which the law prohibits the making of; ſuch are all contracts between perſons incapable of contracting, as minors, religious, lunatics, wives without conſent of their huſbands, &c.

CONTRACT is alſo uſed for the inſtrument in writing, which ſerves as a proof of the conſent granted, and the obligation paſſed between the parties.

Among the ancient Romans, contracts, and all voluntary acts, were written, either by the parties themſelves, or by one of the witneſſes, or by a domeſtic ſecretary of one of the parties, whom they called a *notary*, but who was no public perſon as among us.

The contract, when finiſhed, was carried to the magiſtrate, who gave it a public authority by receiving it *inter acta*, into the number of acts under his juriſdiction; giving each of the parties a copy thereof, tranſcribed by his clerks or domeſtic regiſters, and ſealed with his ſeal. Which practice paſſed into France, where it obtained a long time.

CONTRACTILE FORCE, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themſelves up again to their former dimenſions.

CONTRACTION, in *Phyſics*, the diminiſhing the extent or dimenſions of a body, or the cauſing its parts to approach nearer to each other; in which ſenſe it ſtands oppoſed to dilation or expanſion.

CONTRACTION is frequently uſed by anatomical writers, to expreſs the ſhrinking up of a fibre, or an aſſemblage of fibres, when extended.

Convulſions and ſpaſms proceed from a preternatural contraction of the fibres of the muſcles of the part convulſed. On the contrary, paralytic diſorders generally proceed from a too great laxneſs of the fibres of the part affected; or from the want of that degree of contraction neceſſary to perform the natural motion or action of the part. In the firſt, therefore, the animal ſpirits are ſuppoſed to flow, either in too great a quantity, or irregularly; and, in the laſt, the animal ſpirits are either denied a free paſſage into the part affected, or the tenſion of the fibrillæ is ſuppoſed inſufficient to promote the circulation.

CONTRACTION, in *Grammar*, is the reducing of two ſyllables into one, as *can't* for *cannot*, *ſhould'ſt* for *ſhouldeſt*, &c.

CONTRADICTION, a ſpecies of direct oppoſition, wherein one thing is found diametrically oppoſite to another.

CONTRADICTORY PROPOSITIONS, are oppoſite

sites, one of which imports a mere and naked denial of the other.

Seeming contradictories is when the members of a period quite disagree in appearance and sound, but perfectly agree and are consistent in sense: thus,

> Cowards die many times before their death:
> The valiant never taste of death but once.
>
> *Shakespeare.*

CONTRAFISSURE, in *Surgery*, a kind of fracture, or fissure, in the cranium, which sometimes happens on the side opposite to that which received the blow, or at least at some distance from it.

CONTRAINDICATION, in *Medicine*, is an indication which forbids that to be done which the main scope of a disease points out.

Suppose, e. gr. in the cure of a disease a vomit were judged proper; if the patient be subject to a vomiting of blood, it is a sufficient contraindication as to its exhibitition.

CONTRARIETY, an opposition between two things, which imports their being contrary to one another; and consists in this, that one of the terms implies a negation of the other, either mediately or immediately; so that contrariety may be said to be the contrast, or opposition of two things, one of which imports the absence of the other, as love and hatred.

CONTRAST; opposition or dissimilitude of figures, by which one contributes to the visibility or effect of the others. See Resemblance.

Contrast, in *Painting* and *Sculpture*, expresses an opposition or difference of position, attitude, &c. of two or more figures, contrived to make variety in a painting, &c.; as where, in a group of three figures, one is shown before, another behind, and another sidewise, they are said to be in contrast.

The contrast is not only to be observed in the position of several figures, but also in that of the several members of the same figures: thus, if the right arm advance farthest, the right leg is to be hindermost; if the eye be directed one way, the arm to go the contrary way, &c. The contrast must be pursued even in the drapery.

Contrast, in *Architecture*, is to avoid the repetition of the same thing, in order to please by variety.

CONTRATE-wheel, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to those of the other wheels, from whence it takes its name. See *Watch-Making*.

CONTRAVALLATION, or *the Line of Contravallation*, in *Fortification*, a trench guarded with a parapet, and usually cut round about a place by the besiegers, to secure themselves on that side, and to stop the sallies of the garrison. See Fortification.

CONTRAVENTION, in *Law*, a man's failing to discharge his word, obligation, duty, or the laws or customs of the place.

CONTRAYERVA. See Dorstenia, Botany *Index*.

CONTRE, in *Heraldry*, an appellation given to several bearings, on account of their cutting the shield contrary and opposite ways: thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the same nature opposite to each other, so as colour may be opposed to metal, and metal to colour.

CONTRIBUTION, the payment of each person's quota of the part he is to bear in some imposition, or common expence. See Contingent, &c.—Contributions are either involuntary, as those of taxes and imposts; or voluntary, as those of expences for carrying on some undertaking for the interest of the community.

Contributions, in a military sense, are impositions paid by frontier countries to secure themselves from being plundered and ruined by the enemy's army. The peasants till their ground under the faith of contributions, as securely as in the time of profound peace.

CONTRITION, in *Theology*, a sorrow for our sins, resulting from the reflection of having offended God, from the sole consideration of his goodness, without any regard to the punishment due to the trespass, and attended with a sincere resolution of forsaking them. The word is derived from the Latin *conterere*, to break or bruise.

CONTROL is properly a double register kept of acts, issues, &c. of the officers or commissioners in the revenue, army, &c. in order to perceive the true state thereof, and to certify the truth, and the due keeping of the acts subject to the enregisterment.

CONTROLLER, an officer appointed to control or oversee the accounts of other officers; and, on occasion, to certify whether or not things have been controlled.

In Britain we have several officers of this name; as controller of the king's house, controller of the navy, controller of the customs, controller of the mint, &c.

Controller of the Hanaper, an officer who attends the lord chancellor daily, in term and in seal-time, to take all things sealed in leathern bags from the clerks of the hanaper, and to mark the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the same, and so charge the clerk of the hanaper with them.

Controller of the Household, the second officer under the lord steward. The name of his office comes from the French word *contrerouler*. His office is to control the accounts and reckonings of the Green Cloth, of which board he is always a member. He carries a white staff, and is always one of the privy-council. He has 107l. 17s. 6d. a-year wages, and 1092l. 2s. 6d. board wages.

Controller of the Pipe, an officer of the exchequer, who makes out a summons twice every year, to levy the farms and debts of the pipe. See Pipe and Exchequer.

Controllers of the Pells, two officers of the exchequer who are the chamberlain's clerks, and keep a control of pell of the receipts and goings out.

CONTUMACY, in *Law*, a refusal to appear in court when legally summoned, or the disobedience to the rules and orders of a court having power to punish such offence.

CONTUSION,

CONTUSION, in *Medicine* and *Surgery*, any hurt of the body that is inflicted by a blunt instrument. See SURGERY.

CONVALESCENCE, in *Medicine*, the insensible recovery of health; or that state in which, after the cure of a disorder, the body which has been reduced, has not yet regained its vigour, but begins to resume its powers. Proper aliments conduce to the re-establishment of the languid faculties; but as the tone of the bowels is weakened, the digestive faculty is not equal to its office, which is shown by light sweats over the whole body; and the smallest excess in this respect is oftentimes the occasion of dangerous relapses. A person in this state is like a taper relumined, which the least degree of wind is sufficient to extinguish.

CONVALLARIA, or *Lily of the Valley*, in *Botany*, a genus of plants, belonging to the hexandria class; and in the natural method ranking under *Sarmentaceæ*. See BOTANY *Index*.

CONVENARUM URBS, or *Lugdunum*, in *Ancient Geography*, a town of the Convenæ, a people of Gallia Narbonensis, at the foot of the Pyrenees. Its origin was owing to the Sertorian war, Pompey compelling the robbers of the Pyrenees and fugitive slaves to settle there, (Pliny). It stood near the head of the Garonne. Now St Bertrand, in Gascony. E. Long. 30. Lat. 43. 15.

CONVENTICLE, a diminutive of convent; denoting, properly, a cabal, or secret assembly, of a part of the monks of a convent, to make a brigue or party in the election of an abbot. From the ill use of these assemblies, the word is come into disrepute; and now stands for any mischievous, seditious, or irregular assembly. F. Douciné observes, the occidentals always esteemed the fifth general council an unlawful conventicle.

The term conventicle is said, by some, to have been first applied in England to the schools of Wickliff, and has been since used to signify the religious assemblies of all in that country who do not conform to the established doctrines and worship of the church of England.

By 22 Car. II. cap. 1. it is enacted, That if any persons of the age of 16 years, subjects of this kingdom, shall be present at any conventicle, where there are five or more assembled, they shall be fined 5s. for the first offence, and 10s. for the second; and persons preaching incur a penalty of 20l. Also suffering a meeting to be held in a house, &c. is liable to 20l. penalty. Justices of peace have power to enter such houses, and seize persons assembled, &c. And if they neglect their duty, they shall forfeit 100l. And if any constable, &c. know of such meetings, and do not inform a justice of peace, or chief magistrate, &c. he shall forfeit 5l. But the 1st W. and M. cap. 18. ordains, that protestant dissenters shall be exempt from penalties: though, if they meet in a house with the doors locked, barred, or bolted, such dissenters shall have no benefit from 1 W. and M. Officers of the government, &c. present at any conventicle, at which there shall be ten persons, if the royal family be not prayed for in express words, shall forfeit 40l. and be disabled (Stat. 10 Anne, cap. 2.)

CONVENTION, a treaty, contract, or agreement between two or more parties.

CONVENTION is also a name given to an extraordinary assembly of parliament, or the estates of the realm, held without the king's writ. Of this kind was the convention parliament which restored Charles II. This parliament met above a month before his return, and sat full seven months after his restoration, and enacted several laws still in force, which were confirmed by stat. 13 Car. II. c. 7. and c. 14. Such also was the convention of estates in 1688, who upon the retreat of King James II. came to a conclusion that he had abdicated the throne, and that the right of succession devolved to King William and Queen Mary; whereupon their assembly expired as a convention, and was converted into a parliament.

Convention of Estates, in Scotland, was partly of the nature of a parliament; but differing in this, that the former could only lay on taxes, while parliament could both impose taxes and make laws.

CONVENTUAL, something belonging to a convent or monastery. See MONASTERY, and COENOBITE.

CONVENTUAL, is particularly used for a religious who actually resides in a convent; in contradistinction to those who are only guests, or are entertained there, or are in possession of benefices depending on the house. See MONK.

CONVENTUS JURIDICI, were courts of justice established in the Roman provinces; with a resort or extent of jurisdiction, circumscribed and confined within certain limits of district, whither all who were of the resort were to repair for justice. The unseasonable affectation of changing forms of war into forms of civil courts, proved the ruin of Varus and of three legions in Germany, (Florus). *Conventum agere*, is to hold a court of justice.

CONVERGING or *Convergent Lines*, in *Geometry*, are such as continually approach nearer one another, or whose distances become still less and less. These are opposed to divergent lines, the distances of which become continually greater: those lines which converge one way, diverge the other.

Converging Rays, in *Optics*, those rays that, issuing from divers points of an object, incline towards another, till at last they meet and cross, and then become diverging rays.

Converging Series, a series of terms or quantities that always decrease the farther they proceed, or which tend to a certain magnitude or limit: in opposition to diverging series, or such as become continually larger and larger.

CONVERSATION, or DISCOURSE, signifies an interlocution between two, or among more persons: with this distinction, that conversation is used for any general intercourse of sentiments whatever, whereas a discourse means a conversation limited to some particular subject.

There is no part, perhaps, of social life, which affords more real satisfaction than those hours which one passes in rational and unreserved conversation. That conversation, however, may answer the ends for which it was designed, the parties who are to join in it must come together with a determined resolution to please, and to be pleased.

In

In the conduct of it, be not eager to interrupt others, or uneasy at being yourself interrupted; since you speak either to amuse or instruct the company, or to receive those benefits from it. Give all, therefore, leave to speak in turn. Hear with patience, and answer with precision. Inattention is ill manners; it shows contempt; and contempt is never forgiven.

Trouble not the company with your own private concerns, as you do not love to be troubled with those of others. Yours are as little to them as theirs are to you. You will need no other rule whereby to judge of this matter.

Contrive, but with dexterity and propriety, that each person may have an opportunity of discoursing on the subject with which he is best acquainted. He will be pleased, and you will be informed. By observing this rule, every one has it in his power to assist in rendering conversation agreeable; since, though he may not choose, or be qualified, to say much himself, he can propose questions to those who are able to answer them.

Avoid stories, unless short, pointed, and quite *a-propos*. He who deals in them, says Swift, must either have a very large stock, or a good memory, or must often change his company. Some have a set of them strung together like onions; they take possession of the conversation by an early introduction of one, and then you must have the whole rope; and there is an end of every thing else, perhaps, for that meeting, though you may have heard all twenty times before.

Talk often, but not long. The talent of haranguing private company is insupportable. Senators and barristers are apt to be guilty of this fault; and members who never harangue in the house will often do it out of the house. If the majority of the company be naturally silent, or cautious, the conversation will flag, unless it be often renewed by one among them who can start new subjects. Forbear, however, if possible, to broach a second before the first is out, lest your stock should not last, and you should be obliged to come back to the old barrel. There are those who will repeatedly cross upon and break into the conversation with a fresh topic, till they have touched upon all and exhausted none. Economy here is necessary for most people.

Laugh not at your own wit and humour; leave that to the company.

When the conversation is flowing in a serious and useful channel, never interrupt it by an ill-timed jest. The stream is scattered, and cannot be again collected.

Discourse not in a whisper, or half-voice, to your next neighbour. It is ill-breeding, and, in some degree, a fraud; conversation-stock being, as one has well observed, a joint and common property.

In reflections on absent people, go no farther than you would go if they were present. "I resolve (says Bishop Beveridge) never to speak of a man's virtues to his face, nor of his faults behind his back:"—A golden rule! the observation of which would, at one stroke, banish flattery and defamation from the earth.

CONVERSE, in *Mathematics*. One proposition is called the *converse* of another, when, after a conclusion is drawn from something supposed in the converse proposition, that conclusion is supposed; and then, that which in the other was supposed, is now drawn as a conclusion from it: thus when two sides of a triangle are equal, the angles under these sides are equal; and, on the converse, if these angles are equal, the two sides are equal.

CONVERSION, in a moral sense, implies a repentance for a temper and conduct unworthy our nature, and unbecoming our obligations to its Author, and a resolution to act a wiser and a better part for the future.

CONVERSION, in *War*, a military motion, whereby the front of a battalion is turned where the flank was, in case the battalion is attacked in the flank.

Conversion of Equations, the same with reduction of equations by multiplication. See ALGEBRA.

CONVERT, a person who has undergone a conversion.

CONVERT is chiefly used in respect of changes from one religion, or religious sect, to another. Converts with relation to the religion turned to, are denominated *apostates* with regard to that they have relinquished.

The Jews formerly converted to Christianity in England, were called *conversos*. Henry III. built them a house in London, and allowed them a competent subsistence for their lives; which house was called *domus conversorum*. But the number afterwards increasing, they grew a burden to the crown; upon which they were distributed among the monasteries: and after the expulsion of the Jews under Edward III. the *domus conversorum* was given for keeping of the rolls.

CONVERTS, in a monastic sense, are lay-friars, or brothers, admitted for the service of the house; without orders, and not allowed to sing in the choir. Till the eleventh century, the word was used for persons who embraced the monkish life at the age of discretion; by which they were distinguished from those devoted in their childhood by their parents, called *oblati*. But in the eleventh century, when they began to receive into monasteries illiterate persons, incapable of being clerks, and only destined for bodily labour, the signification of the word was necessarily changed. F. Mabillon observes, that it was John first abbot of Vallombrosa who first introduced these brother-converts, distinguished by their state from the monks of the choir, who were then either clerks or capable of becoming so.

CONVEX, an appellation given to the exterior surface of gibbous or globular bodies; in opposition to the hollow inner surface of such bodies, which is called *concave*; thus we say, a convex frieze, lens, mirror, superfices, &c.

CONVEXITY, the exterior surface of a convex, i. e. gibbous and globular thing; in opposition to concavity, or the inner surface, which is hollow or depressed. See CONCAVE.

The word is of particular import in catoptrics and dioptrics; where it is applied to mirrors and lenses.

A convex mirror represents its images smaller than the objects; as a concave one represents them larger: a convex mirror reflects the rays from it, diverging; and therefore disperses and weakens their effect: as a concave one reflects them converging; so as they

concur in a point, and have their effect increased; and by how much the mirror is a portion of a smaller sphere, by so much does it diminish the objects, and disperse the rays the more. See MIRROR.

A convex lens is either convex on both sides, called a *convexo-convex;* or it is plain on one side and convex on the other, called a *plano-convex;* or concave on one side and convex on the other, called a *convexo-concave*, or *concavo-convex*, as the one or the other surface prevails, i. e. as this or that is a portion of a smaller sphere. All convex lenses inflect the rays of light in their passage, i. e. send them out from their convex surface converging, so as that they concur in a point or focus. Hence all convex lenses magnify, i. e. represent their images larger than their objects; and this the more as they are portions of smaller spheres.

CONVEYANCE, in *Law*, a deed or instrument that passes land, &c. from one person to another.

CONVICT, in common law, a person that is found guilty of an offence by the verdict of a jury. See the following article.

CONVICTION, in *Law*. When a jury has given a verdict upon trial, finding the prisoner guilty, he is said to be *convicted* of the crime whereof he stands indicted. See TRIAL.

When the offender is thus convicted, there are two collateral circumstances that immediately arise. 1. On a conviction in general for any felony, the reasonable expences of prosecution are by statute 25 Geo. II. c. 36. to be allowed the prosecutor out of the country-stock, if he petitions the judge for that purpose; and by statute 17 Geo. II. c. 3. poor persons, bound over to give evidence, are likewise entitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larceny in particular, the prosecutor shall have restitution of his goods by virtue of the statute 21 Hen. VIII. c. 11. For by the common law there was no restitution of goods upon an indictment; because it is at the suit of the king only; and therefore the party was enforced to bring an appeal of robbery, in order to have his goods again. But, it being considered that the party prosecuting the offender by indictment, deserves to the full as much encouragement as he who prosecutes by appeal, this statute was made, which enacts, that if any person be convicted of larceny by the evidence of the party robbed, he shall have full restitution of his money, goods, and chattels, or the value of them out of the offender's goods, if he has any, by a writ to be granted by the justices. And the construction of this act having been in great measure conformable to the law of appeals, it has therefore in practice superseded the use of appeals of larceny. For instance, as formerly upon appeals, so now upon indictments of larceny, this writ of restitution shall reach the goods so stolen, notwithstanding the property of them is endeavoured to be altered by sale in market overt. And though this may seem somewhat hard upon the buyer, yet the rule of law is, that *spoliatus debet ante omnia restitui*, especially when he has used all the diligence in his power to convict the felon. And, since the case is reduced to this hard necessity, that either the owner or the buyer must suffer, the law prefers the right of the owner, who has done a meritorious act by pursuing a felon to condign punishment, to the right of the buyer, whose merit is only negative, that he has been guilty of no unfair transaction. And it is now usual for the court, upon the conviction of a felon, to order, without any writ, immediate restitution of such goods as are brought into court, to be made to the several prosecutors. Or else, secondly, without such writ of restitution, the party may peaceably retake his goods wherever he happens to find them, unless a new property be fairly acquired therein. Or, lastly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods, and recover a satisfaction in damages. But such action lies not before prosecution; for so felonies would be made up and healed: and also recaption is unlawful, if it be done with intention to smother and compound the larceny; it then becoming the heinous offence of *theft-bote*.

It is not uncommon, when a person is convicted of a misdemeanour, which principally and more immediately affects some individual, as a battery, imprisonment, or the like, for the court to permit the defendant to *speak with the prosecutor*, before any judgement is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done to reimburse the prosecutor his expences, and make him some private amends, without the trouble and circuity of a civil action. But it is surely a dangerous practice; and, though it may be entrusted to the prudence and discretion of the judges in the superior courts of record, it ought never to be allowed in local or inferior jurisdictions, such as the quarter-sessions; where prosecutions for assaults are by this means too frequently commenced, rather for private lucre than for the great ends of public justice. Above all, it should never be suffered, where the testimony of the prosecutor himself is necessary to convict the defendant; for by this means the rules of evidence are entirely subverted; the prosecutor becomes in effect a plaintiff, and yet is suffered to bear witness for himself. Nay, even a voluntary forgiveness by the party injured, ought not, in true policy, to intercept the stroke of justice. "This (says an elegant writer who pleads with equal strength for the *certainty*, as for the lenity of punishment) may be an act of good nature and humanity, but it is contrary to the good of the public. For although a private citizen may dispense with satisfaction for his private injury, he cannot remove the necessity of public example. The right of punishing belongs not to any one individual or particular, but to the society in general, or to the sovereign who represents that society; and a man may renounce his own portion of this right, but he cannot give up that of others."

CONVICTION, in *Theology*, expresses the first degree of repentance, wherein the sinner becomes sensible of his guilt, of the evil nature of sin, and of the danger of his own ways.

CONVOCATION, an assembly of the clergy of England, by their representatives, to consult of ecclesiastical matters. It is held during the session of parliament, and consists of an upper and a lower house. In the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors; consisting of all the deans and archdeacons, of one proctor

for

for every chapter, and two for the clergy of every diocefe, in all 143 divines; viz. 22 deans, 53 archdeacons, 24 prebendaries, and 44 proctors of the diocefan clergy. The lower houfe choofes its prolocutor; whofe bufinefs it is to take care that the members attend, to collect their debates and votes, and to carry their refolutions to the upper houfe. The convocation is fummoned by the king's writ, directed to the archbifhop of each province, requiring him to fummon all bifhops, deans, archdeacons, &c.

The power of the convocation is limited by a ftatute of Henry VIII. They are not to make any canons or ecclefiaftical laws without the king's licenfe; nor when permitted to make any, can they put them in execution, but under feveral reftrictions. They have the examining and cenfuring all heretical and fchifmatical books and perfons, &c. but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their fervants, have the fame privileges as members of parliament.

Since the year 1665, when the convocation of the clergy gave up the privilege of taxing themfelves to the houfe of commons, they feldom have been allowed to do any bufinefs; and are generally prorogued from time to time till diffolved, a new one being generally called along with a new parliament. The only equivalent for giving up the privilege of taxing themfelves, was their being allowed to vote at elections for members to the houfe of commons, which they had not before.

CONVOLUTION, a winding motion, proper to the trunks of fome plants, as the convolvulus, or bindweed; the clafpers of vines, bryony, &c.

CONVOLVULUS, BIND-WEED; a genus of plants of the pentandria clafs, and in the natural method ranking under the 20th order, *Campanaceæ*. See BOTANY and MATERIA MEDICA *Index*.

CONVOY, in naval affairs, one or more fhips of war, employed to accompany and protect merchant fhips, and prevent their being infulted by pirates, or the enemies of the ftate in time of war.

CONVOY, in military matters, a body of men that guard any fupply of men, money, ammunition, or provifions, conveyed by land into a town, army, or the like, in time of war.

CONUS, a CONE, in *Botany*; a fpecies of fruit or fcaly feed-veffel, fo termed by Tournefort and other botanifts. Linnæus has fubftituted STROBILUS in its place.

CONUS, the *cone-fhell*, a genus of fhells. See CONCHOLOGY *Index*.

CONVULSION, a preternatural and violent contraction of the membranous and mufcular parts of the body. See MEDICINE *Index*.

CONWAY, a market-town of Caernarvonfhire in North Wales, fituated near the mouth of a river of the fame name, 15 miles weft of St Afaph. W. Long. 3. 50. N. Lat. 53. 20.

CONYZA, FLEABANE; a genus of plants of the fyngenefia clafs, ranking under the 49th natural order, *Compofitæ*. See BOTANY *Index*.

CONZA, a town of the kingdom of Naples in Italy, fituated in the farther principate, on the river Offanto, 50 miles fouth-eaft of the city of Naples. E. Long. 16. 0. N. Lat. 41. 0. It is the fee of an archbifhop.

COOK, SIR ANTHONY, defcended from Sir Thomas Cook lord mayor of London, was born in 1506, and fuppofed to have been educated at Cambridge. He was fo eminent for his learning, piety, and prudence, that the guardians of King Edward VI. appointed him to be his chief inftructor in learning, and to form his manners. He had four daughters; and being refolved to have fons by education, left he fhould have none by birth, he taught his daughters thofe leffons by night that he had inftilled into the prince by day; he was happy in his endeavours, as they proved learned in Greek and Latin, and equally diftinguifhed by virtue, piety, and good fortune. Mildred was married to the great Lord Burleigh: Ann to Sir Nicholas Bacon, lord keeper of the great feal; Elizabeth to Sir John Ruffel, fon and heir of Francis earl of Bedford; and Catharine to Sir Henry Killigrew. He lived in exile during the Marian perfecution; and returning on the acceffion of Queen Elizabeth, fpent the reft of his days in peace and honour, dying in 1576.

COOK, *Captain James*, one of the ableft and moft celebrated navigators of any country, was the fon of James Cook, a labourer or fervant in hufbandry, and fuppofed to have been a native of the county of Northumberland, and was born on the 27th of October 1728, at the village of Marton in the north riding of Yorkfhire. He was one of nine children, all of whom are now dead except a daughter, who married a fiherman of Redcar. He received the firft rudiments of education from the fchoolmiftrefs of the village; and afterwards, on his father's removal to Great Ayton, he was put to a day-fchool, at the expence of Mr Skottow his father's employer, where he was inftructed in writing and in a few of the firft rules of arithmetic. Before the age of thirteen he was bound apprentice to Mr W. Sanderfon, a haberdafher or fhopkeeper at Straiths, about ten miles from Whitby: but fome difagreement taking place between him and his mafter, he indulged his own inclination in binding himfelf apprentice to Meffrs Walkers of Whitby, who had feveral veffels in the coal trade; and after ferving a few years longer in the fituation of a common failor, he was at length raifed to be mate of one of Mr Walker's fhips. During all this period it is not recollected that he exhibited any thing peculiar either in his abilities or conduct.

Early in the year 1755, when hoftilities broke out between France and England, Cook entered on board the Eagle of fixty guns, to which veffel Sir Hugh Pallifer was foon after appointed, who foon diftinguifhed him as an active and diligent feaman; and his promotion was forwarded by a letter of recommendation which was written by Mr Ofbaldefton, member for Scarborough, at the requeft of feveral neighbours, in Mr Cook's favour. On the 15th of May 1759, he was appointed mafter of the Mercury, which foon after failed to America, and joined the fleet under Sir Charles Saunders at the memorable fiege of Quebec. His intereft with the admiralty appears even then to have been very ftrong; for on Mr Ofbaldefton's letter he was appointed mafter of the Grampus floop; but the proper mafter having unexpectedly returned to her,

Cook.

her, the appointment did not take place. Four days after, he was made maſter of the Garland; when upon inquiry it was found that he could not join her, as the veſſel had already ſailed: and the next day, May 15th 1759, he was made maſter of the Mercury. On this occaſion he was recommended by Captain Palliſer to a difficult and dangerous ſervice, viz. to take the ſoundings of the river St Lawrence, between the iſland of Orleans and the north ſhore, which he performed in the moſt complete manner; and ſoon afterwards he was employed to ſurvey the moſt dangerous parts of the river below Quebec: theſe were his firſt efforts with the pencil. After this expedition he was appointed, on the 22d of September, maſter of the Northumberland, ſtationed at Halifax, where he firſt read Euclid, and applied to aſtronomy and other branches of ſcience. In the year 1762, he was with the Northumberland, aſſiſting at the recapture of Newfoundland; and in the latter end of the ſame year he returned to England, and married, at Barking in Eſſex, Miſs Elizabeth Batts. Early in 1763, when Admiral (then Captain) Greaves was appointed governor of Newfoundland, Mr Cook went out with him to ſurvey the coaſts of that iſland. At the end of the ſeaſon he returned to England; but in the beginning of 1764, Sir Hugh Palliſer being appointed governor of Newfoundland and Labradore, Mr Cook accompanied him in the ſame capacity of ſurveyor, and had the Granville ſchooner to attend him on that buſineſs: in this ſituation he continued till 1767.

While Mr Cook remained on this ſtation, he had an opportunity of exhibiting publicly a ſpecimen of his progreſs in the ſtudy of aſtronomy, in a ſhort paper printed in the 57th volume of the Philoſophical Tranſactions, entitled "An obſervation of an eclipſe of the ſun at the iſland of Newfoundland, Auguſt 5. 1766, with the longitude of the place of obſervation deduced from it." Mr Cook's obſervation was made at one of the Burgeo iſlands near Cape Ray, in N. Lat. 47° 56′ 19″; and by the compariſons of it made by Mr Mitchel, with an obſervation of Dr Hornſby at Oxford, it appeared to have been accurately done: and Mr Cook at that time obtained the character of an able aſtronomer.

In the mean time, a ſpirit for geographical diſcoveries, which had gradually declined ſince the beginning of the 17th century, began to diſcover itſelf anew. Two voyages of this kind had been performed in the reign of George II. the one under Captain Middleton, the other by Captains Moore and Smyth, with a view to diſcover a north-weſt paſſage through Hudſon's Bay to the Eaſt Indies. Two others, under Captains Byron, Wallis, and Carteret, had been undertaken ſoon after the concluſion of the peace in 1763, by order of his preſent majeſty; and before the return of theſe navigators, who were ordered to ſail round the world, another voyage was reſolved upon for aſtronomical purpoſes. It having been calculated that a tranſit of Venus over the ſun's diſk would happen in 1769, a long memorial to his majeſty was preſented by the Royal Society; in which they ſet forth the great importance of making proper obſervations on this phenomenon, the regard that had been paid to it by the different courts of Europe; and intreating, among other things, that a veſſel might be fitted out, at the expence of government for conveying proper perſons to ſome of the Friendly Iſlands, in order to make the neceſſary obſervations. This being complied with on the part of his majeſty, Alexander Dalrymple, Eſq. an eminent member of the Royal Society, was appointed to take the command of the bark appropriated for the purpoſe. In the execution of the project, however, an unexpected difficulty occurred. Mr Dalrymple, ſenſible of the impoſſibility of guiding a veſſel through unknown and dangerous ſeas without any proper command over the crew, demanded a brevet commiſſion as captain of the veſſel, in the ſame manner as had formerly been granted to Dr Halley in a voyage of diſcovery made by him. This commiſſion Sir Edward Hawke abſolutely refuſed to ſign; declaring, when preſſed upon the ſubject, that he would rather ſuffer his right hand to be cut off than truſt any of his majeſty's ſhips to a perſon who had not been properly bred to the ſervice; and in this proceeding he ſeemed to be juſtified by the mutinous behaviour of Dr Halley's crew; who, denying the legality of his authority over them, had involved him in a very diſagreeable diſpute, and which was attended with pernicious conſequences. Mr Dalrymple, on the other hand, being equally determined in his refuſal to proceed without the authority in queſtion, there was a neceſſity for finding out ſome perſon of ſcience who might alſo be free from the objection made by Sir Edward Hawke. Mr Cook therefore was propoſed by Mr Stephens; and his recommendation being ſeconded by Sir Hugh Palliſer, he was immediately appointed to direct the expedition; and on this occaſion was promoted to the rank of lieutenant in his majeſty's ſervice.

Mr Cook's commiſſion as lieutenant was dated May 25. 1768; a veſſel of 370 tons, named the *Endeavour*, was provided for him; and while the neceſſary preparations were making for the voyage, Captain Wallis returned. It having been recommended to this gentleman to fix upon a proper place for making the aſtronomical obſervations, he had accordingly choſen the iſland named by him *George's Iſland*, but ſince known by the name of *Otaheite*; judging alſo that Port Royal harbour in it would afford an eligible ſituation. This propoſal being accepted, directions for the purpoſe were accordingly given to Mr Cook, with whom Mr Charles Green was joined in the aſtronomical part; the latter having been aſſiſtant to Dr Bradley in the royal obſervatory at Greenwich, and thus judged to be every way qualified for the office. The lieutenant was likewiſe accompanied by Mr Banks, now Sir Joſeph Banks, Dr Solander, &c. The principal deſign of the voyage was, as has already been hinted, to make obſervations on the tranſit of Venus; but this being done, Mr Cook was directed to make further diſcoveries in the Pacific ocean; and on the 30th of July 1768, he ſet ſail on his expedition. An account of the voyage, and the diſcoveries made during the time of it, is given in the next article; here it is ſufficient to obſerve, that throughout the whole Mr Cook approved himſelf an able ſeaman; and from his behaviour both to his own people and to the ſavage nations he occaſionally met with, ſhowed a moſt exact regard to the rules both of juſtice and humanity. On his firſt arrival at Otaheite, the following regulations were drawn up for his people, which he took care ſhould be punctually obeyed.

1. To

1. To endeavour, by every fair means, to cultivate a friendſhip with the natives, and to treat them with all imaginable humanity. 2. A proper perſon or perſons to be appointed to treat with the natives for proviſions, fruits, &c. and no other perſon belonging to the ſhip to do ſo without leave. 3. Every perſon on ſhore to attend punctually to his duty, and to pay proper attention to his tools or arms; and if loſt through negligence, to have the full value charged againſt his pay, with ſuch farther puniſhment inflicted as occaſion might require. 4. The ſame penalty to be inflicted on every one who ſhould embezzle, trade with, or offer to trade with, any part of the ſhip's ſtores; and, 5. No iron to be given in exchange for any thing but proviſions. His rigid adherence to theſe rules was manifeſted in ſeveral inſtances, particularly by ſeverely puniſhing the ſhip's butcher, who had threatened the life of a woman, wife to one of the chiefs of the iſland, for refuſing a ſtone hatchet on the terms he propoſed. On erecting their obſervatory, in order to go through the aſtronomical operations, an accident happened which had like to have diſconcerted the whole ſcheme. This was the loſs of their quadrant, which had been ſtolen by ſome of the natives; but, chiefly through the exertions of Mr Banks, it was recovered, and the obſervations made accordingly. Scarce was this accompliſhed, however, before another theft of the natives demanded the moſt ſerious conſideration of the commander. Some of them taking advantage of the attention of the officers being otherwiſe engaged, took the opportunity of breaking into one of the ſtore-rooms, and ſtealing from thence a bag of ſpike nails of no leſs than an hundred weight. This was a moſt important affair; for as thoſe nails were of great eſtimation among the Indians, the poſſeſſion of ſuch a quantity muſt undoubtedly have much leſſened their value, and thus rendered proviſions of every kind greatly dearer on the iſland than before. One of the thieves therefore being diſcovered, was puniſhed with 200 laſhes; notwithſtanding which he obſtinately refuſed to diſcover any of his accomplices. Repeated thefts committed afterwards required all the wiſdom and reſolution of Mr Cook to conduct himſelf in a proper manner. After due conſideration, he judged it to be a matter of importance to put an end to theſe practices at once, by doing ſomething which might engage the natives themſelves to prevent them for their common intereſt. This, however, he was not at preſent able to accompliſh; nor indeed did it ſeem poſſible to prevent them without uſing fire-arms, which from motives of humanity he ſtill determined to avoid. At laſt, after a ſtay of three months, when preparing to take his leave, the moſt diſagreeable adventure took place that he had hitherto met with. This was the deſertion of two of his people, who having married young women of that country, determined to take up their reſidence in it. Mr Cook was now obliged to ſeize ſome of the chiefs, and to inform them that they could not obtain their liberty unleſs the deſerters were recovered. This at laſt produced the deſired effect; the deſerters were given up, and Mr Cook ſet ſail, along with Tupia, (who had formerly been the prime miniſter to Oberea, a princeſs of the iſland) and a boy of 13 years of age, both of whom were deſirous of accompanying him to England.

Cook.

While Mr Cook proceeded to viſit others of the South ſea iſlands, Tupia occaſionally ſerved as an interpreter. On his arrival in New Zealand, Mr Cook found the people extremely hoſtile and inſolent. At their very firſt meeting, one of the natives having threatened to dart his lance into the boat, was ſhot dead. Another, having carried off Mr Green's hanger was fired at with ſmall ſhot; and upon his ſtill refuſing to reſtore it, was fired at with ball and killed. This, however, produced very little effect on the reſt, who offered to make an attack upon them, till ſeveral muſkets were fired with ſmall ſhot, which wounded three or four more. Next day the commander, having determined to force ſome of the natives on board, in order to conciliate their affections by kind treatment, directed his men to follow two canoes whom he perceived under way before him. One made her eſcape, but the other, not obſerving the boats in purſuit, was overtaken; on which the ſavages plied their oars ſo briſkly, that the ſhip's boats were not able to keep up with them. Tupia, whoſe language the New Zealanders underſtood, called to them to return, with aſſurances that no hurt ſhould be done them; but they continued their flight without minding him. A muſket was then fired over their heads with a view to intimidate them, but upon this they prepared to fight; and on the coming up of the boats began the attack with ſo much vigour, that the lieutenant's people were obliged to fire upon them with ball, by which four out of ſeven that were in the boat were killed, and the other three jumped into the water, and were taken on board.

This part of Mr Cook's conduct ſeems inconſiſtent with that humanity for which he was in general ſo eminently diſtinguiſhed; he was aware of the cenſure, and makes the following apology. "Theſe people certainly did not deſerve death for not chooſing to confide in my promiſes, or not conſenting to come on board my boat, even if they had apprehended no danger; but the nature of my ſervice required me to obtain a knowledge of their country, which I could no otherwiſe obtain but by forcing into it in an hoſtile manner, or gaining admiſſion through the confidence and good will of the people. I had already tried the power of preſents without effect; and I was now prompted by my deſire to avoid farther hoſtilities, to attempt to get ſome of them on board; the only method we had left of convincing them that we intended them no harm, and had it in our power to contribute to their gratification and convenience. Thus far my intentions certainly were not criminal; and though in the conteſt, which I had not the leaſt reaſon to expect, our victory might have been complete without ſo great an expence of life; yet in ſuch ſituations, when the command to fire has once been given, no man can pretend to reſtrain its exceſs, or preſcribe its effect."

Notwithſtanding the diſaſter juſt mentioned, to which the three New Zealanders, who were taken on board, had been witneſſes, they were ſoon conciliated, and began to ſing with a degree of taſte that ſurpriſed the Engliſh gentlemen. They were boys, the oldeſt about 19 and the youngeſt about 11; but no kindneſs which

Cook.

which could be ſhown them was in any degree effectual to bring about a reconciliation with the reſt. On the contrary, having perceived the ſhip in ſome diſtreſs, they inſtantly ſhowed a diſpoſition to make an attack; and from this they were only prevented by the firing of a four-pounder charged with grape-ſhot. Even this did not produce any permanent effect; another attack was determined upon, and would undoubtedly have been made, had not Tupia informed them, that if they perſiſted in their attempt, the arms of their adverſaries, like thunder, would deſtroy every one of them. This was enforced by the fire of another four-pounder with grape-ſhot, which ſpreading wide in the water, terrified them to ſuch a degree that they began to paddle away as faſt as poſſible. Notwithſtanding this, however, ſome intercourſe began to take place; but in every inſtance the New Zealanders manifeſted their hoſtility and treachery in ſuch a manner as ſhowed that they were not to be gained by fair means. At laſt an attempt to carry off Tayeto, Tupia's boy, rendered it abſolutely neceſſary to fire upon them in order to reſcue him from certain deſtruction, ſome of the ſavages having got him into a canoe, where they held him down by violence. In conſequence of this one of the ſavages was killed on the ſpot, and ſeveral more wounded, by the diſcharge of muſkets from the boats; Tayeto recovered his liberty, jumped into the water, and ſwam to the ſhip. Some partial intercourſe again took place: but ſtill it appeared that the innate rancour of theſe ſavages was not to be ſubdued by any fair means; and it was only by the powerful arguments of cannon and muſketry that they could be kept from attempting to do miſchief.

From the account of this voyage publiſhed by Dr Hawkeſworth, indeed, it appears, that a conſiderable number of ſavages periſhed in a ſimilar manner to that above mentioned, and they ſeem to have manifeſted a more hoſtile behaviour than afterwards: on thoſe melancholy occaſions, however, it is obſerved to the honour of Mr Cook, that his humanity was eminently conſpicuous beyond that of the common people, who all along ſhowed as much inclination to deſtroy the Indians as a ſportſman does to kill the game he purſues.

While Mr Cook coaſted the iſlands of New Zealand, he was ſometimes in the moſt imminent danger of being ſhipwrecked. In the latitude of 35° ſouth, and in the midſt of ſummer in that climate, he met with ſuch a gale of wind as he ſcarce ever experienced before; ſo that he was no leſs than three weeks in getting ten leagues to the weſtward, and two more before he could get 30 leagues farther. Fortunately, however, they were all this time a conſiderable way from land, otherwiſe it is probable that the ſtorm muſt have proved fatal.

Mr Cook having ſpent ſix months in circumnavigating and fully exploring the iſlands of New Zealand, he ſailed from thence on the 31ſt of March 1770. It muſt be obſerved, however, that the extreme hoſtility manifeſted by the inhabitants in that part of the iſland where he firſt arrived, was not univerſally diffuſed; but that a friendly intercourſe was for a long time maintained with thoſe about Queen Charlotte's Sound. From New Zealand he proceeded to New Holland, and on the 28th of April came in ſight of Botany Bay. Here all their endeavours to induce the natives to have any intercourſe with them proved ineffectual, though happily there was no blood ſpilt in any quarrel.

During their navigation round New Holland, the coaſts of which are full of dangerous rocks and ſhoals, our navigators were brought into a more perilous ſituation than ever; and from which the eſcape was ſo extraordinary, that it deſerves a particular relation. This happened on the 10th of June 1770, as they purſued their courſe from Trinity Bay, and nearly in the latitude aſſigned to the iſlands diſcovered by Quiros. At that time they had the advantage of a fine breeze and a clear moonlight; and in ſtanding off from ſix till near nine o'clock, the ſhip had deepened her water from 14 to 21 fathoms; but while the navigators were at ſupper, it ſuddenly ſhoaled to 12, 10, and 8 fathoms in the ſpace of a few minutes. Every thing was then ready for putting the ſhip about, when they ſuddenly got into deep water again, and continued in 20 and 21 fathoms for ſome time, ſo that the gentlemen went to bed in perfect ſecurity. A little before eleven, however, the water ſhoaled at once from 20 to 17 fathoms; and before the lead could be heaved again, the ſhip ſtruck, and remained immoveable, excepting as far as ſhe was heaved up and down, and daſhed againſt the rocks by the ſurge. The alarm was now univerſal, and not indeed without the greateſt reaſon. It appeared that the veſſel had been lifted over the ledge of a rock, and lay in a hollow within it, where there were in ſome places from three to four fathoms water, and in others ſcarcely as many feet: the ſheathing boards were disjoined, and floating round the ſhip in great numbers; and at laſt the falſe keel alſo was deſtroyed, while the rock kept grating her bottom with ſuch force as to be heard in the fore ſtore-room. It was now neceſſary to lighten the ſhip as much as poſſible: and this was done with all expedition to the amount of more than 50 tons. In the morning of the 11th of June they diſcovered the land at about eight leagues diſtance, without any iſland between, on which they could have been ſent aſhore in the event of the ſhip going to pieces, that ſo they might have been carried to the main land by turns. To add to their diſtreſs, the ſhip drew ſo much water, that it was with difficulty kept under with three pumps. Laſtly, it appeared, that even the riſing of the tide, on which they had ultimately depended for relief, was inſufficient to anſwer the purpoſe as the day tide fell conſiderably ſhort of that in the night-time. Having therefore lightened the ſhip ſtill farther, by throwing out every thing that could poſſibly be ſpared, they waited with patience for the next tide; when, after incredible exertion, the ſhip righted, and they got her over the ledge of the rock into deep water. By continual labour, however, the men were at laſt ſo much exhauſted, that they could not ſtand to the pumps more than five or ſix minutes at a time; after which they threw themſelves flat on the deck, though a ſtream of water between three and four inches deep ran over it; and in this ſituation, they lay till others, exhauſted as well as themſelves, took their places on which they ſtarted up again, and renewed their exertions. In this dreadful extremity, Mr Monkhouſe, a midſhipman, propoſed the expedient of ſothering the ſhip, as it is called,

called, by which means he said that he had seen a merchant ship brought from Virginia to London after she had sprung a leak that admitted more than four feet water in an hour. The expedient being approved of, it was put in execution in the following manner. He took a lower studding-sail, and having mixed a large quantity of oakum and wool together, stitched them down by handfuls as lightly as possible; the whole being afterwards spread over with the dung of the sheep and other filth. The sail was then hauled under the ship's bottom by means of ropes which kept it extended. When it came under the leak, the wool and oakum, with part of the sail, were forced inwards by the pressure of the water, which thus prevented its own ingress in such an effectual manner, that one pump, instead of three, was now sufficient to keep it under. Thus they got the ship into a convenient port on the coast of New Holland, where they had an opportunity of repairing the injury. Here they discovered that their preservation had not been owing entirely to the expedient above mentioned; for one of the holes was in a great measure filled up by a piece of rock which had broken off and stuck in it; and this hole was so large, that had it not been filled up in the manner just mentioned, they must undoubtedly have perished notwithstanding all the assistance that could have been derived from the pumps.

The dangers they sustained in navigating this coast were innumerable, insomuch, that for very near three months they were obliged to have a man constantly in the chains heaving the lead. They were always entangled among rocks and shoals, which could not have failed to destroy a less experienced navigator; and even Mr Cook, with all his sagacity, could not sometimes have extricated himself, had it not been for the favourable interposition of some natural events, which no human penetration could foresee or have the least dependence upon. Of this we shall only give the following instance. Having at last, as they thought, got safely over the vast reefs of sunk rocks with which the coast of New Holland is surrounded, they flattered themselves that all danger was past, and the vast swell of the water convinced them that they were now in the open ocean. The remembrance of former dangers, however, induced them frequently to take the precaution of sounding; notwithstanding which, in the latitude of about $14\frac{1}{2}°$ S. they found themselves one morning only about a mile distant from the most hideous breakers, though the sea all around was unfathomable. Their situation was rendered the more dreadful by its being a dead calm, at the same time that they were carried towards the rock with such rapidity, that by the time they had got the ship's head turned by means of the boats, she was scarcely 100 yards distant from it. Their only resource then was to tow the ship, if possible, by means of the boats and pinnace, out of a situation so very perilous; but all their efforts would have been unsuccessful, had not a breeze of wind sprung up, which, though too light to have been noticed at any other time, was found to second their efforts so effectually, that the ship began to move perceptibly from the reef in an oblique direction: during the time that this breeze lasted, which was not more than ten minutes, they had made a considerable way. A dead calm succeeding, they began to lose ground, and in a little time were driven within 200 yards of the rocks: but fortunately the breeze returned, and lasted ten minutes more; during which time a small opening was perceived in the reef at the distance of about a quarter of a mile. The mate being sent out to examine this opening, reported that it was not more than the length of the ship in breadth, but that there was smooth water within. On this it was determined to push into it by all means. The attempt failed of success; as, just when they had brought the ship with great labour to the mouth of the opening, they found a current setting out from it by reason of the tide now beginning to ebb. But though their hopes were disappointed in getting through the opening, they were, by the current setting out from it, driven in a very short time to the distance of a quarter of a mile from the rocks; and by dint of towing and other exertions, they were got by noon to the distance of two miles. This temporary deliverance, however, afforded but small prospect of being ultimately relieved. They had still no other expectation than of being forced back into their former situation by the return of the tide; but happily they now perceived another opening about a mile to the westward. Mr Hicks the lieutenant being sent to examine this opening, returned with an account of its being narrow and hazardous, but capable of being passed. To this place therefore the ship was directed by every possible means; and a light breeze happening to spring up, they fortunately reached it, and were instantly hurried through with great rapidity by the current of the returning tide; which, had it not been for this opening, would undoubtedly have dashed them to pieces against the rocks.

From the time they quitted the coast of New Holland till their arrival at Batavia in the island of Java, our navigators met with no other danger but what is common in sea voyages. They were obliged to stay for some time at this place to repair their damages; and on viewing the condition of the ship, found they had more reason than ever to admire the manner in which they had been preserved. Both the false keel and main-keel were greatly injured; great part of the sheathing was torn off; several of the planks were much damaged, and among these there were two, and half of another, which for six feet in length were not above the eighth part of an inch in thickness, besides being penetrated with worms quite to the timbers. Here the crew were excessively annoyed by sickness, which obliged them to remain much longer than they would otherwise have done: and it is worthy of notice, that every one of the crew was ill excepting the sail-maker, an old man between 70 and 80 years of age, and who was drunk every night. Poor Tupia, with his boy Tayeto, fell sacrifices to the unhealthiness of the climate, as well as the surgeon, three seamen, and Mr Green's servant. Nor did the evil stop here; for on their setting out from Batavia, the seeds of disease which had been received there broke out in the most violent and fatal manner, insomuch that in the course of about six weeks there died one of Mr Banks's assistants, by name Mr Sporing, Mr Parkinson his natural history painter, Mr Green the astronomer, the boatswain, carpenter, and mate, Mr Monkhouse the midshipman, the corporal of the marines, two of the carpenter's

carpenter's crew, and nine feamen. Even the jolly old fail-maker could now hold out no longer; but whether his death might not in fome meafure be attributed to his being lefs plentifully fupplied with liquors than formerly, might have deferved inquiry. Thefe unfortunate events probably made a confiderable impreffion on Mr Cook's mind; and perhaps induced him to direct his attention to thofe methods of preferving the health of feamen which he afterwards put in execution with fo much fuccefs. After touching at St Helena, they continued their voyage for England, where they arrived on the 11th of June 1771: and on the 29th of Auguft the fame year, his majefty teftified his approbation of Mr Cook's conduct by appointing him a captain in the navy. On this occafion Mr Cook wifhed to have been advanced to the rank of poft-captain, which though not more profitable than the other, is more honourable; but this being inconfiftent with the rules of preferment in the navy, the earl of Sandwich, at that time at the head of the admiralty, could not agree to it.

Captain Cook was not allowed to remain long inactive. The idea of a fouthern continent had long been entertained, and Mr Dalrymple had renewed the attention of the public towards the queftion, by his hiftorical collection of voyages to the Pacific ocean, publifhed in two quarto volumes, one in 1770, the other in 1771. To determine the matter finally, Captain Cook was again fent out: and the object of this voyage was not merely to fettle the queftion juft mentioned, but to extend the geography of the globe to its utmoft limits. That the undertaking might be carried on with the greater advantage, it was determined to employ two fhips, on the choice and equipment of which the utmoft attention was beftowed. The fuccefsful voyage which had already been made in the Endeavour, fuggefted the idea of that fhip being a proper model for the two which were to be fent out; and the opinion of Lord Sandwich concurring with the general idea, two veffels, conftructed by the fame perfon who had built the Endeavour, were purchafed for the voyage. Thefe were about 14 or 16 months old at the time they were purchafed; and, in the opinion of Captain Cook, were as fit for the purpofe as if they had been but newly built. The larger of the two, of 462 tons burden, was named the *Refolution*; the fmaller, of 336 tons, had the name of the *Adventure*: the complement of men on board the former, of which Captain Cook was commander, being 112; on the latter, commanded by Mr Tobias Furneaux, 81. In their equipment, every article that could be fuppofed neceffary, however much out of the common line, was procured, and every circumftance that could be fuppofed to contribute to the fuccefs of the voyage was attended to in the moft fcrupulous manner. Befides the ufual ftores and provifions, all of which were of the beft kinds, the fhips were furnifhed with malt, four krout, falted cabbage, portable foup, falop, muftard, marmalade of carrots, beer, and infpiffated wort. Mr Hodges, an excellent landfcape painter, was engaged to make drawings and paintings of fuch objects as required them. Mr John Reinhold Forfter, with his fon, were both engaged, in order to explore and collect the natural hiftory of the countries through which they paffed; and laftly, that nothing might be wanting to render the voyage as complete as poffible, Mr William Wales, and Mr William Bayley were engaged by the board of longitude to make celeftial obfervations. They were furnifhed with the beft inftruments of every kind, and among the reft with four time-pieces; three conftructed by Mr Arnold, and one by Mr Kendal on Mr Harrifon's principles.

At Plymouth Captain Cook received his inftructions; which were not only to fail round the globe, but to fail round it in high fouthern latitudes, and to make fuch traverfes as might finally refolve the queftion concerning the fouthern continent. In purfuance of thefe inftructions he fet fail on the 13th of July 1772, and on the 29th of the fame month reached the Madeiras. As he proceeded afterwards in his voyage, he made three puncheons of beer from the infpiffated wort carried out along with him, and found it excellently to anfwer the purpofe, provided the material could have been keep without fermentation in its infpiffated ftate; but as this was found impoffible, the expedient feems to have failed. In this voyage, however, the captain ufed with the greateft fuccefs fuch methods as appeared likely to contribute to the prefervation of the health of his men. In rainy weather, he took care that the fhip fhould be aired and dried by means of fires made between the decks, the damp places were fmoked, and the people were ordered to air their bedding, and wafh and dry their clothes, whenever an opportunity offered. Thus he reached the Cape of Good Hope without having a fingle man fick. Having left it and kept on his courfe to the fouthward, he foon began to meet with cold and ftormy weather, by which he loft almoft the whole of his live ftock of fheep, hogs, and geefe. The bad effects of this ftormy weather upon the men were guarded againft by an addition to their clothing, and giving them a dram on particular occafions. On the fixth of December, being in the latitude of 50° 40′, he fell in with iflands of ice, and continued among them in various latitudes till the 17th of January 1773; when he fet fail for New Zealand, which he reached on the 27th.

The reception of our navigator by the New Zealanders was now much more friendly than in the former voyage, fo that there were no contefts with the natives; nor did Captain Cook obferve any one of thofe whom he had feen before, neither was there the fmalleft remembrance of former hoftilities. Having ftaid in this country till the 7th of June, our navigators fet fail for Otaheite; but during the voyage the crews of both fhips were attacked by the fcurvy. Thofe of the Adventure were in a very fickly ftate; the cook was dead, and 28 of her beft men incapable of duty. On board the Refolution matters were much better; and the only reafon that could be conjectured for the difference was, that the people of the Adventure had been in a habit of body more inclined to the fcurvy than thofe of the Refolution, and had eaten fewer vegetables. Here it was obferved, that the averfion of feamen to a change of diet is fo great, that it can only be overcome by the fteady and perfevering example of a commander. While he remained at New Zealand, the captain had difcovered a tree which greatly refembled the American black fpruce. Perfuaded, therefore, that it would be attended with effects

equally ſalutary on the health of the people, he employed them in brewing beer from it. This was done while they continued at Duſky Bay, in order to ſupply the want of vegetables, which were not to be procured there; but on removing to Queen Charlotte's Sound, they were more fortunate. Captain Cook himſelf went to look out for antiſcorbutic vegetables; and returned in a very ſhort time with a boat-load of ſcurvy-graſs, celery, &c. Theſe were boiled with the peas and wheat; and though ſome of the people diſliked them at firſt, they ſoon became ſo ſenſible of their good effects, that they cheerfully followed the example of the reſt: and the freedom of the crew from the ſcurvy and other diſtempers was by every one attributed to the New Zealand ſpruce beer and vegetables. From this time forward the captain had ſcarce occaſion to give orders for gathering vegetables when they came to any land.

During this voyage Captain Cook experienced another narrow eſcape from ſhipwreck. Being becalmed at the diſtance of half a league from a reef of rocks near Oſnaburgh iſland, it was found neceſſary to order out the boats to tow off the ſhips; but this was found impoſſible. The calm continuing, and the ſituation of our navigators becoming every moment more dangerous, the captain attempted to get through an opening in the reef which he had judged practicable; but on approaching it, found that there was not ſufficient depth of water; at the ſame time that the draught of the tide through it forced the ſhip thither in a manner ſcarce to be reſiſted. One of the warping machines, with about 400 fathoms of rope, was then ordered out, but did not produce any effect. They were within two cables length of the breakers, and no bottom could be found for caſting anchor. Having no other reſource, however, they did drop an anchor; but before it took hold, the Reſolution was in leſs than three fathoms water, and ſtruck at every fall of the ſea, which broke violently cloſe under her ſtern, threatening deſtruction to every one on board. At laſt the tide ceaſing to act in the ſame direction, the boats were ordered to try to tow off the veſſel; in which being aſſiſted by the land-breeze, which fortunately ſprung up at that inſtant, they with much labour ſucceeded.

Having ſpent a conſiderable time in the South Sea iſlands, Captain Cook returned to New Zealand, and from thence ſet ſail for the ſouthern part of the continent of America. Here he explored all the iſlands in the neighbourhood, and then returned to England, where he arrived in ſafety on the 30th of July 1774, having been abſent three years and 18 days; and in all that time loſt only one man, who died of a conſumption probably begun before he ſet out on the voyage.

The reception our navigator now met with was ſuited to his merit. He was immediately raiſed to the rank of poſt-captain, and ſoon after unanimouſly elected a member of the Royal Society; from whom he received the prize of the gold medal for the beſt experimental paper that had appeared throughout the year. It was the cuſtom of Sir John Pringle, at the delivery of this medal, annually, to make an elaborate diſcourſe, containing the hiſtory of that part of ſcience for which the medal was given; and, as the ſubject of Captain Cook's paper (the means of preſerving the health of ſeamen) was analogous to the profeſſion of Sir John Pringle himſelf as a phyſician, he had the greater opportunity of diſplaying his eloquence on the occaſion. The ſpeech he made was in the higheſt degree honourable to Captain Cook. He remarked, that the ſociety had never more meritoriouſly beſtowed the medal than on the perſon who now received it. "If (ſays he) Rome decreed the civic crown to him who ſaved the life of a ſingle citizen, what wreaths are due to the man who, having himſelf ſaved many, perpetuates in your Tranſactions the means by which Britain may now, on the moſt diſtant voyages, preſerve numbers of her intrepid ſons, her mariners; who braving every danger, have ſo liberally contributed to the fame, to the opulence, and to the maritime empire of the country?" Theſe honourable teſtimonies of the public regard, however, Captain Cook did not receive, being already embarked on another voyage, from which he never returned.

The third voyage of this celebrated navigator was not undertaken by any expreſs command of his majeſty. Captain Cook had already done ſo much, that it was thought but reaſonable he ſhould now ſpend the remainder of his life in quiet; and in order to enable him to do this in a more comfortable manner, beſides his rank of poſt-captain in the navy, he was alſo made a captain in Greenwich. Still, however, there were ſome points in the ſcience of geography which had very much engaged the attention of the public, and were indeed of ſuch importance as to become a national concern. Theſe were to diſcover the connection between Aſia and America, and to determine whether there was not a poſſibility of ſhortening the paſſage to the Eaſt Indies by ſailing round the northern parts of the continents of Europe and Aſia. Many attempts, indeed, had already been made by various navigators of different nations; but all of them had failed, and, what was worſe, had left the point ſtill undetermined. An act of parliament had been paſſed in 1745, by which a reward of 20,000l. was held out to the ſhips of any of his majeſty's ſubjects for accompliſhing this important voyage, but without mentioning any thing of thoſe belonging to his majeſty; and this reward was further confined to the finding out of the north-weſt paſſage to the Eaſt Indies through Hudſon's bay. In the year 1776, however, both the errors juſt mentioned were corrected. It was now enacted, "That if any ſhip belonging to any of his majeſty's ſubjects, or to his majeſty, ſhall find out, and ſail through, any paſſage by ſea between the Atlantic and Pacific oceans, in any direction or parallel of the northern hemiſphere, to the northward of the 52d degree of northern latitude; the owners of ſuch ſhips if belonging to any of his majeſty's ſubjects, or the commanders, officers, and ſeamen, of ſuch ſhip belonging to his majeſty, ſhall receive, as a reward for ſuch diſcovery, the ſum of 20,000l.

It was not, as has already been hinted, now deemed proper to ſolicit Captain Cook to undergo freſh dangers by undertaking a voyage of this kind; nevertheleſs, as he was univerſally looked upon to be the fitteſt perſon in the kingdom for the purpoſe, the eyes of every one were tacitly fixed upon him: he was conſulted on every thing relating to it, and ſolicited

Cook.

cited to name the perſon whom he judged moſt proper to conduct it. To determine this point, Captain Cook, Sir Hugh Palliſer, and Mr Stephens, were invited to the houſe of Lord Sandwich to dinner; where, beſides the conſideration of the proper officer for conducting the expedition, many things were ſaid concerning the nature of the deſign. They enlarged upon its grandeur and dignity, its conſequences to navigation and ſcience, and the completeneſs it would give to the whole ſyſtem of diſcoveries; until at laſt Captain Cook was ſo much inflamed by the repreſentation of the importance of the voyage, that he ſtarted up, and declared that he would conduct it himſelf. This was what the parties preſent had deſired, and probably expected; his offer was therefore inſtantly laid before the king, and Captain Cook appointed commander of the expedition by the 10th of February 1776. At the ſame time it was agreed, that on his return from the voyage, he ſhould be reſtored to his place at Greenwich; and if no vacancy occurred during the interval, the officer who ſucceeded him was to reſign in his favour. The inſtructions he now received were, that he ſhould attempt the high latitudes between the continents of Aſia and America, and if poſſible return to England along the northern coaſts of Aſia and Europe. This was moſt probably the reſult of the captain's own deliberations, and what had been ſuggeſted by him to Lord Sandwich and other people in power. He was particularly deſired to ſail firſt into the Pacific ocean through the chain of newly diſcovered iſlands which he had lately viſited. After having croſſed the equator, and paſſed into the northern parts of the ocean juſt mentioned, he was then to hold ſuch a courſe as might tend to ſettle many intereſting points of geography, and produce ſome intermediate diſcoveries, before he arrived at the main ſcene of operation. With regard to this principal object, he was ordered, immediately on his arrival on the coaſt of New Albion, to proceed northward as far as the latitude of 65 degrees, without loſing any time in exploring creeks or rivers previous to his arrival in that latitude; and for his further encouragement, the act of 1745, offering a premium for the diſcovery of the paſſage, was amended in the manner above mentioned. That nothing might be wanting which could promote the ſucceſs of the grand expedition, Lieutenant Pickerſgill was ſent out, in 1776, with directions to explore the coaſts of Baffin's bay; and the next year Lieutenant Young was commiſſioned not only to examine the weſtern parts of that bay, but to endeavour to find a paſſage on that ſide from the Atlantic to the Pacific ocean. Nothing, however, was performed by either of theſe gentlemen which in the leaſt could promote Captain Cook's ſucceſs. Two veſſels were provided as in the former voyage, viz. the Reſolution and the Diſcovery; the command of the former being given to Captain Cook, and of the latter to Captain Charles Clerke. The only thing in which the appointment of the Diſcovery differed from that of the Reſolution was, that the former had no marine officer on board. Every degree of attention was beſtowed, as in the former voyage, upon the proper victualling and other neceſſaries for the two ſhips; and that the inhabitants of thoſe countries which our navigator intended to viſit might derive ſome permanent benefit from the intercourſe they had with him, it was determined to ſend abroad a breed of domeſtic animals, and likewiſe a quantity of uſeful ſeeds, to be left in proper places. With this view, a bull, two cows with their calves, and ſeveral ſheep, with hay and corn for their ſubſiſtence, were taken on board; and it was likewiſe propoſed to take in others at the Cape of Good Hope. A large aſſortment of iron tools and trinkets was alſo ſent out; and, in ſhort, every thing that could be judged proper either to conciliate the good will of the natives or to prove ſerviceable to them, was provided for the voyage, as well as every convenience for the ſhips companies. In the former voyage Captain Cook had brought along with him a native of one of the South ſea iſlands, named *Omai*, who reſided in England during the interval between the ſecond and third voyages, and was now happy at getting an opportunity of returning to his own country. Though he could by no means complain of the entertainment he had met with in England, the idea of returning home loaded with treaſure, which might enable him to make a figure among his countrymen, ſoon overcame all uneaſy ſenſations, which the leaving of his Engliſh friends might excite. His majeſty had taken care to furniſh him with every thing that could poſſibly be of uſe when he came to his native country; and he had beſides received ſeveral valuable preſents from Lord Sandwich, Sir Joſeph Banks, and ſeveral ladies and gentlemen of his acquaintance; ſo that nothing was omitted which could poſſibly be done to convey, by his means, to the inhabitants of the South Sea iſlands, an idea of the Britiſh power and greatneſs.

Every thing being prepared for the voyage, our navigator ſet ſail from the Nore on the 25th of June 1776; but by reaſon of ſome delay in receiving his inſtructions, did not leave Plymouth till the 12th of July. He had not been long at ſea before he began his operations for preſerving the health of his people; which were found equally efficacious in this as in the former voyage. Finding his ſtock of provender for the animals on board likely to run ſhort, he touched at Teneriffe, in order to procure a ſupply, having judged that to be a more proper place than Madeira for the purpoſe. On ſailing from thence he ran a great riſk of running upon ſome ſunk rocks on the iſland of Bonaviſta; but in this, as well as on other occaſions of danger, he behaved with the ſame judgment, coolneſs, and preſence of mind, that diſtinguiſhed him throughout the whole courſe of his life. On the 12th of Auguſt he arrived before Port Praya, in one of the Cape de Verd iſlands named *St Jago;* but not finding it neceſſary to go in there, he continued his voyage to the ſouthward. The weather now becoming gloomy and rainy, required a continuance of the methods he had already practiſed for preſerving the health of his people; and, as formerly, they were attended with the greateſt ſucceſs. In this voyage, the effect of theſe precautions was the more remarkable, as at this time the ſeams of the veſſel were opened to ſuch a degree as to admit the rain, ſo that ſcarce any perſon on board could lie dry in his bed; and all the officers in the gun-room were driven out of their cabins by the water which came through the ſides. Such was the humanity of the commander, however, that while the ſhips continued at ſea, he would not truſt

truſt the workmen over their ſides to repair the defects, though caulkers were employed in the inſide as ſoon as ſettled weather returned. On the 1ſt of September our navigators croſſed the equator, and on the 18th of October anchored in Table bay at the Cape of Good Hope. Here they met with a violent tempeſt, the effects of which were felt both on ſea and land. It laſted three days, and the Reſolution was the only ſhip in the bay that rode out the ſtorm without dragging her anchors. On ſhore the tents and obſervatory were deſtroyed, and the aſtronomical quadrant narrowly eſcaped irreparable damage. The Diſcovery, which had been ſome time later in ſailing from England, was driven off the coaſt, and did not arrive till the 10th of November.

While they remained in this place, a diſaſter happened which threatened the loſs of moſt of their live ſtock. The bulls and two cows had been put aſhore to graze among other cattle; but Captain Cook had been adviſed to keep the ſheep, 16 in number, near the tents, where they were penned in every night. Some dogs having got in among them in the night-time, killed four, and diſperſed the reſt. Six of them were recovered the next day, but the two rams and two of the fineſt ewes in the flock were miſſing. The captain applied to Baron Plettenberg the governor; but all his endeavours were unſucceſsful, until he employed ſome of the meaneſt and loweſt of the people, fellows whoſe character was, that for a ducatoon they would cut their maſter's throat, burn the houſe over his head, and bury him and his whole family in aſhes. This is mentioned as an inſtance how far the boaſted policy of the Dutch government at the Cape of Good Hope falls ſhort of its alleged perfection. After all, two of the fineſt ewes in the flock were miſſing, and never could be recovered. The captain, therefore, to repair this loſs, and to make an addition to his original ſtock, purchaſed two young bulls, two ſtone horſes, two mares, two heifers, two rams, ſeveral ewes and goats, with ſome rabbits and poultry; when, having finiſhed all his buſineſs, he ſet ſail on the 30th of November, though it was not till the 3d of December that he got clear of land. Soon after his putting to ſea, he had the miſfortune to loſe ſeveral of the goats, eſpecially the males, together with ſome ſheep; and it was with the utmoſt difficulty that the reſt of the cattle were preſerved, by reaſon of the ſhip toſſing and tumbling about in a very heavy ſea. Having explored ſome deſolate iſlands in the ſouthern ſeas, Captain Cook ſet ſail for New Zealand. During this part of the voyage, our navigators were involved in ſo thick a fog, that, according to the authors of Captain Cook's life, "they ſailed 300 leagues in the dark." The firſt land they afterwards reached was New Holland; where having remained till the 30th of January 1777, they ſet ſail for New Zealand, and on the 12th of February they anchored in Queen Charlotte's Sound. Here the people were ſhy and timorous, on account of their having formerly deſtroyed 10 of Captain Furneaux's people, who had been ſent aſhore to gather vegetables. The cauſe of the quarrel could not be known, as none of the party were left alive to tell the news. Lieutenant Burney, who went aſhore in queſt of them, found only ſome fragments of their bodies; from which it appeared that they had been killed and eaten by the ſavages. It was not the intention of Captain Cook, at this diſtance of time, to reſent the injury; he even refuſed to put to death a chief named *Kahoora*, who, as he was informed by the natives themſelves, had killed Mr Rowe the commander of the party. He was, however, particularly careful that no opportunity ſhould now be given the ſavages of committing ſuch an action with impunity; and with this view a boat was never ſent on ſhore without being well armed, and the men under the command of ſuch officers as could be depended upon. The New Zealanders were no ſooner aſſured of Captain Cook's pacific diſpoſition, than they threw aſide their fears and ſuſpicions, and entered into a commercial intercourſe with the people. It would have been the leſs excuſable in Captain Cook to have revenged at this time the maſſacre of Mr Rowe's party, as he was aſſured that the quarrel originated from ſome petty thefts of the ſavages, which were too haſtily reſented on the part of the Britiſh; and had it not been for this, no miſchief would have happened.

On the 25th of February our navigator left New Zealand, taking with him, at the requeſt of Omai, two boys, the eldeſt about 18 and the youngeſt about 10. Theſe were ſoon cured of their paſſion for travelling, being both violently ſea-ſick; but as it was then too late to repent, they expreſſed their grief in loud and almoſt continual lamentation; and this in a kind of ſong which ſeemed to conſiſt of the praiſes of their native country, whence they were now to be ſeparated for ever. By degrees, however, the ſea-ſickneſs abated, their lamentations became leſs frequent, and at laſt ceaſed entirely; their native country was forgotten, and they appeared to be as firmly attached to their new friends the Engliſh as if they had been born among them.

So much time was now ſpent in ſailing up and down in the Pacific ocean, where ſeveral new iſlands were diſcovered, that Captain Cook judged it impoſſible to accompliſh any thing for this year in the high northern latitudes; for which reaſon he determined to bear away for the Friendly iſlands, in order to ſupply himſelf with thoſe neceſſaries which he had found impoſſible to be got at any of the iſlands which he had juſt diſcovered. In his run thither ſeveral new iſlands were viſited; and in proſecuting theſe diſcoveries our navigator once more narrowly eſcaped being ſhipwrecked. The danger at this time aroſe from a low ſandy iſland, which the Reſolution was very near running upon. From this ſhe was only ſaved by the circumſtance of all the men having been accidentally called upon deck to put the veſſel about, and moſt of them being at their ſtations when the danger was diſcovered. Soon after this both ſhips ſtruck upon ſome ſunk coral rocks, but happily were got off without damage.

After a ſtay of between two and three months, Captain Cook took leave of the Friendly iſlands on the 13th of July 1777; and on the 12th of Auguſt reached Otaheite, where he introduced Omai to his country people, and whoſe reception by them is particularly related under the next article. Here the captain found the people of Otaheite ready to engage in a war with thoſe of Eimeo; but though ſtrongly ſolicited by the former to aſſiſt them in an expedition againſt

against their enemies, he refused to take any concern in the affair, alleging, by way of excuse, that the people of Eimeo had never offended him. This seemed to satisfy most of the chiefs; but one, named *Towha*, was so much displeased, that Captain Cook could never regain his favour. He even threatened, that as soon as the captain should be gone, he would make war upon Otoo, one of the princes of these islands whom he knew to be in strict friendship with him; but from this he was deterred by the captain's threatening to return and chastise him if he made any such attempt. As a mark of Otoo's friendship, he gave our navigator a canoe, which he desired him to carry to the king of Britain, having nothing else, as he said, worth his acceptance.

From Otaheite Captain Cook proceeded to Eimeo, where, on account of some thefts committed by the natives, he was obliged to commence hostilities, by burning a number of their war canoes, and even some houses. These transactions gave him much concern; and the more that he had been so much solicited to make war on these people by his friends at Otaheite, to whose intreaties he had refused to listen. From Eimeo he proceeded to Huaheine, where he saw Omai finally settled, and left with him the two New Zealand youths already mentioned. The youngest of these was so much attached to the English, that it was necessary to carry him out of the ship and put him ashore by force. During his stay on this island, the captain was obliged to punish a thief with greater severity than he had ever done before, viz. by causing his head and beard to be shaved, and his ears cut off. Some other disagreeable transactions took place, particularly the desertion of two of his people, who were not recovered without the greatest difficulty. In the course of his exertions for their recovery, he found it necessary to detain the son, daughter, and son-in-law, of the chief of an island named *Otaha*. This had almost produced very serious consequences, the natives having formed a plot for carrying off Captain Cook himself, as well as Captain Clerke and Mr Gore. With regard to the commander, they were disappointed by his own caution and vigilance: but Messrs Clerke and Gore were in particular danger; and it was only owing to the circumstance of one of them having a pistol in his hand as they walked together on shore, that they were not seized.

Having left the Society islands, and discovered a new group, which in honour of his patron the earl of Sandwich, our commander named the *Sandwich Isles*, he set out on the 2d of January 1778 on his voyage northward. In this he was very successful, ascertaining the vicinity of the continents of Asia and America, which had never been done, or but very imperfectly, before. From these desolate regions he returned to the island of Oonalashka; whence, having refitted and taken in provisions, he returned to the southward, and on the 26th of November reached the Sandwich islands, where he discovered a new one named *Mowee*, and on the 30th of the same month another of much larger extent, named *O-why-hee*. Seven weeks were spent in exploring the coasts of this island; and during all this time he continued to have the most friendly intercourse with the people, who, however, appeared to be much more numerous and powerful than those of any island our navigators had yet touched at. Several of the chiefs and principal people had attached themselves greatly to the commander, and in general the people appeared to be much more honest in their dispositions than any whom he had ever visited. But by the time he had finished his circumnavigation of the island, and cast anchor in a bay called *Karakakooa*, matters were greatly altered. An universal disposition to theft and plunder had now taken place; and in this it was evident that the common people were encouraged by their chiefs, who shared the booty with them. Still, however, no hostilities were commenced: the greatest honours were paid to the commander; and, on his going ashore, he was received with ceremonies little short of adoration. A vast quantity of hogs and other provisions were procured for the ships; and on the 4th of February 1779, they left the island, not without most magnificent presents from the chiefs, and such as they had never before received in any part of the world. Unluckily they met with a storm on the sixth and seventh of the same month; during which the Resolution sprung the head of her foremast in such a manner that they were obliged to return to Karakakooa bay to have it repaired. As they returned, Captain Cook had an opportunity of showing his humanity to the people, by the relief he afforded to some of their canoes which had suffered in the storm. The same friendly intercourse which had formerly been held with the natives now commenced, and Captain Cook was treated with the usual honours; but on the 13th of this month it was unhappily broken off on the following account. One of the natives being detected in stealing the tongs from the armourer's forge in the Discovery, was dismissed with a pretty severe flogging; but this example was so far from being attended with any good effect, that in the afternoon another, having snatched up the tongs and a chissel, jumped overboard with them and swam for the shore. The master and midshipman were instantly dispatched in pursuit of him; but he escaped on board a canoe, which paddled away so quickly that the cutter could not come near it. A chief named *Pareah*, who was at this time on board the Resolution, understanding what had happened, promised to go ashore, and get back the stolen goods; but before this could be done, the thief had made his escape into the country. Captain Cook, who was at that time ashore, had endeavoured to intercept the canoe when it landed, but was led out of the way by some of the natives who pretended to be his guides. The tongs and chissel, however, were brought back to the master as he advanced to the landing place, but he being now joined by some of the rest of the people in the pinnace, could not be satisfied with the recovery of the stolen goods, but insisted upon having the thief or the canoe which carried him by way of reprisal. On his preparing to launch this last into the water, he was interrupted by Pareah, who insisted that it was his property, and that he should not take it away. As the officer paid no regard to his remonstrances, Pareah, who seems to have been a very strong man, seized him, pinioned his arms behind, and held him fast by the hair of the head. On this one of the sailors struck the chief with an oar; on which, quitting the officer, he instantly snatched the oar out of the man's hand,

hand, and broke it in two acrofs his knee. The Indians then attacked the failors with ftones, and foon drove them to their boats, to which they were forced to fwim, as they lay at fome diftance from the fhore. The officers who could not fwim retired to a fmall rock, where they were clofely purfued by the Indians; and here the mafter narrowly efcaped with his life, till Pareah returned and obliged the Indians to give over their attacks. The gentleman, fenfible that Pareah's prefence alone could protect them, entreated him to remain with them till they could be brought off in the boats. On his refufal, the mafter fet out to the place where the obfervatories had been erected, for farther affiftance; but Pareah, who met him, and fufpected his errand, obliged him to return. In the mean time the multitude had begun to break in pieces the pinnace, after having taken every thing out of her that was loofe: on the return of Pareah, however, they were again difperfed, and fome of the oars reftored, after which the gentlemen were glad to get off in fafety. Before they reached the fhip Pareah overtook them in a canoe, and delivered the midfhipman's cap which had been taken from him in the fcuffle; he alfo joined nofes with them in token of friendfhip, and defired to know whether Captain Cook would kill him on account of what had happened. They affured him that he would not, and made figns of reconciliation on their part. On this he left them and paddled over to the town of Kavaroah; and that was the laft time that he was feen by the Englifh. In the night-time the fentinels were much alarmed by fhrill and melancholy founds from the adjacent villages, which they took to be the lamentations of the women. Next day it was found that the large cutter of the Difcovery had been carried off in the night-time; on which Captain Cook ordered the launch and fmall cutter to go under the command of the fecond lieutenant, and to lie off the eaft point of the bay in order to intercept all the canoes that might attempt to get out, and if neceffary to fire upon them. The third lieutenant of the Refolution was difpatched to the weftern part of the bay on the fame fervice; while the mafter was fent in purfuit of a large double canoe already under fail, and making the beft of her way out of the harbour. He foon came up with her, and by firing a few fhots, obliged her to run on fhore, and the Indians to leave her. This was the canoe belonging to a chief named *Omea*, whofe perfon was reckoned equally facred with that of the king; and to the neglect of fecuring him we may attribute the fucceeding difafter. Captain Cook now formed the refolution of going in perfon to feize the king himfelf in his capital of Kavaroah; and as there was reafon to fuppofe that he had fled, it was his defign to fecure the large canoes, which on that account he caufed to he hauled up on the beach. With this view he left the fhip about feven o'clock in the morning of Sunday the 14th of February, being attended by the lieutenant of marines, a ferjeant, corporal, and feven private men. The crew of the pinnace, under the command of Mr Roberts, were alfo armed: and as they rowed towards the fhore, the captain ordered the launch to leave her ftation, at the oppofite point of the bay, in order to affift his own boat. Having landed with the marines at the upper end of the town, the Indians flocked round him, and proftrated themfelves before him. No fign of hoftility, nor even much alarm, appeared; the king's fons waited on the commander as foon as he fent for them, and by their means he was introduced to the king, who readily confented to go on board; but in a little time the Indians began to arm themfelves with long fpears, clubs, and daggers, and to put on thick mats which they ufe as defenfive armour. This hoftile appearance was greatly augmented by an unlucky piece of news which was juft now brought by a canoe, viz. that one of the Indian chiefs had been killed by the people in the Difcovery's boats. On this the women, who had hitherto fat on the beach converfing familiarly, and taking their breakfafts, removed, and a confufed murmur ran through the crowd. An old prieft now appeared with a cocoa-nut in his hand, which he held out as a prefent to Captain Cook, finging all the while, and making a moft troublefome noife, as if he meant to divert the attention of the captain and his people from obferving the motions of the Indians, who were now everywhere putting on their armour. Captain Cook beginning to think his fituation dangerous, ordered the lieutenant of the marines to march towards the fhore, as he himfelf did, having all the while hold of the king's hand, who very readily accompanied him, attended by his wife, two fons, and feveral chiefs. The Indians made a lane for them to pafs; and as the diftance they had to go was only about 50 or 60 yards, and the boats lay at no more than five or fix yards diftance from land, there was not the leaft apprehenfion of the cataftrophe which enfued. The king's youngeft fon Keowa went on board the pinnace without the leaft hefitation, and the king was about to follow, when his wife threw her arms about his neck, and, with the affiftance of two chiefs, forced him to fit down. The captain might now have fafely got aboard, but did not immediately relinquifh the defign of taking the king along with him. Finding at laft, however, that this could not be accomplifhed without a great deal of bloodfhed, he was on the point of giving orders for the people to reimbark, when one of the Indians threw a ftone at him. This infult was returned by the captain, who had a double barrelled piece, by a difcharge of fmall fhot from one of the barrels. This had little effect, as the man had a thick mat before him; and as he now brandifhed his fpear, the captain knocked him down with his mufket. The king's fon, Keowa, ftill remaining in the pinnace, the detaining him would have been a great check upon the Indians; but unluckily Mr Roberts, who commanded the pinnace, fet him afhore at his own requeft foon after the firft fire. In the mean time another Indian was obferved in the act of brandifhing his fpear at the commander; who thereupon was obliged to fire upon him in his own defence. Miffing his aim, however, he killed one clofe by his fide: upon which the ferjeant obferving that he had miffed the man he aimed at, received orders to fire alfo, which he did, and killed him on the fpot. This repreffed the foremoft of the Indians, and made them fall back in a body; but they were urged on again by thofe behind, and difcharged a volley of ftones among the marines, who immediately returned it by a general difcharge of their mufkets; and this was inftantly followed

Cook.

ed by a fire from the boats. Captain Cook expreffed his aftonifhment at their firing, waved his hand to them to ceafe, and called to the people in the boats to come nearer to receive the marines. This order was obeyed by Mr Roberts; but the lieutenant who commanded the launch, inftead of coming nearer, put off to a greater diftance; and by this prepofterous conduct deprived the unfortunate commander of the only chance he had for his life: for now the Indians, exafperated by the fire of the marines, rufhed in upon them and drove them into the water, leaving the captain alone upon the rock. A fire indeed was kept up by both boats; but the one was too far off, and the other crowded with the marines, fo that they could not direct their fire with proper effect. Captain Cook was then obferved making for the pinnace, carrying his mufket under his arm, and holding his other hand on the back-part of his head to guard it from the ftones. An Indian was feen following him, but with marks of fear, as he ftopped once or twice feemingly undetermined to proceed. At laft he ftruck the captain on the back of the head with a club, and then precipitately retreated. The latter ftaggered a few paces, and then fell on his hand and one knee, and dropped his mufket. Before he could recover himfelf, another Indian ftabbed him with a dagger in the neck, though ftill without putting an end to his life. He then fell into a pool of water knee-deep, where others crowded upon him: but ftill he ftruggled violently with them, got up his head, and looked towards the pinnace as if foliciting affiftance. The boat was not above five or fix yards diftant; but fuch was the confufed and crowded ftate of the crew, that no affiftance could be given him. The Indians then got him under again, but in a deeper water, though he ftill continued to ftruggle, and once more got his head up; but being quite fpent he turned towards the rock as if to fupport himfelf by it, when a favage ftruck him with a club, which probably put an end to his life, as he was never feen to ftruggle any more. The favages hauled his lifelefs body upon the rocks, and ufed it in the moft barbarous manner, fnatching the daggers out of one another's hands, in order to have the pleafure of mangling it. If any thing could add to the misfortune of this celebrated navigator's death, it was, that even his mangled remains were not faved from the hands of the barbarians. The lieutenant already mentioned, who, by his removing to a diftance when he ought to have come on fhore, feemed to have been the occafion of his death, returned on board without making any attempt to recover his body; though it appeared from the teftimonies of four or five midfhipmen who arrived foon after at the fatal fpot, that the beach was almoft deferted by the Indians, they having at laft yielded to the continual fire from the boats. The officer alleged in his own excufe for removing at firft from the fhore, that he miftook the fignals; but be this as it will, the complaints againft him were fo many and fo great, that Captain Clerke was obliged publicly to take notice of them, and to take the depofitions of his accufers in writing.—Thefe papers, however, were not found, and it is fuppofed that the captain's bad ftate of health had induced him to deftroy them. After all, we are informed that, in the opinion of Captain Philips who commanded the marines, it is very doubtful whether any effectual relief could have been given to the commander, even if no miftake had been committed on the part of the lieutenant. The author of all the mifchief was Pareah, the chief already mentioned, who had employed people to fteal the boat in the night-time. The king was entirely innocent both of the theft and the murder of Captain Cook; but the latter was perpetrated by fome chiefs who were his near relations. The chief who firft ftruck him with a club was named *Karimans raha*, and he who ftabbed him with the dagger was called *Nooah*. The latter, Mr Samwell, from whofe narrative this account is taken, obferves, was ftout and tall, had a fierce look and demeanour, and united in his perfon the two properties of ftrength and agility more than he had ever obferved in any other perfon.—Both of them were held in great eftimation by their countrymen on account of the hand they had in his death.

By reafon of the barbarous difpofition of the Indians, it was found impoffible to recover Captain Cook's body after the firft opportunity already mentioned was loft. By dint of threats and negociations, however, fome of the principal parts were procured with great difficulty; by which means the navigators were enabled to perform the laft offices to their much refpected commander. Thefe being put into a coffin, and the fervice read over them, were committed to the deep with the ufual military honours on the 21ft of February 1779. Soon after his death a letter was iffued by M. de Sartine, fecretary to the marine department of France, and fent to all the commanders of French fhips, importing, that Captain Cook fhould be treated as the commander of a neutral and allied power; and that all captains of armed veffels who might meet with him, fhould make him acquainted with the king's orders, but at the fame time let him know, that on his part he muft refrain from hoftilities. This humane and generous proceeding, with regard to France, originated from M. Turgot; but the thought feems firft to have ftruck Dr Franklin. Thus much at leaft is certain, that the doctor, while ambaffador from the United States, wrote a circular letter to the American naval commanders fomething to the purport of that already mentioned; but in this he was not fupported by Congrefs; for an edict was inftantly iffued, that fpecial care fhould be taken to feize Captain Cook if an opportunity of doing it occurred. The Spaniards proceeded in the fame manner, and both acted on a principle equally mean and abfurd, that the obtaining a knowledge of the weftern coaft of America, or of a northern paffage into the Pacific ocean, might be attended with fome bad confequence to their refpective ftates.

Captain Cook was a man of plain addrefs and appearance, but well looked, and upwards of fix feet high. His head was fmall, and he wore his hair, which was brown, tied behind. His face was full of expreffion; his nofe exceedingly well fhaped; his eyes, which were fmall and of a brown caft, were quick and piercing; his eyebrows prominent, which gave his countenance altogether an air of aufterity. Notwithftanding this, it was impoffible for any one to excel him in humanity, as is evident from the whole tenor of his behaviour both to his own people and the

many

many ſavage nations with whom he had occaſion to interfere. This amiable property diſcovered itſelf even in the final cataſtrophe of his life; his utmoſt care being directed to the preſervation of his people, and the procuring them a ſafe retreat to their boats. And it cannot be enough lamented, that he who took ſo much care of others, ſhould have periſhed in ſuch a miſerable manner for want of being properly ſupported by them. The perſeverance with which he purſued every object which happened to be pointed out as his duty was unequalled. Nothing ever could divert him from what he had once undertaken; and he perſevered in the midſt of dangers and difficulties which would have diſheartened perſons of very conſiderable ſtrength and firmneſs of mind. For this he was adapted by nature, having a ſtrong conſtitution, inured to labour, and capable of undergoing the greateſt hardſhips. His ſtomach bore without difficulty the coarſeſt and moſt ungrateful food; and he ſubmitted to every kind of ſelf denial with the greateſt indifference. To this ſtrength of conſtitution he joined an invincible fortitude of mind, of which the circumnavigation of New Holland, and his voyage towards the South Pole, furniſh innumerable inſtances. He was maſter of himſelf on every trying occaſion; and the greater the emergency, the greater always appeared his calmneſs and recollection: ſo that in the moſt dangerous ſituations, after giving proper directions to his people, he could ſleep ſoundly the hours that he had allotted to himſelf. That he poſſeſſed genius in an eminent degree cannot be queſtioned; his invention was ready, and capable not only of ſuggeſting the moſt noble objects of purſuit, but the moſt proper methods of attaining them. His knowledge of his own profeſſion was unequalled; and to this he added a very conſiderable proficiency in other ſciences. In aſtronomy, he became ſo eminent, that he was at length enabled to take the lead in making the aſtronomical obſervations during the courſe of his voyages. In general learning he likewiſe attained to ſuch a proficiency as to be able to expreſs himſelf with clearneſs and propriety; and thus became reſpectable as the narrator, as well as the performer, of great actions. He was an excellent huſband and father, ſincere and ſteady in his friendſhip, and poſſeſſed of a general ſobriety and virtue of character. In converſation he was unaffected and unaſſuming; rather backward in puſhing diſcourſe, but obliging and communicative to thoſe who wiſhed for information: and he was diſtinguiſhed by a ſimplicity of manners almoſt univerſally the attendant of truly great men. With all theſe amiable qualities, the captain was occaſionally ſubject to a haſtineſs of temper, which has been ſet forth in its utmoſt extent, if not exaggerated by ſome, though but few, who are not his friends: but even theſe, as well as others, when taking a general view of his character, are obliged to acknowledge that he was undoubtedly one of the greateſt men of his age.

Captain Cook is diſtinguiſhed as an author by an account of his ſecond voyage written by himſelf. His firſt voyage, as well as that of ſeveral other navigators, had been recorded by Dr Hawkeſworth; but on the preſent occaſion it was not judged neceſſary to have recourſe to any other than the pen of the author himſelf; and his journal, with a few occaſional alterations, and being divided into chapters, was ſufficient for the purpoſe. The ſtyle is clear, natural, and manly; and it is not improbable, that even a pen of more ſtudied elegance could not have made it appear to more advantage. When it appeared, which was not till ſome time after the author had left England, the book was recommended by the accuracy and excellency of its charts, and by a numerous collection of fine engravings done from the original drawings of Mr Hodges.

We cannot conclude this article without taking ſome notice of the honours paid to our celebrated navigator after his death, both by his own countrymen and thoſe of other nations. Perhaps indeed it may be ſaid with juſtice, that foreigners hold his memory in an eſtimation unequalled even in this country; a remarkable proof of which occurs in the eulogy upon him by Michael Angelo Gianetti, read in the Florentine academy, on the 9th of June 1785, and publiſhed at Florence the ſame year. It is ſaid alſo, that one of the French literary academies propoſed a prize for the beſt eulogium on Captain Cook; and many poetical teſtimonies of his merit appeared in our own language. The Royal Society of London reſolved to teſtify their reſpect to him by a medal, for which purpoſe a voluntary ſubſcription was opened. A gold medal was given to ſuch of the fellows as ſubſcribed 20 guineas, and a ſilver one to thoſe who ſubſcribed ſmaller ſums; and each of the other members received one of bronze. Thoſe who ſubſcribed 20 guineas were, Sir Joſeph Banks, preſident, the prince of Anſpach, the duke of Montague, Lord Mulgrave, and Meſſrs Cavendiſh, Peachey, Perrin, Poli, and Shuttleworth. Many deſigns were propoſed on the occaſion; but the following was that which was actually ſtruck. On one ſide was the head of Captain Cook in profile, with this inſcription round it, JAC. COOK OCEANI INVESTIGATOR ACERRIMUS; and on the exergue, REG. SOC. LOND. SOCIO SUO. On the reverſe is a repreſentation of Britannia holding a globe, with this inſcription round her, NIL INTENTATUM NOSTRI LIQUERE; and on the exergue, AUSPICIIS GEORGII III. One of the gold medals ſtruck on this occaſion, was preſented to the king, another to the queen, and a third to the prince of Wales. Another was ſent to the French king on account of the protection he had granted to the ſhips; and a ſecond to the empreſs of Ruſſia, in whoſe dominions they had been treated with every expreſſion of friendſhip and kindneſs. Both theſe great perſonages condeſcended to accept of the preſent with marks of ſatisfaction. The French king wrote a handſome letter to the Scociety, ſigned by himſelf, and underſigned by the marquis de Vergennes; and the empreſs of Ruſſia commiſſioned Count Oſterman to ſignify to Mr Fitzherbert the ſenſe ſhe had of the value of the preſent, and that ſhe had cauſed it to be depoſited in the muſeum of the Imperial Academy of Sciences. As a further teſtimony of the pleaſure ſhe derived from it, the empreſs preſented to the Royal Society a large and beautiful gold medal, containing on one ſide the effigies of herſelf, and on the other a repreſentation of the ſtatue of Peter the Great. After the general aſſignment of the medals, which took place in 1784, there being a ſurplus of money ſtill remaining, it was reſolved by the preſident and council, that an additional number of medals ſhould be thrown off, to be diſpoſed of in preſents to Mrs Cook, the earl of

of Sandwich, Dr Benjamin Franklin, Dr Cook, provoſt of King's College Cambridge, and Mr Planta. At the ſame time it was agreed that Mr Aubert ſhould be allowed to have a gold medal of Captain Cook, on his paying for the gold, and the expence of ſtriking it, in conſideration of his intention to preſent it to the king of Poland.

During the two viſits of the ſhips at Kamtſchatka, Major Behm, the commandant of that province, had beſtowed, in the moſt liberal manner, every kind of aſſiſtance which it was in his power to beſtow; and ſuch was the ſenſe entertained by the lords of the admiralty of the kindneſs he had ſhowed, that they determined to make him a preſent of a magnificent piece of plate with an inſcription expreſſive of his humane and generous conduct. The inſcription was drawn up by Dr Cook, and afterwards ſubmitted to the opinion and correction of ſome gentlemen of the firſt eminence in claſſical taſte.

Sir Hugh Palliſer, who had all along diſplayed an uncommon reſpect and kindneſs for Captain Cook, likewiſe diſplayed his regard for his memory in a moſt eminent manner. On his eſtate in Buckinghamſhire, he conſtructed a ſmall building with a pillar, containing the character of Captain Cook, which is given at the end of the introduction to the laſt voyage. This was drawn up by the honourable Admiral Forbes, admiral of the fleet, and general of the marines to whom Captain Cook was known only by his merit and extraordinary actions.

Amidſt all theſe expreſſions of unavailing praiſe, it was not forgotten to ſhow ſome eſſential ſervice to the widow and family of our celebrated navigator. A memorial for a penſion of 200l. per annum was given in to the king from the commiſſioners of the admiralty, and ſigned by the earl of Sandwich, Mr Butler, the earl of Liſburne, Mr Penton, Lord Mulgrave, and Mr Mann. His majeſty complied with the requeſt of the memorial, and the grant was paſſed through the uſual forms with all poſſible ſpeed. By this 200l. per annum was ſettled on the widow during life; and 25l. a-year on each of her three ſons. After her death the 200l. was to be divided between her children; a fourth was allotted to Captain King, and the remaining fourth to Mr Bligh and the repreſentatives of Captain Clerke.

The laſt honour paid to the memory of Captain Cook was the granting a coat of arms to the family, which was done by patent on the 3d of September 1785: and of this we have the following deſcription. Azure, between the two polar ſtars, Or; a ſphere on the plane of the meridian, north pole elevated, circles of latitude for every ten degrees, and a longitude for every 15; ſhowing the Pacific ocean between 60° and 240° weſt, bounded on one ſide by America, and on the other by Aſia and New Holland; in memory of the diſcoveries made by him in that ocean, ſo very far beyond all former navigators. His track thereon is marked with red lines; and for creſt, in a wreath of the colour is an arm imbowed, veſted in the uniform of a captain of the royal navy. In the hand is the union jack, on a ſtaff proper. The arm is encircled by a wreath of palm and laurel.

Cook's Diſcoveries.—The number of countries diſcovered by Captain Cook, and which had never before been viſited by any European, is very conſiderable; but it was a remarkable property of our celebrated navigator, that, wherever he touched, every thing relative to the place was determined with ſuch acuracy and preciſion, that all former accounts ſeemed to go for nothing, and the diſcovery to belong entirely to Captain Cook. Thus it was not unuſual with him to make diſcoveries in places already well known; and thus his voyages have conveyed a vaſt fund of knowledge perfectly original. Though the accounts of the different places, therefore, at which he touched, are particularly given under their names in the order of the alphabet, we ſhall in this article endeavour to join the whole together in ſuch a manner as to give the reader ſome idea of the benefit which has accrued to ſcience from voyages attended not only with much expence and labour, but even with the loſs of the celebrated navigator's life.

1 Madeira volcanic iſland.

When he ſet out in the Endeavour in the year 1768, the firſt place he touched at was Madeira. Here Mr Banks and Dr Solander, beſides ſome additions to the ſcience of botany, diſcovered undoubted marks of the iſland having a volcanic origin. On leaving this place, they found it neceſſary to touch at Rio de Janeiro for proviſions, and, during the run thither, the commander had an opportunity of determining the cauſe of the luminous appearance of the ſea. On the 29th of October they obſerved that the water frequently emitted flaſhes like lightning, though much ſmaller; but ſuch was their frequency, that eight or ten of them were viſible almoſt at the ſame moment. This appearance they found, both at this time and afterwards, to ariſe from a ſmall kind of animal with which the water abounded. Whilſt ſtaying at Rio de Janeiro, a melancholy obſervation was made of the prodigious waſte of human lives with which the working of the Portugueſe gold mines was attended, no fewer than 40,000 negroes being annually imported for this purpoſe, none of whom, it ſeems, ſurvive the labour of the year; and our navigator was informed, that in 1766 this number was ſo far ſhort, that they were obliged to draught 20,000 more from the town of Rio itſelf. Proceeding from thence to the ſouthern coaſts of America, he had an opportunity of determining a queſtion of great importance to navigation, viz. whether, in ſailing to the Pacific ocean, it is better to paſs through the ſtraits of Magellan, or to double Cape Horn, and ſail through thoſe of Le Maire? From Captain Cook's voyage it appears, contrary to the opinion of former navigators, that the latter is the preferable paſſage. Through this he was only 33 days in coming round the land of Terra del Fuego from the eaſt entrance of the ſtrait of Le Maire till he had advanced about 12 degrees to the weſtward, and three and a half to the northward of Magellan's ſtraits. During all this time the ſhip ſcarcely received any damage, though if he had paſſed the other way he could not have accompliſhed his paſſage in leſs than three months, beſides immenſe fatigue to his people and damage to the ſhip. In theſe ſtormy regions, however, he experienced the ſame inconveniencies felt by other navigators; ſuch a ſea being met with off Cape Diego, that the ſhip frequently pitched her bowſprit under water. Here alſo the exceſſive cold and mutability of weather in theſe ſouthern

southern regions was experienced in such a manner as had nearly proved fatal to some of the gentlemen who sailed along with him. Dr Solander, Mr Banks, Mr Monkhouse the surgeon, and Mr Green the astronomer, with their attendants and servants, set out on a botanical expedition while the ship lay at anchor in the bay of Good Success. It was then the middle of summer, and the morning on which they set out was as mild and warm as it usually is in the month of May in England: but having ascended a mountain for the purpose of botanizing, they were surprised by such storms of snow and hail that they could not get back that night. Dr Solander, who warned them of their danger, that people when about to perish with cold were seized with a violent inclination to sleep, was the first who seemed likely to fall a victim to it; and it was not in the power of his companions to keep him from sitting down for that purpose. He was awakened in a few minutes; but during this short interval his feet had become so much diminished by the contraction of the vessels, that his shoes fell off from them when he was again made to rise. Even these dreary regions, however, are not without inhabitants, whom our voyagers justly concluded to be the lowest of the human species. Indeed, considering the little convenience they have, it is wonderful how they can resist the severity of the climate, for they are almost without clothing; they dwell in miserable hovels, which admit both the wind and snow or rain; and they have not any utensil for dressing their food. Nevertheless, these miserable creatures, as they appeared to our navigators, seemed to have no wish to possess more than they enjoyed; and they were absolutely indifferent about every thing that was offered them, except large beads which they would take as ornaments. Hence Dr Hawkesworth, who wrote the account of the voyage, concludes, that these people may be on a level with ourselves with respect to the real happiness they enjoy.

On the 26th of January 1769 our navigators left Cape Horn; and from that time to the first of March, during which they run no less than 660 leagues, met with no current by which the ship was affected. Hence it is probable, that during all this time they had never been near any land, the currents of the ocean being usually met with in the neighbourhood of islands. Several islands, however, were discovered before they reached Otaheite, on which they bestowed the names of Lagoon Island, Thrumb-cap, Bow Island, the Groups, Bird Island, and Chain Island. All these seemed to be inhabited, and were covered with a most delightful verdure; which appeared to the greater advantage, as our navigators had for a long time seen no land but the dreary hills and wastes of Terra del Fuego. Having arrived at Otaheite, they set about observing the transit of Venus over the sun, which indeed was the main purpose for which the voyage had been undertaken. The anxiety which they underwent when the time of the expected phenomenon approached may easily be imagined, as the whole depended on the circumstance of a clear sky, which though more readily to be expected in that climate than one more to the northward, was still a matter of uncertainty. In consequence of some hints which had been given by the earl of Morton, Captain Cook determined to send out two parties to different places to make the observations; by which means there would be a chance of success, even if those at Otaheite should fail. For this purpose he sent Mr Gore in the long boat to Eimeo, a neighbouring island, along with Mr Monkhouse, Mr Banks, and Mr Sporing, who were furnished with proper instruments by Mr Green the astronomer. Messrs Hicks, Clerke, Pickersgill, and Saunders, were sent in the pinnace to a convenient spot to the eastward of the main observatory, where they were likewise ordered to make observations with such instruments as they had. The day on which the transit happened was the 3d of June 1769, when they had the satisfaction to see the sun rise without a cloud; and as the weather continued equally clear throughout the day, there was the best opportunity of making the observations in a proper manner. All of them saw an atmosphere or dusky cloud round the planet, which disturbed their observation, and probably caused them to differ from each other more considerably than they would otherwise have done. According to Mr Green, the times of ingress and egress of the planet were as follow:

Cook's Discoveries.

Morning.	h.	min.	sec.
First external contact, - -	9	25	42
First internal contact, or total immersion,	9	44	4
Afternoon.			
Second internal contact. - -	3	14	8
Second external contact, or end of the transit,	3	32	10

From these observations the latitude of the observatory was found to be 17° 29′ 15″ S. and the longitude 149° 32′ 30″ W. of Greenwich. Several curious remarks were made both on the country itself, and on the inhabitants. Mr Banks, in an excursion up the country, discovered many traces of volcanic fire; the stones, like those of Madeira, had evidently the appearance of being burnt, and the very clay on the hills had the same appearance. The natives, though addicted to thieving, appeared in general harmless and friendly, and very ready to supply the ship with necessaries in exchange for such things as they wanted. The articles on which they set the greatest value were hatchets, axes, large nails, spikes, looking-glasses, and beads. They were also fond of fine linen, whether white or printed; but an axe of the value of half a crown would buy more provisions than a piece of cloth of the value of 20 shillings. They are very fickle and inattentive; so that it was not possible to engage them to pay any regard to the worship of the Deity which they saw performed before them; nor would they attend to any explanation of it that was given them. They are not, however, destitute of a religion of their own; and are particularly careful of the repositories of the dead, which they will not allow to be violated on any account. Of this Captain Cook had an instance, when some of his people offered to take down an inclosure of one of those repositories. They were violently opposed by the natives, who sent a messenger to acquaint them that they would never suffer any such thing; and the only insult that ever was offered to an Englishman by the people of this island was on a similar account. From Otaheite our navigators carried with

9 Otaheite a volcanic island.

10 Account of the natives.

Cook's Discoveries.

with them Tupia, formerly high prieſt of the country, and prime miniſter to Queen Oberea. From his practice it appeared, that the prieſts of Otaheite, as well as elſewhere, take care to place themſelves a ſtep nearer the Deity than the common people, and to uſe the deceptions too frequently put in practice by ſuch mediators. While on board the Endeavour, he frequently prayed to his god *Tane* for a wind; and according to his own account never failed of ſucceſs. This, however, he took care to enſure; for he never began his prayers till he perceived the breeze already on the water, and ſo near that it muſt reach the ſhip before they could well be ended. It was obſerved likewiſe of the people of Otaheite, that they had their bards or minſtrels, who went about the country with muſical inſtruments. The band whom they ſaw at this time conſiſted of two players on flutes and three drummers; the latter accompanying the flutes with their voices. Their ſongs were made extempore, and the Engliſh themſelves were generally the ſubject.

11 Society Iſlands diſcovered.

From Otaheite our navigators ſailed towards a neighbouring iſland named *Tethuora*; but finding it ſmall, low, and without any ſettled inhabitants, the captain choſe rather to direct his courſe towards Huaheine and Ulietea, which he was informed were well inhabited. Theſe had never been viſited by any European ſhip; but the inhabitants, though peaceable and friendly, were very ſlow and cautious in trading, ſo that the captain was obliged to bring out his hatchets to market; a commodity which he had hoped might have been concealed from thoſe who had never ſeen an European ſhip before. On his arrival at Ulietea he found by the diſcourſe of Tupia, that the inhabitants of a neighbouring iſland named *Bolabola* were of ſuch a martial diſpoſition as to be the terror of thoſe of Huaheine, Ulietea, and others, inſomuch, that he apprehended great danger to our navigators ſhould they touch at an iſland which the Bolabola men had lately conquered. This, however, had ſo little effect upon Captain Cook, that he not only landed on the iſland already mentioned, but took poſſeſſion, in his majeſty's name, of Bolabola itſelf, together with Ulietea, Huaheine, and another named Otaha, which were all viſible at once. During their ſtay here they paid a viſit to Opoony, the formidable monarch of Bolabola; whom, to their ſurpriſe, they found a feeble wretch, withered and decrepid, half blind with age, and ſo ſtupid that he ſeemed ſcarce to be poſſeſſed of a common degree of underſtanding. About theſe iſlands they ſpent ſix weeks, beſtowing upon them the name of the *Society Iſles*, on account of their being ſo near to each other. They are ſix in number, Ulietea, Huaheine, Bolabola, Otaha, Tubai, and Maurna. The ſmaller ones in their neighbourhood are Tethuora, Eimeo, Tapoamanoa, Oatara, Opururu, Tamou, Toahoatu, and Whennuaia.

12 Wretched appearance of the king of Bolabola.

13 Oheteroa iſland diſcovered.

Leaving the Society Iſlands, which are ſituated between Lat. 16. 10. and 16. 55. S. and between 150. 57. and 152. W. from the meridian of Greenwich, they fell in with the iſland of Oheteroa, ſituated in S. Lat. 22. 27. and W. Long. 150. 47.; but this was found to be deſtitute of any harbour or ſafe anchorage, and the diſpoſition of the inhabitants ſo hoſtile that they could not by any means be conciliated, ſo that no attempts were made to land. From Tupia Captain Cook learned that there were ſeveral iſlands in the neighbourhood, which our navigator conjectured to be Boſcawen and Keppel's iſlands, diſcovered by Captain Wallis; but without ſpending more time in exploring theſe, he ſet ſail to the ſouthward in ſearch of a continent.

14 Comet of 1769 obſerved.

Our voyagers left Oheteroa on the 15th of Auguſt 1769, and on the 30th had a view of the comet which appeared that year; its tail ſubtending on an angle of 42 degrees. This proved a new ſource of apprehenſion to Tupia, who inſtantly cried out, that as ſoon as it was ſeen at Bolabola, the people of that country would attack thoſe of Ulietea, who would undoubtedly be obliged to fly with precipitation to the mountains to ſave their lives. On the 6th of October they diſcovered land, which from its ſize, and the enormous mountains obſervable on it, was ſuppoſed by the gentlemen on board to be part of *Terra Auſtralis incognita*; but, on farther examination it was found to be part of New Zealand. Here the inhabitants were found to ſpeak a dialect of the language of Otaheite, ſo that they could underſtand Tupia, and he them; yet ſo extremely hoſtile were their diſpoſitions, that not the ſmalleſt intercourſe could be held with them; nor could any thing neceſſary for the ſhips be procured excepting wood; ſo that the name Captain Cook thought proper to beſtow on this part of the country was *Poverty Bay*. By the natives it is called *Taoneroa*, and lies in S. Lat. 38. 42. and W. Long. 181. 36. During the time of his ſtay in this part of the world, the captain circumnavigated almoſt the whole country of New Zealand, which he found to conſiſt of two iſlands ſeparated from each other by a narrow ſtrait, which, from its diſcoverer, has obtained the name of *Cook's Strait*. In ſome places the diſpoſition of the inhabitants was as favourable as could be wiſhed; ſo that Dr Solander, Mr Banks, and other gentlemen, had an opportunity of exploring the country in ſome degree, with a view to diſcover its natural productions. In one of their excurſions, as they paſſed through a valley, the hills on each ſide of which were very ſteep, they were ſuddenly ſtruck with the ſight of a very extraordinary natural curioſity. It was a rock perforated through its whole ſubſtance, ſo as to form a rude but ſtupendous arch or cavern, opening directly to the ſea. This aperture was 75 feet long, 27 broad, and 45 in height, commanding a view of the bay and the hills on the other ſide, which were ſeen through it; and opening at once on the view, produced an effect far ſuperior to any of the contrivances of art. On that part of the coaſt, which, from having obſerved a tranſit of Mercury, they named *Mercury Bay*, oyſters were found in ſuch plenty, that they might have loaded not only their boats, but even their ſhip with them. They were about the ſame ſize with thoſe met with in this country; and on account of their being found in ſuch plenty, and likewiſe that the adjacent country abounds with conveniencies, Captain Cook was at great pains to point out the ſituation of the place. By his obſervations the latitude of Mercury Bay is 36. 48. 28. S.

15 They arrive at New Zealand.

16 Rock of extraordinary ſhape.

17 Natural productions of the country.

Leaving this bay, our commander proceeded to explore other parts of the country, which by his account ſeems to abound with rivers. Two large ones were met with in Mercury bay; one of which, from the

the abundance of oyſters found at its mouth, was called *Oyſter river;* the other they named *Mangrove river*, from the number of mangrove trees growing there. A third, which they called *Thames*, was met with in that part called the Bay of Iſlands, up which they ſailed 14 miles. Its banks were everywhere adorned with lofty trees, which they had likewiſe obſerved in other parts of the country. They were too heavy for maſts, but would make the fineſt planks imaginable; and as they reſembled the pitch pine, the timber of which is lightened by tapping, the carpenter was of opinion that they might thus be rendered more proper for maſts than any European timber. One of theſe trees meaſured 19 feet 8 inches in circumference at the height of ſix feet from the ground, and was no leſs than 89, with very little taper, to the branches; ſo that the lieutenant ſuppoſed it muſt contain 356 feet of ſolid timber. In Queen Charlotte's Sound the country was little other than one vaſt foreſt, with plenty of excellent water, and the coaſt abounding with fiſh. As the ſhip lay at the diſtance of only a quarter of a mile from the ſhore, they were agreeably entertained with the ſinging of an infinite number of ſmall birds, which formed a melody greatly ſuperior to any thing they had ever heard before. The muſic of theſe little choriſters ſeemed to be like ſmall bells, moſt exquiſitely tuned, though probably the diſtance and intervention of the water had a conſiderable effect in heightening it. They began to ſing about two in the morning, and continued their ſong till ſunriſe, after which they were ſilent all the day, reſembling in this reſpect the nightingales of our country.

The time which Captain Cook ſpent in exploring the coaſts of New Zealand was not leſs that ſix months. By his reſearches it was ſhown to conſiſt of two large iſlands, the moſt northerly of which is called *Eaheinomauwe*, and the moſt ſoutherly *Tovy* or *Tavai Poenammoo;* though it is not certain whether the whole ſouthern iſland or only a part of it is comprehended under this name. This iſland ſeems to be barren and mountainous, but *Eaheinomauwe* has a much better appearance; and it was univerſally believed by the gentlemen on board, that all kinds of European grain, as well as garden plants and fruits, would flouriſh in the greateſt abundance and perfection; and from the vegetables found here it was concluded that the winters are not more ſevere than thoſe of England, and it was known by experience, that the ſummer was not hotter, though the heat was more equal than in this country. Here are no quadrupeds except dogs and rats; and the latter are ſo ſcarce, that they eſcaped the notice of many on board. The birds are not numerous, and the gannet is the only one of the European kind that was obſerved. The inſects are equally ſcarce; but the ſea makes abundant recompenſe for this ſcarcity of land animals; every creek ſwarms with fiſh, equally delicious with thoſe in this country. The foreſts are of vaſt extent, and filled with excellent timber trees; the largeſt, ſtraighteſt, and cleaneſt that Mr Cook had ever ſeen. There is here one plant which anſwers the purpoſes of both hemp and flax, and excels all others of the kind that have been met with in any other part of the world. If the ſettling of New Zealand therefore ſhould ever be deemed an object worthy of the attention of Great Britain, Captain Cook was of opinion, that the beſt place for eſtabliſhing a colony would be either on the banks of the Thames or in the bay of Iſlands; each of theſe places having the advantage of an excellent harbour. Settlements might be extended, and a communication made with the inland parts of the country by means of the river; and veſſels eaſily conſtructed of the excellent timber with which the country everywhere abounds.

Cook's Diſcoveries.

20
Account of the inhabitants.

The inhabitants of New Zealand are in a very barbarous ſtate, and have a degree of ferocity unknown to the inhabitants of the South Sea iſlands, though they ſeem to have the ſame origin. During their reſidence there, our navigators had the moſt convincing evidences of their being cannibals, and accuſtomed to devour the bodies of their ſlain enemies. Notwithſtanding theſe barbarous practices, however, they ſeemed to enjoy a ſtate of uninterrupted health. In all the viſits made to their towns, none was ever perceived who had the leaſt bodily complaint, not even the ſlighteſt eruption on the ſkin. This extraordinary degree of health was likewiſe manifeſted by the eaſe with which their wounds were healed without the ſmalleſt application, as well as by the number of old men with which the iſland abounded. Many of theſe, by the loſs of their hair and teeth, ſeemed to be extremely old, but none of them were decrepid; and though inferior in ſtrength to the young men, they came not behind them in the leaſt with regard to cheerfulneſs and vivacity. The univerſal and only drink of the New Zealanders is water.

21
Diſcoveries at New Holland.

Our navigator had now explored three-fourths of that part of the globe where the ſouthern continent was ſuppoſed to lie, without being able to find it; and his voyage had demonſtrated, that the lands ſeen by former navigators could not have been parts of ſuch a continent, though, as he had never proceeded farther to the ſouthward than 40 degrees, the arguments for it were not as yet entirely overthrown. Mr Cook, however, did not at this time proceed farther in the ſearch of ſuch a continent, but ſailed from New Zealand to the coaſt of New Holland, where he anchored in Botany Bay on the 20th of April. Here he found a few ſavage inhabitants more barbarous and degenerate than any that had yet been obſerved. Their language was harſh and diſſonant, totally unintelligible even to Tupia: they appeared to have little curioſity, and ſet no value upon any preſent that could be made them. The moſt remarkable circumſtance in this country ſeems to be its extreme ſcarcity of water; not a ſingle ſtream of any conſequence having ever been obſerved by any navigator. Some were of opinion indeed, that Moreton's bay, in S. Lat. 26. 59. and W. Long. 206. 28. opens into a river; though the only reaſon they had for this opinion was, that the ſea looked paler in that part than uſual, and the land at the bottom part of the bay could not be ſeen. At this time, however, the matter could not be determined by experiment, on account of the wind being contrary. The ſcarcity of water here is the more ſurpriſing, on account of the vaſt extent of the country, and likewiſe its having abundance of tolerably high hills. In this iſland there were found many curious plants and animals; and it was found, that in ſeveral places the magnetical needle was affected to ſuch a degree, as to vary its poſition even to 30 degrees. At one time it varied no leſs

22
Magnetic needle ſurpriſingly affected.

than

Cook's Discoveries.

than two points on being removed to the diſtance of only 14 feet. Some of the looſe ſtones being taken up and applied to the needle produced no effect; but Mr Cook was of opinion that the whole phenomenon was to be aſcribed to iron ore in ſome of the mountains, and of which traces had been already met with. This irregularity continued in ſome degree even at ſea; for when the ſhip was cloſe under Cape Upſtart, the variation of the needle in the evening of the 4th of June was 9° eaſt, and next morning only 5° 35′; and this was in like manner accounted for from iron ore, or ſome magnetical matter below the ſurface of the ground. The great iſland has many other ſmall ones round it, ſeveral of which were viſited by our navigators. One of them, named *Eagle Iſland*, ſeemed to be inhabited by a monſtrous kind of birds, the neſt of one of which meaſured no leſs than 26 feet in circumference, and two feet eight inches in height; and in the Philoſophical Tranſactions, vol. xx. there is an account of one of theſe neſts ſtill larger; but the bird to which it belonged was not ſeen. That which our navigators ſaw was built of ſticks, and lay upon the ground.

23 Birds neſts of an immenſe ſize.

24 Vaſt extent of the country.

The country which goes by the name of *New Holland* is by far the largeſt iſland in the world. Its eaſtern part, called *New South Wales*, now firſt explored by Captain Cook, extends upwards of 2000 miles in length, if the coaſt were reduced to a ſtraight line. Though inhabited, as we have already ſaid, by very barbarous ſavages, their number appears to bear no proportion to the extent of their territory. The intercourſe they had with our navigators was ſo ſmall, that they could pick up but a few words of their language. As a Britiſh ſettlement is now made in that country, there is no doubt that much more exact accounts will ſoon be obtained than even the diligence and attention of Captain Cook could collect on ſuch a tranſient viſit.

25 Separated by ſtraits from New Guinea.

In this voyage our navigator, beſides exploring the eaſtern part of the iſland, which had never been done before, diſcovered that it was ſeparated from the iſland of New Guinea, to which it had formerly been thought to join. The two countries are ſeparated by a ſtrait to which the commander gave the name of *Endeavour Strait*. The north entrance of this lies in S. Lat. 10. 39. and W. Long. 218. 36.; the paſſage is formed by the main land and a congeries of iſlands to the north, on which our navigator beſtowed the name of *Prince of Wales's Iſlands*. Theſe are very different both in height and extent; and the captain was of opinion, that ſeveral paſſages might be found out among them.

26 Cockles of vaſt ſize, ſea-ſcum, &c.

On the coaſt of New Holland oppoſite to New Guinea are found cockles of an immenſe ſize; ſome of them being as much as two men could move, and containing 20 pounds of good meat. In theſe ſeas, as well as on the coaſts of Brazil, our navigators found the ſurface of the water covered with a kind of ſcum called by the ſailors *ſea-ſpawn*. It was examined by Mr Banks and Dr Solander; but they could determine nothing farther than that it was of vegetable origin.

The natives of New Guinea were ſo hoſtile that no diſcoveries of any conſequence could be made. They reſembled the New Hollanders in ſtature, and having ſhort cropped hair. Like them too they were abſolutely naked, but ſomewhat leſs black and dirty. They had a ſurpriſing method of letting off a kind of fires, exactly reſembling the flaſhes of fire-arms, but without any exploſion. It was not known in what manner this was done, as they were never near enough to make a particular obſervation. Thoſe who diſcharged them had a ſhort piece of ſtick which they ſwung ſidewiſe from them, from which there iſſued the fire and ſmoke juſt mentioned. This ſeems to have been intended as a defiance; for they had no effect as offenſive weapons, and others were armed with bows and arrows. The country appeared extremely pleaſant and fertile. The place at which they touched lies in S. Lat. 6. 15.

27 Unaccountable method of natives letting off fires.

As the condition of the Endeavour was now very much ſhattered by having ſailed ſo long in theſe dangerous ſeas, the commander determined to make the beſt of his way for Batavia in order to refit. In this voyage he firſt paſſed two unknown iſlands without touching at either of them. They were ſuppoſed to belong to the Aurora iſlands; but if this be the caſe, the latter muſt be laid down at too great a diſtance from New Guinea. The Weaſel Iſles, laid down by former navigators at about 28 or 25 leagues from the coaſt of New Holland, were not ſeen; for which reaſon Mr Cook is of opinion that they are erroneouſly laid down.

Paſſing by the iſlands of Timor, Timor-lavet, Rotta, and Seman, they next arrived at the iſland of Savu, where a ſettlement had lately been made by the Dutch. In this voyage they had the ſatisfaction of obſerving the aurora auſtralis, which here ſeemed to differ in ſome reſpects from that in the northern hemiſphere. It conſiſted of a dull reddiſh light extending about 20 degrees above the horizon; and though it varied ſometimes in extent, it was never leſs than eight or ten degrees. From this general maſs of light there ſometimes iſſued rays of a brighter colour, which vaniſhed and were renewed like thoſe of the aurora borealis, but without any of that tumultuous motion obſerved in the aurora borealis. The body of the light bore S. S. E. from the ſhip, and continued without any diminution of its brightneſs from 10 to 12 at night.

28 Aurora auſtralis.

The middle part of the iſland of Savu lies in 10. 35. ſouth, and 237. 30. weſt longitude, and afforded a moſt beautiful proſpect from the ſhip. The people are remarkable for the purity of their morals, which are ſaid to be irreproachable, even on the principles of Chriſtianity. Though no man is allowed to have more than one wife, inſtances of illicit commerce betwixt the ſexes are ſcarcely known among them. Inſtances of theft are likewiſe very rare; and ſo far are they from revenging a ſuppoſed injury by murder, that when any differences ariſe among them, they are immediately and implicitly referred to the determination of the king. They will not even make it the ſubject of private debate, leſt they ſhould be provoked to reſentment and ill-nature; and the delicacy and cleanlineſs of their perſons are ſaid to be proportionable to the purity of their morals.

29 Excellent character of the inhabitants of Savu.

On the arrival of the Endeavour at Batavia, our navigator had an opportunity of obſerving the good effects of the electrical chains applied to ſhips, in ſecuring them from the effects of lightning. A dreadful ſtorm of thunder happened one evening, during which the main-maſt

30 Good effects of the electrical chains in preſerving from effects of lightning.

main-maſt of one of the Dutch Eaſt Indiamen was ſplit and carried away cloſe by the deck, the main-top-maſt, and top-gallant-maſt being ſhivered to pieces. This ſhip lay ſo near the Endeavour, that the latter would probably have ſhared the ſame fate, had it not been for the conducting chain which fortunately was juſt put up. The exploſion ſhook her like an earthquake, the chain at the ſame time appearing like a line of fire. The ſtroke ſeemed to have been directed to the Dutch veſſel by an iron ſpindle at the maſt head: which practice our commander diſcommends, but ſtrongly inculcates the uſe of the electrical chain.

On their landing at Batavia, Tupia was confined by ſickneſs, ſo that he appeared quite lifeleſs and dejected when put into the boat: but on his arrival at land recovered his ſpirits ſurpriſingly. The ſcene, to him ſo new and extraordinary, ſeemed to produce an effect ſimilar to what is produced by enchantment. His attention was particularly engaged by the various dreſſes of the people: and being informed that at Batavia every one appeared in the dreſs of his own country, he expreſſed a deſire of likewiſe appearing in the garb of Otaheite. Having therefore been furniſhed with South ſea cloth from the ſhip, he equipped himſelf with great quickneſs and dexterity. After the firſt flow of ſpirits had ſubſided, however, he ſoon began to feel the fatal effects of the climate; and his boy Tayeto, whoſe ſpirits had been ſtill more elevated on his arrival, was attacked with an inflammation of the lungs, and in a little time fell a victim to the diſeaſe. Tupia himſelf did not long ſurvive him, and his death was not attributed ſolely to the unwholeſomeneſs of the climate. Having been accuſtomed from his infancy to ſubſiſt chiefly upon vegetable food, and particularly on ripe fruit, he had ſoon contracted the diſorders incident to a ſea life, and could ſcarce have been expected to reach England, even if the unwholeſome climate of Batavia had been out of the queſtion.

The Endeavour left Batavia on the 27th of December 1770, and on the 5th of January 1771 reached Prince's iſland. This place had been formerly much frequented by the India ſhips, but of late entirely deſerted on account of the ſuppoſed bad quality of the water; but this our navigator has diſcovered to be a miſtake; and that, though the water near the ſea is brackiſh, it may be had of excellent quality by going a little way up the country. He is of opinion, that this iſland is a more proper place for ſhips to touch at than either North Iſland or New Bay, becauſe neither of theſe can afford other refreſhments, which may be had at Prince's iſland.

The reſt of the voyage affords but little intereſting matter. The Cape of Good Hope, which was their next ſtage, has been ſo fully deſcribed by former navigators that there was little room for addition. At St Helena the commander made ſome remarks on the rigorous treatment of the ſlaves, which was repreſented as worſe than that of the Dutch either at Batavia or the Cape of Good Hope. In the account of his ſecond voyage, however, this accuſation was retracted.

Captain Cook's ſecond voyage was undertaken in an eſpecial manner to determine finally the queſtion concerning the exiſtence of a ſouthern continent. It commenced in the year 1772; and, as in the former, he proceeded firſt to Madeira. From thence he proceeded to St Jago, one of the Cape de Verde iſlands; where an opportunity was taken of delineating and giving ſuch a deſcription of Port Praya, and the ſupplies to be there obtained, as might be of uſe to future navigators. On the 8th of September he croſſed the line in 8° weſt longitude, and had the ſatisfaction to meet with good weather, though he had been informed that he had ſailed at an improper time of the year, in conſequence of which he would probably be becalmed. From his account, however, it appears, that though in ſome years ſuch weather may be expected, it is by no means univerſally the caſe. In this part of the ocean he had alſo an opportunity of obſerving the cauſe of the luminous property of ſea-water, which in his former voyage had been attributed to inſects. Mr Forſter being of a different opinion, the matter was again particularly inquired into, but the reſult was entirely conformable to the former determination. Some buckets of water being drawn up from alongſide the ſhip, were found to be filled with thoſe inſects of a globular form, and about the ſize of a ſmall pin's head. No life indeed could be perceived in them; but Mr Forſter was thoroughly convinced of their being living animals when in their proper element.

Proceeding ſouthward in queſt of a continent, they fell in with ice iſlands in S. Lat. 50. 40. and two degrees of longitude eaſt from the Cape of Good Hope. One of theſe was ſo much concealed by the hazineſs of the weather, that it could not be ſeen at the diſtance of more than a mile. Captain Cook judged it to be about 50 feet in height and half a mile in circumference; its ſides riſing in a perpendicular direction, and the ſea breaking againſt them with great violence. Two days after, they paſſed ſix others, ſome of which were two miles in circumference and 60 feet in height; yet ſuch was the ſtrength and violence of the waves that the ſea broke quite over them. On the 14th they were ſtopped by a vaſt field of low ice, of which they could perceive no end. In different parts of this field there were ſeen iſlands, or hills of ice like thoſe already deſcribed, and ſome of the people imagined that they ſaw land over them; but upon a narrow examination this was found to be a miſtake. On getting clear of the field of ice they again fell in with looſe iſlands; and it was a general opinion that theſe are only formed in bays and rivers, our navigators concluded that they could not be at a great diſtance from land. They were now in the latitude of 55° 40′ ſouth; and as they had ſailed for more than 30 leagues along the edge of the ice without finding any opening, the captain determined to run 30 or 40 leagues farther to the eaſtward, in hopes of then getting to the ſouthward. If in this attempt he met with no land or other impediment, his deſign was to ſtretch behind the ice altogether, and thus determine the matter at once. In a ſhort time, however, it became evident that the field of ice along which they had ſailed ſo long, did not join with any land; and the captain now came to a reſolution of running as far to the weſt as the meridian of Cape Circumciſion. In the proſecution of this deſign he met with a very ſevere ſtorm, which was rendered the more dangerous by the pieces of looſe ice among

Cook's Diſcoveries.

34 Calms not always to be feared near the equinoctial.

35 Luminous quality of ſea water further determined.

36 Ice iſlands.

among which they were ſtill entangled, and a vaſt field of which they could not perceive the boundaries about three miles to the northward. Of this they could not get clear without receiving ſome ſevere ſtrokes; and after all, when they arrived at the place where they ought to have found Cape Circumciſion, it could not be diſcovered; ſo that the captain concluded that what Bouvet took for land could have been nothing but ice.

37
Ice not always found in the vicinity of land.

During this run the fallacy of the general opinion had been diſcovered, that the ice with which the polar regions abound has been formed in the vicinity of land. It was found likewiſe, that the water produced from the melting of ice, even though formed in the ocean, was perfectly ſweet and well taſted. Of this circumſtance the captain took advantage to ſupply himſelf with water; and gave it as his opinion that it was the moſt expeditious method of watering he had ever known. He had likewiſe an opportunity of detecting another popular error, viz. that penguins, albatroſſes, and other birds of that kind, never go far from land. This indeed may be the caſe in open ſeas, but in ſuch as are covered with ice it is very different; for they then inhabit the ice iſlands, and float out with them to ſea to a great diſtance,

When in the latitude of 49. 13. S. ſome ſigns of land were perceived; but as the wind did not admit of any ſearch being made in the direction where it was ſuppoſed to lie, the captain proceeded in his voyage to the eaſtward. A very remarkable alteration in the direction of the needle was now perceived, and which could not be ſuppoſed owing to the vicinity of any magnetic matter, as it happened while the ſhips were far out at ſea. The circumſtance was, that when the ſun was on the ſtarboard ſide of the ſhip the variation was leaſt, but greateſt when on the oppoſite ſide. An aurora auſtralis was again obſerved, which broke out in ſpiral or circular rays, and had a beautiful appearance; but did not ſeem to have any particular direction, being conſpicuous at various times in different parts of the heavens, and diffuſing its light over the whole atmoſphere.

38
Irregularity of the magnetic needle.

The extreme cold and ſtormy weather which now began to take place, determined Captain Cook not to croſs the antarctic circle a ſecond time as he had once deſigned. His obſervations confirmed the accounts of former navigators, that the cold of the ſouthern ſeas is much more intenſe than in equal latitudes in the northern hemiſphere; but at the ſame time it ſhowed that this cold cannot be owing to the vicinity of a continent, as had been formerly imagined. On the contrary, it was now determined beyond diſpute, that if any ſuch continent exiſted in the eaſtern part of the ſouthern ocean, it muſt be confined within the latitude of 60 degrees. No farther diſcoveries therefore being practicable in higher latitudes, as the winter ſeaſon was approaching, the commander ſteered for New Zealand, where he anchored in Duſky Bay on the 25th of March, having been at ſea 117 days without once coming in ſight of land. Here the time was ſpent in procuring proper refreſhments for the people, and exploring the ſea-coaſt and country for the benefit of future navigators. Nor was our commander unmindful of the inhabitants. Here he left the five geeſe which yet remained, chooſing for them a place where there were no people at the time to diſturb them; and as they had there great plenty of food, he had no doubt of their breeding, and in a ſhort time ſpreading over the country, Some days after a piece of ground was cleared by ſetting fire to the topwood, after which it was dug up and ſowed with garden ſeeds. Duſky Bay is ſituated in the weſtern iſland of New Zealand, called *Tavai Poenammoo*, which, as has already been ſaid, is leſs fertile than the other. The inland part is full of rugged mountains of a vaſt height: but the ſea-coaſt is covered with trees, among which is the true ſpruce, which was found to be of great uſe. It was remarked, that though a vaſt quantity of rain fell during the time of reſidence here, it was not attended with any bad effects on the health of the people: which furniſhes an additional argument for the healthineſs of the place. Duſky Bay is reckoned by Captain Cook to be the moſt proper place in New Zealand for the procuring of refreſhments, though it is attended with ſome diſagreeable circumſtances, particularly being infeſted with great numbers of black ſand-flies, which were troubleſome to an extreme degree. The natives ſeen at Duſky Bay were apparently of the ſame race with thoſe ſeen in other parts of the country, and led a wandering life, without any appearance of being united in the bonds of ſociety or friendſhip.

39
Extreme cold of the ſouthern ſeas.

40
Further account of New Zealand.

From Duſky Bay the captain proceeded to Queen Charlotte's Sound, where he met with the Adventure, which had been ſeparated from the Reſolution for above 14 weeks. In his paſſage thither he had an opportunity of obſerving ſix water-ſpouts, one of which paſſed within 50 yards of the Reſolution. It has been a common opinion, that theſe meteors are diſſipated by the firing of a gun, and the captain was ſorry he had not made the experiment; but he acknowledges, that though he had a gun ready for the purpoſe, and was near enough, his attention was ſo much engaged in viewing them, that he forgot to give the neceſſary orders.

41
Water ſpouts.

Having planted another garden in this part of the country, and left two goats, two breeding ſows and a boar, in as private a ſituation as poſſible, that they might be for ſome time out of the reach of the natives, the captain ſet ſail for Otaheite. During the long abſence of the Adventure, Captain Furneaux had viſited the coaſt of New Holland, and diſcovered that there was no probability of Van Diemen's land being ſeparated from it by ſtraits: he had likewiſe found additional proofs that the natives of New Zealand were accuſtomed to eat human fleſh. Captain Cook alſo remarked with concern, that the morals of the New Zealanders were by no means mended by the viſit he had formerly paid them. At that time he looked upon the women to be more chaſte than thoſe of moſt of the nations he had viſited; but now they were ready to proſtitute themſelves for a ſpikenail, and the men to force them to ſuch an infamous traffic, whether agreeable to the inclinations of the females or not.

42
Diſcoveries of Captain Furneaux.

In the run from New Zealand to Otaheite, our commander paſſed very near the ſituation aſſigned by Captain Carteret to Pitcairn's iſland, diſcovered by him in 1767, but without being able to find it, though a ſight of it would have been uſeful for correcting its longitude as well as that of others in the neighbourhood;

Co 's Diſco ries.

hood; but there was not at preſent any time to ſpend in ſearching for it. Proceeding farther on in his voyage, however, he fell in with a cluſter of iſlands ſuppoſed to be thoſe diſcovered by M. Bougainville; and named by him the *Dangerous Archipelago*. To four of theſe Captain Cook gave the names of *Reſolution*, *Doubtful*, *Furneaux*, and *Adventure Iſlands*. Reſolution Iſland is ſituated in S. Lat. 17. 24. W. Long. 141. 39. Doubtful Iſland in S. Lat. 17. 20. W. Long. 141. 38. Furneaux Iſland in S. Lat. 17. 5. W. Long. 143. 16. and Adventure Iſland in S. Lat. 17. 14. and W. Long. 144. 30.

New ands diſco ed.

Mi e con ning the omen of heite

No diſcovery of any great conſequence was made at the iſland of Otaheite or thoſe in its neighbourhood, excepting that the captain had an opportunity of correcting the opinion, which till now had prevailed, of the exceſſive diſſoluteneſs and immodeſty of the women of Otaheite; and which had been enlarged upon by Dr Hawkeſworth more than ſeemed to be conſiſtent with decency. The charge, however, according to the accounts of this ſecond voyage, is far from being indiſcriminately true, even of the unmarried females of the lower claſs. Some additions were made to the knowledge of the geography of thoſe iſlands; and from Huaheine Captain Furneaux took on board of his ſhip one of the natives of Ulietea named *Omai*, afterwards ſo much ſpoken of in England. Captain Cook at firſt appeared diſſatisfied with his choice of this youth, as being inferior in rank to many others, and having no particular advantage in ſhape, figure, or complexion; however, he had afterwards reaſon to be better pleaſed. During the captain's reſidence at Otaheite, he uſed his utmoſt endeavours to diſcover whether the venereal diſeaſe was endemic among them, or whether it had been imported by Europeans; but in this he could not meet with any perfectly ſatisfactory account, though it was univerſally agreed, that if it had been introduced by Europeans, it muſt have been by the French under M. Bougainville.

45 vey's d diſco- d.

Captain Cook having left Ulietea on the 17th of September 1773, directed his courſe weſtward, with an inclination to the ſouth. In this courſe he diſcovered land in S. Lat. 19. 8. and W. Long. 158. 54. to which he gave the name of *Harvey's Iſland*. From thence he proceeded to the iſland of Middleburg, where he was treated in the moſt hoſpitable manner poſſible. To ſuch an exceſs did the people carry their generoſity, that they ſeemed to be more fond of giving away their goods than in receiving any thing for them; inſomuch that many, who had not an opportunity of coming near the boats, threw over the heads of others whole bales of cloth, and then retired, without either waiting or aſking for any thing in return. From Middleburg he proceeded to Amſterdam iſland, where the beauty and cultivation of the iſland afforded the moſt enchanting proſpect. There was not an inch of waſte ground; the roads were no wider than what was abſolutely neceſſary, and the fences were not above four inches thick. Even this was not abſolutely loſt; for many of theſe contained uſeful trees or plants.

46 uth ſea ands generally ſur- unded ith coral cks.

It is obſervable of the iſles of Middleburg and Amſterdam, as well as of moſt others in the South ſea, that they are guarded from the waves by a reef of coral rocks, which extend about one hundred fathoms from the ſhore. Thus they are effectually ſecured from the encroachments of the ocean; by which they would probably ſoon be ſwallowed up, as moſt of them are mere points in compariſon of the vaſt quantity of water which ſurrounds them. Here he left a quantity of garden vegetable ſeeds and pulſe, which it was not doubted would be taken care of by the induſtrious inhabitants. In the laſt-mentioned iſlands our navigators found no animals but hogs and fowls; the former being of the ſame kind with thoſe uſually ſeen in the other iſlands of the South ſea; but the latter greatly preferable, equalling thoſe of Europe in their ſize, and even preferable in reſpect of the goodneſs of their fleſh.

Cook's Diſcoveries.

On the 7th of October, Captain Cook left the iſland of Amſterdam, with a deſign to pay another viſit to New Zealand, in order to take in wood and water for his voyage in queſt of a ſouthern continent. The day after he left Amſterdam he fell in with the iſland of Pilſtart, formerly diſcovered by Taſman, and ſituated in S. Lat. 26′. W. Long. 175. 59. thirty-two leagues diſtant from the eaſt end of Middleburg. On his arrival at New Zealand, he exerted himſelf as much as poſſible to leave a proper aſſortment of vegetables and animals for the benefit of the inhabitants. One of the firſt things he did, therefore, was to make a preſent to a chief, who had come off in a canoe, of a quantity of the moſt uſeful garden ſeeds, ſuch as cabbage, turnips, onions, carrots, parſneps, and yams; together with ſome wheat, French and kidney beans, and peaſe. With the ſame perſon alſo he left two boars, two ſows, four hens, and two cocks. This preſent, however valuable in itſelf, ſeems to have been but indifferently received; for the chief was much better ſatisfied with a ſpikenail half the length of his arm than with all the reſt; notwithſtanding which, he promiſed to take care of the ſeeds, and not to kill any of the animals. On inquiring about thoſe animals left in the country in the former part of his voyage, the captain was informed, that the boar and one of the ſows had been ſeparated, but not killed. The other he ſaw in good condition, and very tame. The two goats, he was informed, had been killed by a native of the name of Gaubiah. The gardens had met with a better fate; all the articles being in a very flouriſhing condition, though left entirely to nature, excepting the potatoes. Captain Cook, however, ſtill determined to ſupply theſe iſlanders with uſeful animals, put on ſhore a boar, a young ſow, two cocks, and two hens, which he made a preſent of to the adjacent inhabitants. Three other ſows and a boar, with two cocks and hens, he ordered to be left in the country without the knowledge of the Indians. They were carried a little way into the woods, and there left with as much food as would ſerve them for 10 or 12 days, in order to prevent them from coming down to the coaſt in queſt of it, and thus being diſcovered.

47 Another viſit to New Zealand.

48 Voyage in queſt of a ſouthern continent.

A ſecond ſeparation from the Adventure had now taken place; notwithſtanding which, Captain Cook ſet out alone with his veſſel in queſt of a ſouthern continent; and ſuch was the confidence put in him by the ſailors, that all of them expreſſed as much ſatisfaction and alacrity as if not only the Adventure, but ever ſo many ſhips had been in company.

On the 26th of November the captain ſet ſail from New Zealand; and on the 12th of December began to fall

Cook's Discoveries.

fall in with the ice, but considerably farther to the southward than they had met with it in the former part of his voyage; being now in the Lat. of 62. 10. S. and 172° W. Long. As they proceeded southward, the number of ice islands increased prodigiously; and in Lat. 67. 31. and W. Long. 142. 54. they all at once got in among such a cluster of these islands, that it became a matter of the utmost difficulty and danger to keep clear of them. Finding it impossible, therefore, to get any farther to the southward at present, the captain determined to explore a considerable tract of sea to the north of his present situation, and then again to stand to the south. But in this he was still unsuccessful; no land being discovered either in sailing northward, eastward, westward, or southward; though he proceeded as far in the last direction as 71. 10. S. Lat. and 106. 54. W. It was now impossible to proceed; and the opinion of the captain himself, as well as most of the gentlemen on board, was that the ice by which they were now stopped extended as far as the pole. As there was still room, however, in parts of the ocean entirely unexplored, for very large islands, our commander determined not to abandon the pursuit in which he was engaged until there should not be any possibility of doing more: and besides the possibility of making new discoveries, he was conscious that many of the islands already discovered were so obscurely known, that it was of consequence to pay them a second visit. With this view he proposed to go in quest of Easter or Davis's island; the situation of which was known with so little certainty, that none of the attempts lately made to discover it had been successful. He next intended to get within the tropic, and then to proceed to the west, touching at any islands he might meet with, and settling their situations, until he should arrive at Otaheite, where it was necessary for him to make some stay in order to look for the Adventure. It was part of his design also to run to the eastward as far as Terra Austral del Espiritu Santo, discovered by Quiros, and which M. Bougainville had named *The Great Cyclades*. From this land he proposed to sail to the southward, and from thence to the east between the latitude of 50° and 60°. In the execution of this design, he determined if possible to reach Cape Horn, during the ensuing November, when he would have the best part of the summer before him to explore the southern part of the Atlantic ocean.

49 Is stopped by ice.

In pursuing his course to the northward, it had been part of his design to find out the land said to have been discovered by Juan Fernandez in about the latitude of 38°; but he was soon convinced, that if any such land existed, it could only be a very small island; but the prosecution of the design was for some little time interrupted by a violent bilious disorder by which the captain was attacked. In this, when he began to recover, as there was no fresh meat on board, he was obliged to have recourse to dog's flesh; and a favourite animal belonging to Mr Forster was sacrificed on the occasion. The captain was able to eat not only of the broth made of this, but likewise of the flesh, when his stomach could bear nothing else. On the 11th of March they arrived at Easter island, before which time the captain was tolerably recovered. Here they made but few discoveries farther than determining the situation of it to be in S. Lat. 27. 5. 30. and W. Long. 109. 46. 20. The island itself was found barren and desolate, having every appearance of being lately ruined by a volcanic eruption; without either wood, fuel, or fresh water worth taking on board. The inhabitants were few in number; and the women in very small proportion to the men, but remarkable for their lewdness. A number of gigantic statues were observed, which had also been taken notice of by Commodore Roggewein, and the origin of which could not be accounted for.

50 Nutritive property of dog's flesh.

Visit Easter island,

On leaving Easter island, Captain Cook was again attacked by his bilious disorder; but happily recovered before he reached the Marquesas, which they did on the 6th and 7th of April. One of these, being a new discovery, received the name of *Hood's Island*, from the young gentleman by whom it was first observed. These are five in number; situated between 9 and 10 degrees of south latitude, and between 138. 47. and 139. 13. of west longitude. They were discovered by Mendana a Spaniard; and their names are, La Magdalena, St Pedro, La Dominica, Santa Christina, and Hood's Island. The inhabitants are, without exception, the finest race of people in the South sea, surpassing all others in that part of the world in the symmetry of their persons and regularity of their features. Their origin, however, from the affinity of language, was evidently the same with that of Otaheite. It was in St Christina that our commander anchored; and he has left particular directions for finding a particular cove in Resolution bay in that island, which is the most convenient for procuring wood and water.

and the Marquesas.

In the passage from the Marquesas to Otaheite, our navigators passed several low and small islands connected together by reefs of coral rocks. One of these, named by the inhabitants *Tiookea*, was visited by Lieutenant Cooper. It was discovered and visited by Captain Byron; and is situated in S. Lat. 27. 30. W. Long. 144. 56. The inhabitants are much darker in their complexion, and seem to be of a fiercer disposition than those of the neighbouring islands. They have the figure of a fish marked upon their bodies; a very proper emblem of their profession, deriving their subsistence almost entirely from the sea. Passing by St George's islands, which had been also discovered and named by Captain Byron, our commander now discovered four others, which he named *Palliser's Islands*. One of these is situated in S. Lat. 15. 26. and W. Long. 146. 20. another in S. Lat. 15. 27. and W. Long. 146. 3. They were inhabited by people resembling those of Tiookea, and like them were armed with long pikes. Here our navigator observes, that from W. Long. 138° to 148° or 150°, the sea is so full of small low islands, that one cannot proceed with too much caution.

Island Teoio

Palliser's islands

On his arrival at Otaheite, provisions were met with in great plenty; and they were now very acceptable, by reason of the long time the ship had been at sea without obtaining any considerable supply. Two goats which had been given by Captain Furneaux to a chief named *Otoo*, appeared to be in a very promising situation. The female had brought forth two kids, which were almost large enough to propagate; and as she was again with kid, there was little doubt that the island

Arrival at Otaheite.

iſland would ſoon be ſtocked with theſe uſeful animals; though it was otherwiſe with the ſheep, all of which had died except one. On this occaſion, alſo, the captain furniſhed the natives with cats, of which he gave away twenty; ſo that there was little danger of the ſtock of theſe animals decaying. During his reſidence at this time, he had an opportunity of making ſome computation of the number of inhabitants on the iſland, which he ſuppoſed to be no leſs than 200,000.

Hua ne, Ulie , Ho ila &c.

Huaheine and Ulietea iſlands were next viſited, but without any remarkable occurrence. From the latter our commander ſet ſail on the 5th of June 1774; and next day came in ſight of Howe iſland, diſcovered by Captain Wallis, and ſituated in S. Lat. 16. 46. and W. Long. 154. 8. On the 16th a new iſland, named *Palmerſtone iſland*, was diſcovered, in S. Lat. 18. 4. W. Long. 163. 10.; and four days after, another was obſerved in S. Lat. 19. 1. W. Long. 169. 37. As it was evidently inhabited, the captain determined to land; but found the people ſo extremely hoſtile, that no intercourſe could be had: nay, he himſelf was in danger of loſing his life by a lance thrown by one of the natives, which paſſed cloſe over his ſhoulder. From the extreme hoſtility of the people of this iſland, it was named by Captain Cook *Savage Iſland*. It is of a round ſhape, pretty high, and has deep water cloſe to the ſhore, but has no good harbour.

7 Ro dam iſla

Paſſing by a number of ſmall iſlands, Captain Cook next anchored at that of Anamocka or Rotterdam, diſcovered by Taſman. It is ſituated in 20. 15. S. Lat. and 174. 31. W. Long. Its form is triangular, each ſide extending about three and a half or four miles. From the north-weſt to the ſouth it is encompaſſed by a number of ſmall iſlands, ſand banks, and breakers; of which no end can be ſeen from the iſland on the northern ſide, and may poſſibly be as far extended as Amſterdam or Tongataboo. While the captain remained on this iſland, he learned the names of more than 20 of the adjacent iſles, ſome of which were in ſight between the north-weſt and north-eaſt. Two of theſe, which lie more to the eaſtward than the others, are named *Amattafoa* and *Oghoo*. They are remarkable for their height; and from a great ſmoke viſible about the middle of Amattafoa, it was ſuppoſed to have a volcano. The iſland of Rotterdam, Middleburg, or Eaoowe, with Pilſtart, form a group extending about three degrees of longitude, and two of latitude. The whole group was named *The Friendly Iſles* by Captain Cook, on account of the friendſhip which ſeemed to ſubſiſt among the inhabitants, and their courteous behaviour to ſtrangers. The people of Rotterdam iſland are ſimilar to thoſe of Amſterdam; but the iſland is not in ſuch a high ſtate of cultivation as Amſterdam, nor do its fruits come to ſuch perfection. It is alſo inferior in the articles of cloth, matting, &c. which are accounted the wealth of theſe parts.

;8 S poſed vo no.

59 y Hebr es viſit-

From Rotterdam iſland our navigator continued his courſe to the weſtward, where he firſt diſcovered a ſmall iſland in S. Lat. 19. 48. W. Long. 178. 2. It was named Turtle iſland, from the great number of theſe animals found upon it. Sixteen days after he fell in with the cluſter of iſlands named by M. Bougainville the *Great Cyclades*. The firſt iſland on which he landed was Mallicollo, where, though the people were at firſt very hoſtile, they were ſoon conciliated, and a friendly intercourſe took place. The language of theſe people is conſiderably different from that of the other South ſea iſlands; they are diminutive in their perſons, and of ugly features; their hair black or brown, ſhort and curling, but leſs ſoft than that of the negroes. They had no name for a dog in their language, and had never ſeen the animal; ſo that they were extremely fond of a dog and bitch, of which Captain Cook made them a preſent. The harbour in this iſland, in which the ſhip came to an anchor, was named Sandwich harbour, and lies on the north-eaſt ſide, in S. Lat. 16. 25. 20. E. Long. 167. 57. 53. It is very commodious for the carrying on any operations at land, having a good depth of water, and many other advantages.

Cook's Diſcoveries.

60 Shepherd's iſles.

The next diſcovery was that of the group named *Shepherd's Iſles*, in honour of Dr Shepherd, Plumian profeſſor of aſtronomy at Oxford. Numbers more were every day obſerved; of which one peaked rock, named the *Monument*, was uninhabited, being apparently inacceſſible to any other creature but birds. Sandwich iſland is of a conſiderable extent, and exhibits a moſt beautiful proſpect. It is ſurrounded with other ſmaller iſlands, the principal of which were named *Montague* and *Hinchinbrooke*. At Erromango they found the people hoſtile and treacherous; and from a ſkirmiſh they had with them near a promontory on the north-eaſt point of the iſland, it was named *Traitor's Head*. Its ſituation is in S. Lat. 10. 43. E. Long. 169. 28.

61 Tanna iſland.

From Erromango our navigators proceeded to Tanna, an iſland they had formerly diſcovered at a diſtance, and which is ſurrounded by ſome others, three of which are named *Immer*, *Footoona* or *Erronan*, and *Anatom*. At Tanna they ſtaid for ſome time, on account of their wanting ſome quantity of wood. A volcano was ſeen about the middle of this iſland, which burned with great violence, particularly in moiſt and wet weather; but notwithſtanding the friendly terms on which they were with the natives, the latter would never allow them to approach this mountain. There were ſome ſpots on the ſea-coaſt which emitted a hot and ſulphureous ſmoke; and the people alſo expreſſed much uneaſineſs when theſe were approached or meddled with. The port which the ſhip entered in this iſland was named *Reſolution Harbour*, and is ſituated in S. Lat. 19. 32. 25½. E. Long. 169. 44. 35. It is a ſmall creek three quarters of a mile long, and about half as broad. It is extremely convenient, having plenty of wood and water cloſe to the ſhore. Among the vegetable productions of this iſland, there is reaſon to ſuſpect the nutmeg tree to be one, a pigeon having been ſhot, in the craw of which was a wild nutmeg. The inhabitants are two diſtinct races of people, and ſpeak two different languages; one that of the Friendly Iſlands, the other peculiar to Tanna and thoſe in the neighbourhood. The people are very expert in the uſe of their weapons; on which Mr Wales makes the following remarks: "I muſt confeſs I have often been led to think the feats which Homer repreſents his heroes as performing with their ſpears, a little too much of the marvellous to be admitted in an heroic poem, I mean when confined

62 Volcano.

63 Dexterity of the inhabitants in the uſe of their lances.

Cook's Discoveries.

within the strait stays of Aristotle; nay, even so great an advocate for him as Mr Pope acknowledges them to be surprising; but since I have seen what these people can do with their wooden spears, and them badly pointed, and not of an hard nature, I have not the least exception to any one passage in that great poet on this account. But if I see fewer exceptions, I can find infinitely more beauties in him, as he has, I think, scarcely an action, circumstance, or description of any kind whatever relating to a spear, which I have not seen and recognised among these people; as their whirling motion and whistling noise as they fly; their quivering motion in the ground when they fall; their meditating their aim when they are going to throw; and their shaking them in their hand as they go along."

The archipelago, in which Captain Cook had now remained a considerable time, is situated between 14. 29. and 20. 4. S. Lat. and between 166. 41. and 170. 21. E. Long. extending 125 leagues in the direction of N. N. W. ½ W. and S. S. E. ½ E. The principal islands are the Peak of the Etoile, Terra del Espiritu Santo, Mallicollo, St Bartholomew, the isle of Lepers, Aurora, Whitsuntide isle, Ambrym, Paoom, Apee, Three Hills, Sandwich, Erromango, Tanna, Immer, and Anatom. They were first discovered in 1606 by Quiros, who supposed them to be part of a southern continent; nor were they visited from that time till the year 1768, when M. Bougainville bestowed upon them the name of the *Great Cyclades*, as already mentioned. This gentleman, however, besides landing in the isle of Lepers, only discovered that the country was not connected, but consisted of islands. Captain Cook examined the whole in such an accurate manner, ascertaining the situation of many of the islands, and discovering such numbers of new ones, that he thought he had an undoubted right to impose a new name upon them, and therefore called them the *New Hebrides*.

64
New Caledonia discovered.

From the New Hebrides Captain Cook set sail for New Zealand, in order to prosecute his voyage in search of a southern continent, but in three days discovered a large island, which he named *New Caledonia*; and which, next to New Zealand, is the largest in the Pacific ocean. It lies between 19. 37. and 22. 30. S. Lat. and between 163. 37. and 167. 14. E. Long. lying N. W. ½ W. and S. E. ½ E. extending about 87 leagues in that direction, though its breadth does not anywhere exceed 10 leagues. The natives are strong, active, well made, and seem to be a middle race between those of Tanna and the Friendly Isles; and the women were more chaste than those of the islands farther to the eastward. The island afforded a considerable variety of plants for the botanists, and some excellent timbers of the species of the pitch pine, for masts and spars. The wood is close-grained, white, and tough; and very fit for the purpose. One of the small islands surrounding the large one was named the *Isle of Pines*, from the quantity of these trees found upon it; and another, from the number and variety of plants it afforded, had the name of *Botany Island*. The coast, however, was so dangerous, that our navigator, having no more time to spare, was obliged to leave some part of it unexplored, though the extent was determined, as has been already related. Mr Forster was of opinion, that the language of this people is totally different from that of any of the other South Sea islands.

65
Norfolk island.

Proceeding from New Caledonia, our navigator next fell in with an island about five leagues in circumference, and of a good height, situated in S. Lat. 29. 2. 30. and E. Long. 168. 16.; on which he bestowed the name of *Norfolk Island*. It was entirely uninhabited. Various trees and plants common in New Zealand were observed here, particularly the flax plant, which is more luxuriant in this island than in any part of New Zealand. The chief produce of the island is a kind of spruce-pine, many of the trees of which are 10 or 12 feet in circumference. The palm cabbage likewise abounds here; and the coasts are well stocked with excellent fish. On the 18th of October they arrived at Queen Charlotte's Sound in New Zealand; the situation of which was now ascertained by Mr Wales with the utmost accuracy, its latitude being found 41. 5. 56½. S. and its longitude 174, 25. 7½ E. On examining the gardens which had been made, it was found that they were in a thriving condition, though they had been entirely neglected by the natives. Some of the cocks and hens were supposed to be still in existence, as a new laid hen's egg was found, though none were seen.

66
Arrival at New Zealand;

On the 10th of November Captain Cook set sail from New Zealand in search of a southern continent; but having traversed a vast extent of sea for 17 days, from S. Lat. 43. 0. to 55. 48. he gave up all thoughts of finding any more land in this part of the ocean, and therefore determined to steer directly for the west entrance of the straits of Magellan, with a design of coasting the southern part of Terra del Fuego quite round Cape Horn to Le Maire's Straits. As the world had hitherto received but very imperfect accounts of this coast, he thought a survey of it would be of more advantage to navigation and geography than any thing he could expect to meet with in a higher latitude. On the 17th of December he reached the coast of Terra del Fuego, and in three days more anchored in a place to which he gave the name of *Christmas Sound*. The land appeared desolate beyond any thing he had hitherto experienced. It seems to be entirely composed of rocky mountains, without the least appearance of vegetation. These mountains terminate in horrid precipices, the craggy summits of which spire up to a vast height; so that scarcely any thing in nature can have a more barren and savage prospect than the whole of the country. In the course of his voyage along this coast, he could not but observe, that at no time had he ever made one of such length where so little occurred of an interesting nature. Barren and dreary, however, as the coast was, it was not totally destitute of accommodations about Christmas Sound. Fresh water and wood for fuel were found about every harbour; and the country everywhere abounds with fowl, particularly geese.—A considerable number of plants were also found upon it, almost every species of which was new to the botanists. In passing by Cape Horn, it was wished to determine whether it belonged to the land of Terra del Fuego, or to a small island south from it; but this was found impracticable on account of the foggy weather and dangerous sea. Its latitude was now

6[illegible]
at Terra del Fuego.

6[illegible]
Remarks on a round Horn.

now determined to be 55. 58. S. and its longitude 67. 46. W. The coast appeared less dreary here than on the western side of Terra del Fuego; for though the summits of some of the hills were rocky, the sides and valleys seemed covered with a green turf and wooded in tufts. In passing this cape a remark was made by the captain, that if he were on a voyage round Cape Horn, to the west, and not in want of wood or water, or any other thing which might make it necessary to put into port, he would sail a considerable way to the southward, so as to be out of the reach of land altogether. By this method he would avoid the currents, whose force, he was of opinion, would be broken at 10 or 12 leagues distance from the shore, and farther off would be entirely destroyed. The extent of Terra del Fuego, and consequently of Magellan's Straits, was found to be less than what is commonly laid down in maps and charts, and the coasts, in general, less dangerous than has been usually represented; though this must undoubtedly have been owing in a great measure to the weather, which happened to be remarkably temperate. In one of the small islands near Staten Land, and which from their being discovered on new year's day, were called *New Year's Isles*, a remarkable harmony was observed among the animals of different species with which these desolate regions abound. The sea-lions occupy the greatest part of the sea coast; the bears occupy the inland; the shags are posted in the highest cliffs; the penguins in such places as have the best access to and from the sea; and the other birds choose more retired places. Occasionally, however, all these animals were seen to mix together like domestic cattle and poultry in a farm yard, without one attempting to hurt the other in the least. Even the eagles and vultures were frequently observed sitting together on the hills among the shags, while none of the latter, either old or young, appeared to be disturbed at their presence. It is probable, therefore, that these birds of prey subsist by feeding on the carcases of the animals which die naturally or by various accidents, and which must be very numerous, from the immense quantity existing on the island.

Our navigator now set out in quest of that extensive coast laid down in Mr Dalrymple's chart, and in which is marked the gulf of St Sebastian; but when he came into the place where it is supposed to lie, neither land nor any certain signs of it could be met with. Some islands, however, were discovered, particularly Willis's island, in S. Lat. 54. 0. W. Long. 38. 23.; another named *Bird Island* and *South Georgia*, situated between 53. 57. and 54. 57. S. Lat. and between 38. 13. and 35. 34. W. Long. All these were covered with snow and ice to a great height. Not a tree was to be seen, not even a shrub, nor were there any rivulets or streams of water: the only vegetables to be met with were a coarse strong-bladed grass, wild burnet, and a kind of moss. A considerable quantity of seals and penguins were met with, whose flesh, though very coarse, was preferred by the ship's company, even by Captain Cook himself, to the salt provisions, which were now greatly decayed. The most southerly land discovered by our navigator was that on which he bestowed the name of *Southern Thule*, and which is situated in S. Lat. 59. 13. 30. W. Long. 27. 45. This was still more desolate than South Georgia, being forsaken even by the seals and penguins which abounded on it. Not a single herb of any kind was seen upon it, but vast high and barren mountains, the tops of some of which reached above the clouds; and it may be remarked, that this seems to be the only part of the world, hitherto discovered, entirely unfit for the support of animal life.

Cook's Discoveries.

71
Of the existence of a southern continent.

Southern Thule was discovered on the 31st of January 1775; and from this to the 6th of February several other islands were discovered, and named *Cape Bristol*, *Cape Montague*, *Saunders's Isles*, *Candlemas Isle*, and *Sandwich's Land*. With regard to this last, Captain Cook was undetermined whether it was a group of islands or part of a continent lying near the pole, as after all his disappointments, he was still inclined to think that such a continent has an existence, on account of the vast quantity of ice met with in the southern seas, and which from its great height appears to be formed in bays and gulfs of the land, and not in the ocean itself. The greatest part of the southern continent, however, if it has any existence, must be within the polar circle, where the sea is so encumbered with ice, that the land must be inaccessible. So great is the danger in navigating these southern seas, that Captain Cook asserts, on the most probable grounds in the world, that such lands as lie to the southward of his discoveries could not be explored; and that even no man would venture further than he had done. Thick fogs, snow storms, intense cold, and every thing that can render navigation difficult or dangerous, must be encountered; all which difficulties are greatly heightened by the inexpressibly horrid aspect of the country itself. It is a part of the world doomed by nature never once to feel the warmth of the sun's rays, but to be buried in everlasting snow and ice. Whatever ports there may be on the coast, they are almost entirely covered with frozen snow of a vast thickness. If, however, any of them should be so far open as to invite a ship into it, she would run the risk of being fixed there for ever, or of coming out in an ice island. To this it may be added, that the islands and floats on the coast, the great falls from the ice clefts in the port, or a sudden snow storm, might be attended with equally fatal effects. For these reasons our commander determined to abandon the pursuit of a land whose existence was so equivocal, but whose inutility, if it should be discovered, was certain. One thing only remained to complete what he wished to accomplish, and that was to determine the existence of Bouvet's land. In this inquiry he spent 16 days; but having run for 13 of these directly in the latitude assigned to that land, and found no appearance of it, or of Cape Circumcision, he concluded that neither of them had any existence, but that the navigators had been deceived by the appearance of ice islands. Two days more were spent in quest of some land which had been observed more to the southward, but with the like bad success; after which our commander abandoned all farther thoughts of southern discoveries, and prepared for returning to England. On his way home, however, he determined to direct his course in such a manner as to fall in with the islands of Denia and Marseveen. These are laid down in Dr Halley's variation chart in latitude 41. 30. S. and about 4. 0. E. from the meridian of

72
Voyage in quest of Bouvet's land.

73
Of the isles of Denia and Marseveen.

Cook's Discoveries.

of the Cape of Good Hope. None of these islands could be found; and therefore our commander having very little time to spare either in searching for them or attempting to disprove their existence, made the best of his way to the Cape of Good Hope, and from thence to England. In his passage thither, he visited the isles of St Helena, Ascension, and Fernando de Noronha.

74 Of the usefulness of distilling sea-water.

An experiment was made on the use of the still for procuring fresh water at sea; the result of which was, that though the invention was useful upon the whole, yet it would not by any means be advisable to trust entirely to it. Provided indeed that there was not a scarcity of fuel, and that the coppers were good, as much might thus be procured as would support life; but that no efforts would be sufficient to procure the quantity necessary for the preservation of health, especially in hot climates. He was likewise convinced that nothing contributes more to the health of seamen than having plenty of fresh water. His last stage in this second voyage before his arrival in England was at Fayal, one of the Azores islands; and his only design in stopping here was to give Mr Wales an opportunity of finding the rate of the watches going, that so he might be enabled to find the longitude of these islands with the greater certainty.

75 Third voyage.

76 Visits the isle of Teneriffe.

In our commander's third voyage he touched at the island of Teneriffe instead of Madeira, looking upon the former to be a better place for procuring refreshments; and was convinced of the justness of his conjecture by the facility with which provisions of all kinds were obtained. The air of the country is exceedingly healthy, and proper for those subject to pulmonary complaints. This was accounted for by a gentleman of the place from the great height of the island, by which it was in the power of any person to change the temperature of the air as he pleased; and he expressed his surprise that physicians, instead of sending their patients to Nice or Lisbon, did not send them to Teneriffe.

77 Tea-shrub.

From the same gentleman it was learned, that the tea shrub grows in that island as a common weed, which is constantly exterminated in large quantities. The Spaniards, however, sometimes use it as tea, and ascribe to it all the qualities of that brought from the East Indies. They gave it also the name of tea, and say that it was found in the country when the islands were first discovered.

78 Impregnated lemon.

Another botanical curiosity is the fruit called the *impregnated lemon*, which is a perfect and distinct lemon inclosed within another, and differing from the outer only in being a little more globular.

79 Prince Edward's islands discovered.

From Teneriffe Captain Cook proceeded to the Cape of Good Hope, and from thence to the southward, where he fell in with two islands, the larger of which is about 15 leagues in circuit, and the smaller about nine; their distance from one another being about five leagues. The one of these islands lies in S. Lat. 46. 53. and E. Long. 37. 46.; the other in S. Lat. 46. 4. E. Long. 38. 8. As the ships passed through between them, they could not discern either tree or shrub upon any of them, even with the assistance of their best glasses. The shore seemed to be bold and rocky, their internal parts full of mountains, whose sides and summits were covered with snow. These two, with four others, which lie from 9 to 12 degrees of longitude more to the east, and nearly in the same latitude, had been discovered in the year 1772 by Captain Marion du Fresne and Crozet, two French navigators, in their passage from the Cape of Good Hope to the Philippines. As no names had been assigned to them in a chart of the Southern ocean communicated to Captain Cook in 1775, the two larger ones were by him distinguished by the name of *Prince Edward's islands*, in honour of his majesty's fourth son; the other four, with a view to commemorate the discoverers, were called *Marion's* and *Crozet's islands*.

8[illegible] Voyage in quest of Kerguelen's land.

From these our commander steered to the southward in search of Kerguelen's land, which he had been instructed to touch at, in order to discover, if possible, a good harbour there. In his passage to it several new islands were discovered; one, to which Kerguelen had given the name of the *Island of Rendezvous*, Captain Cook, on account of its shape, changed to that of *Blight's Cap*. It is situated in S. Lat. 48. 29. E. Long. 68. 40. and is a high round rock, inaccessible to all creatures but birds.

8[illegible] Description of the island.

Next day he fell in with Kerguelen's land, at first thought to be a part of the southern continent, but afterwards found by Kerguelen himself to be an island. The extent of it, however, was not determined either by the French navigator or by Captain Cook. The former reckons it at 200 leagues in circumference, but Captain Cook estimates it at much less. Our navigator could not get any extensive view of it on account of the foggy weather; but as far as could be discovered, it was barren and desolate, insomuch that there was neither food nor covering for cattle of any kind, so that they would inevitably perish if any were left. Even the sea-coasts were in a great measure destitute of fish; but the shore was covered with innumerable multitudes of seals, together with penguins and other birds; all of which were so void of fear that any quantity whatever might be killed without any difficulty. Not a single tree nor shrub could be seen, nor a piece of drift wood on the shore; and herbage of every kind was likewise very scarce. A prodigious quantity of the sea-weed called by Sir Joseph Banks *fucus giganteus* was found in one of the bays. The whole variety of plants found in this island did not exceed sixteen or eighteen species. The harbour in which our navigator made his longest stay on this desolate coast was named *Port Pallifer*, and is situated in S. Lat. 49. 3. E. Long. 69. 37. In this voyage our navigator undoubtedly displayed superior nautical abilities to those of M. Kerguelen, who in two voyages to the place had never been able to bring his ships to anchor on any part of the coast.

Of V[illegible] Diemen's land.

From Kerguelen's land, our navigator proceeded to the coast of New Holland, where he now touched at the southern part, called *Van Diemen's Land*, where he anchored in Adventure Bay. Here they found plenty of wood and water, with abundance of grass, coarse indeed, where they went first ashore, but afterwards much finer and proper for the cattle. Here, as everywhere else, the latitudes and longitudes were settled with the greatest exactness. The bottom of Adventure bay was found to lie in S. Lat. 43. 21. 6.; E. Long. 147. 29. The inhabitants visited them in a friendly manner, but seemed as stupid and insensible as those they had formerly seen. They seemed to be totally ignorant of the use of iron, and set no value upon any thing in the ornamental way excepting beads;

beads; nor did they seem to be acquainted even with the use of fish-hooks. Here they found the stories of the ancient fauns and satyrs living in hollow trees realized. Some huts covered with bark, and of a most wretched construction, were indeed found near the shore; but the most commodious habitations were afforded by the largest trees. These had their trunks hollowed out by fire to the height of six or seven feet; and there was room enough in one of them for three or four persons to sit round a hearth made of clay; and it may justly seem surprising, that notwithstanding the extreme violence offered to the vegetative powers of the tree by forming this habitation, it still continued to flourish in consequence of one side being left entire. The people, notwithstanding their extreme barbarity, were supposed to proceed from the same stock with those of the South sea islands. As in one of their visits the natives had seized upon two pigs which had been brought ashore, apparently with an intention to kill them, the commander determined to make them a present of those animals; though from their excessive stupidity and inattention there was no probability of their allowing them to propagate, if they had been put directly into their hands. To prevent this, Captain Cook ordered the two they had attempted to seize, being a boar and a sow, to be carried about a mile within the head of the bay, and saw them left by the side of a fresh-water rivulet. He was prevented from leaving any other species by a consideration of the barbarity of the inhabitants.

83 Visit to New Zealand.

From New Holland our navigator proceeded to New Zealand, where he arrived on the 12th of February 1777, and anchored in Queen Charlotte's sound. Here he was desirous of leaving a further supply of animals; but the inhabitants had hitherto shown such carelessness about those which had been left, that he durst not venture to leave any other than two goats, a male and female with kid, and two hogs, a boar and sow. He was informed, however, that one chief had several cocks and hens in his possession, so that there was some probability of these animals being allowed to multiply; and as ten or a dozen hogs had at different times been left by Captain Cook, besides those put on shore by Captain Fourneaux, it seems also to be likely that this race of creatures will increase either in a wild or domestic state, or both. The gardens had still been almost totally neglected, and some of them destroyed. These which remained, however, produced cabbages, onions, leeks, purslain, radishes, and a few potatoes. These last had been brought from the Cape of Good Hope, and were so greatly meliorated by the change of soil, that with proper cultivation they seemed to bid fair for excelling those of other countries.

Our navigator's next course was towards the island of Otaheite; in the run to which he discovered the island of Mangea, situated in S. Lat. 22. 57. E. Long. 201. 53. From thence he proceeded to Wateoa, where Omai, on his way home, recognised three of his countrymen, natives of the Society islands, who had arrived here by the following accident. About 12 years before, 20 of the natives of Otaheite had embarked in a canoe, in order to visit the neighbouring island of Ulietea. A violent storm arose, which drove them out of their course, and they suffered incredible hardship by famine and fatigue, so that the greatest part of them perished. Four men continued hanging by the side of the vessel for four days after it was overset, when they were at last brought within sight of the people of this island. The latter immediately sent out their canoes, and brought them ashore, treating them afterwards with so much kindness, that the three who now survived expressed no desire of returning to their own country, though they had now an opportunity, but chose rather to remain where they were. This island is situated in S. Lat. 20. 1. E. Long. 201. 45. and is about 6 leagues in circumference. The inhabitants are said to be equally amiable in their persons and dispositions.

84 Extraordinary preservation of some natives of Otaheite.

Visiting a small island named *Wenooa-ete*, or *Otakootaia*, situated in S. Lat. 19. 15. and E. Long. 201. 37. our commander found it without inhabitants, though there were undoubted marks of its being occasionally frequented. Harvey's island, which in his former voyage had been destitute of inhabitants, was now found to be well peopled; but the inhabitants showed such an hostile disposition that no refreshments could be procured; for which reason it was determined to steer for the Friendly islands, where there was a certainty of meeting with an abundant supply. In his way thither he touched at Palmerstone island, from a small isle near which a supply of 1200 cocoa nuts was obtained, besides abundance of fish and birds of various kinds. Had this island been capable of furnishing water, the captain would have preferred it to any of the inhabited ones for the purpose of procuring refreshments, as they could be had in any quantity without molestation from the petulance of the inhabitants. As water at this time happened to be a scarce article, our navigator was obliged to supply himself from the showers which fell, and which afforded as much in an hour as he could procure by distillation in a month.

85 Palmerstone island a proper place of refreshment, but without water.

During the time of residence at the Friendly islands, our navigator visited one named *Hepaee*, at which no European ship had ever touched before. Here he was entertained in a friendly manner, supplied with refreshments, and left some useful animals. Great additions were made to the geography of these islands, and many curious remarks made on the inhabitants and natural products. It was observed by Mr Anderson, that the people had very proper notions of the immateriality and immortality of the human soul; and he thought himself authorized to assert that they did not worship any part of the visible creation.

86 Reception of Omai at Otaheite.

Passing by a small island named *Toobouai*, about five or six miles in extent, and situated in S. Lat. 23. 25. E. Long. 210. 37. our navigators now arrived at Otaheite. Here Omai met with his relations, some of whom received him with apparent indifference; but his meeting with an aunt and a sister was marked with expressions of the most tender regard. It was Huaheine, however, that was destined for the place of Omai's final residence, and thither the captain repaired on purpose to settle him. The affair was conducted with great solemnity; and Omai brought with him a suitable assortment of presents to the chiefs, went through a great number of religious ceremonies, and made a speech, the subject of which had been dictated to him by Captain Cook. The result of the negociation was, that a spot of ground was assigned him,

87 He is settled at Huaheine.

Cook's Discoveries.

him, extending about two hundred yards along the ſhore of the harbour, with a proportionable part of an adjacent hill. The carpenters of both ſhips were then employed in conſtructing a houſe for him, in which he might ſecure his European commodities. At the ſame time a garden was made for his uſe, in which were planted ſhaddocks, vines, pine-apples, melons, and ſeveral other garden vegetables. Here he met with a brother, ſiſter, and ſiſter-in-law, by whom he was very affectionately received; but it was diſcovered with concern, that none of his relations were able to protect him in caſe of any attack on his perſon or property; ſo that there was too much reaſon to fear that he would be plundered immediately on the departure of the Engliſh. To prevent this, if poſſible, Captain Cook adviſed him to conciliate the favour and engage the patronage and protection of ſome of the moſt powerful chiefs by proper preſents; at the ſame time that he himſelf took every opportunity of letting the inhabitants know that it was his intention to return to the iſland again, and if he did not find Omai in the ſame ſtate of ſecurity in which he left him, thoſe by whom he had been injured would certainly feel the weight of his reſentment. About a fortnight after leaving Huaheine, the captain had a meſſage from Omai; in which he informed him that every thing went well, only that his goat had died in kidding, for which he deſired another might be ſent; and accompanied this requeſt with another for two axes, which were ſent along with a couple of kids, male and female. On taking his final leave of the Society iſlands, Captain Cook obſerves that it would have been far better for theſe poor people never to have known the ſuperiority of the Europeans in ſuch arts as render life comfortable, than after once being acquainted with it to be again abandoned to their original incapacity of improvement; as, if the intercourſe between them and us ſhould be wholly diſcontinued, they could not be reſtored to that happy ſtate of mediocrity in which they were found. It ſeemed to him that it was become in a manner incumbent on the Europeans to viſit theſe iſlands once in three or four years, in order to ſupply them with thoſe conveniences of which they have taught them the uſe. It is indeed to be apprehended, that by the time the iron tools which were then among them are worn out, they will have forgotten the uſe of their own; as in this laſt voyage it was obſerved that the uſe of their former tools was almoſt totally aboliſhed.

88 Remarks on the Society iſlands.

89 Chriſtmas iſland diſcovered.

Having left the Society iſlands, Captain Cook now proceeded to the northward, croſſing the equator on the 22d and 23d of December; and on the 24th diſcovered a low uninhabited iſland about 15 or 20 leagues in circumference. Here the longitude and latitude were exactly determined by means of an eclipſe of the ſun. The weſt ſide of it, where the eclipſe was obſerved, lies in N. Lat. 1. 59. E. Long. 202. 30. From the time of its diſcovery it obtained the name of *Chriſtmas Iſland*. Plenty of turtle was found upon it, and the captain cauſed the ſeeds of the cocoa-nut, yams, and melons, to be planted.

90 Sandwich iſles.

Proceeding ſtill to the northward, our navigator next fell in with five iſlands, to which he gave the general name of *Sandwich Iſles*, in honour of his patron. Their names in the language of the country are Woahoo, Atooi, Oneeheeow, Oreehoua, and Tehoora. They are ſituated between latitude 21. 30. and 22. 15. North, and between 199. 20. and 201. 30. E. Long. The longitude was deduced from no fewer than 72 ſets of lunar obſervations. The largeſt of theſe iſlands is Atooi, and does not in the leaſt reſemble the other iſlands of the South ſea formerly viſited by our navigator, excepting only that it has hills near the centre, which ſlope gradually towards the ſea-ſide. The only domeſtic animals found upon it were hogs, dogs, and fowls. Captain Cook deſigned to have made the inhabitants of this iſland a preſent of ſome others; but being driven out of it by ſtreſs of weather, he was obliged to land them upon a ſmaller one named *Oneeheeow*. They were a he-goat and two females, and a boar and ſow of the Engliſh breed, which is much ſuperior to that of the South Sea iſlands. He left alſo the ſeeds of melons, pumkins, and onions. The ſoil of this iſland ſeemed in general to be poor: it was obſervable that the ground was covered with ſhrubs and plants, ſome of which had a more delicious fragrancy than had been experienced before. The inhabitants of theſe iſlands are much commended, notwithſtanding their horrid cuſtom of eating human fleſh. In every thing manufactured by them there is an ingenuity and neatneſs in an uncommon degree; and the elegant form and poliſh of ſome of their fiſhing-hooks could not be exceeded by an European artiſt, even aſſiſted by all his proper tools. From what was ſeen of their agriculture alſo, it appeared that they were by no means novices in that art, and that the quantity and goodneſs of their vegetable productions might with propriety be attributed as much to their ſkilful culture as to the fertility of the ſoil. The language of the Sandwich iſles is almoſt identically the ſame with that of Otaheite.

9[illegible] American coaſt diſcovered.

Proceeding farther to the northward, our navigators diſcovered the coaſt of New Albion on the 7th of March 1778. Its appearance was very different from that of the countries with which they had been hitherto converſant. The land was full of mountains, the tops of which were covered with ſnow; while the valleys between them, and the grounds on the ſea-coaſt, high as well as low, were covered with trees, which formed a beautiful proſpect as of one vaſt foreſt. The place where they landed was ſituated in N. Lat. 44. 33. E. Long. 235. 20. At firſt the natives ſeemed to prefer iron to every other article of commerce; but at laſt they ſhowed ſuch a predilection for braſs, that ſcarcely a bit of it was left in the ſhips, except what belonged to the neceſſary inſtruments. It was obſerved alſo, that theſe people were much more tenacious of their property than any of the ſavage nations that had hitherto been met with, inſomuch that they would part neither with wood, water, graſs, nor the moſt trifling article, without a compenſation, and were ſometimes very unreaſonable in their demands; with which, however, the captain always complied as far as was in his power.

9[illegible] Nootka found.

The place where the Reſolution was now anchored was by our navigator called *St George's Sound*, but he afterwards underſtood that the natives gave it the name of *Nootka*. Its entrance is ſituated in the eaſt corner of Hope Bay, in N. Lat. 49. 33. E. Long. 233. 12. The climate, as far as they had an opportunity of obſerving it, was much milder than that on the eaſtern coaſt

9[illegible] Mildneſs of the climate.

coaſt of the American continent in the ſame parallel of latitude; and it was remarkable that the thermometer, even in the night, never fell lower than 42°, while in the day-time it frequently roſe to 60°. The trees met with here are chiefly the Canadian pine, white cypreſs, and ſome other kinds of pine. There ſeemed to be a ſcarcity of birds, which are much haraſſed by the natives, who ornament their clothes with the feathers, and uſe the fleſh for food. The people are no ſtrangers to the uſe of metals, having iron tools in general uſe among them; and Mr Gore procured two ſilver ſpoons of a conſtruction ſimilar to what may be obſerved in ſome Flemiſh pictures, from a native who wore them round his neck as an ornament. It is moſt probable that theſe metals have been conveyed to them by the way of Hudſon's bay and Canada: nor is it improbable that ſome of them have been introduced from the north-weſtern parts of Mexico.

While Captain Cook ſailed along this coaſt, he kept always at a diſtance from land when the wind blew ſtrongly upon it; whence ſeveral large gaps were left unexplored, particularly between the latitudes of 50° and 55°. The exact ſituation of the ſuppoſed ſtraits of Anian was not aſcertained, though there is not the leaſt doubt, that if he had lived to return by the ſame way in 1779, he would have examined every part with his uſual accuracy. On departing from Nootka ſound, our navigator firſt fell in with an iſland in N. Lat. 59. 49. E. Long. 216. 58. to which he gave the name of *Kay's Iſland.* Several others were diſcovered in the neighbourhood; and the ſhip came to an anchor in an inlet named by the captain *Prince William's ſound.* Here he had an opportunity of making ſeveral obſervations on the inhabitants, as well as on the nature of the country. From every thing relative to the former, it was concluded, that the inhabitants were of the ſame race with the Eſquimaux or Greenlanders. The animals were much the ſame with thoſe met with at Nootka, and a beautiful ſkin of one animal, which ſeemed to be peculiar to the place, was offered to ſale. Mr Anderſon was inclined to think that it was the ſame to which Mr Pennant has given the name of the *caſan marmot.* The alcedo, or great king's-fiſher, was found here, having very fine and bright colours. The humming bird alſo came frequently, and flew about the ſhip when at anchor; though it is ſcarce to be ſuppoſed that it can live throughout the winter on account of the extreme cold. The water-fowl were in conſiderable plenty; and there is a ſpecies of diver which ſeemed to be peculiar to the place. Almoſt the only kinds of fiſh met with in the place were torſk and holibut. The trees were chiefly the Canadian and ſpruce pine, ſome of which were of a conſiderable height and thickneſs. The ſound is judged by Captain Cook to occupy a degree and a half of latitude and two of longitude, excluſively of its arms and branches, which were not explored. There was every reaſon to believe that the inhabitants had never been viſited by any European veſſel before; but our navigator found them in poſſeſſion not only of iron but of beads, which it is probable are conveyed to them acroſs the continent from Hudſon's bay.

Soon after leaving Prince William's ſound, our navigators fell in with another inlet, which it was expected would lead either to the northern ſea or to Hudſon's or Baffin's bay; but upon examination it was found to end in a large river. This was traced for 210 miles from the mouth, as high as N. Lat. 61. 30. and promiſes to vie with the moſt conſiderable ones already known, as it lies open by means of its various branches to a very conſiderable inland communication. As no name was given by our commander to this river, it was ordered by Lord Sandwich to be named *Cook's river.* The inhabitants ſeemed to be of the ſame race with thoſe of Prince William's ſound; and like them had glaſs beads and knives; they were alſo clothed in very fine furs; ſo that it ſeemed probable that a valuable fur-trade might be carried on from that country. Several attempts have accordingly been made from the Britiſh ſettlements in the Eaſt Indies to eſtabliſh a traffic of that kind; but little benefit accrued from it except to the proprietors of the firſt veſſel, her cargo having greatly lowered the price of that commodity in the Chineſe market. It muſt be obſerved, that on the weſtern ſide of the American continent, the only valuable ſkins met with are thoſe of the ſea-otter; thoſe of the other animals, eſpecially foxes and martens, being of an inferior quality to ſuch as are met with in other parts.

97
They fall in with the iſlands diſcovered by the Ruſſians.

Proceeding farther to the northward, our navigators now fell in with a race of people who had evidently been viſited by the Ruſſians, and ſeemed to have adopted from them ſome improvements in dreſs, &c. In the proſecution of this part of their voyage, it appeared that they had been providentially conveyed in the dark through a paſſage ſo dangerous, that our commander would not have ventured upon it in the day-time. They were now got in among thoſe iſlands which had lately been diſcovered by Captain Beering and other Ruſſian navigators, and came to an anchor in a harbour of Oonalaſhka, ſituated in N. Lat. 53. 55. E. Long. 193. 30. Here it was remarked that the inhabitants had as yet profited very little by their intercourſe with the Ruſſians; ſo that they did not even dreſs the fiſh they uſed for their food, but devoured them quite raw.

98
A volcano.

From Oonalaſhka our navigator proceeded again towards the continent, which he continued to trace as far as poſſible to the northward. In N. Lat. 54. 48. E. Long. 195. 45. is a volcano of the ſhape of a perfect cone, having the crater at the very ſummit. On the coaſt farther to the north the ſoil appears very barren, producing neither tree nor ſhrub, though the lower grounds are not deſtitute of graſs and ſome other plants. To a rocky point of conſiderable height, ſituated in N. Lat. 58. 42. E. Long. 197. 36. our commander gave the name of *Cape Newnham.*

99
Cape Prince of Wales.

100
Vicinity of the continents of Aſia and America.

Here Mr Anderſon, the ſurgeon of the Reſolution, died of a conſumption, under which he had laboured for more than twelve months. Soon after he had breathed his laſt, land being ſeen at a diſtance, it was named *Anderſon's iſland;* and on the 9th of Auguſt the ſhip anchored under a point of the continent, which he named *Cape Prince of Wales.* This is remarkable for being the moſt weſterly point of the American continent hitherto known. It is ſituated in N. Lat. 65. 46. E. Long. 191. 45. It is only 39 miles diſtant from the eaſtern coaſt of Siberia; ſo that our commander had the pleaſure of aſcertaining the vicinity of the two continents to each other, which had only been imperfectly

Cook's Discoveries.

fectly done by the Russian navigators. Setting sail from this point next day, he steered to the west and north, when he soon fell in with the country of the Tschutski, which had been explored by Beering in 1728. Here he had an opportunity of correcting M. Stœhlin's map, who had placed in these seas an imaginary island, on which he bestowed the name of *Alaschka*. Being convinced that the land he had now reached was part of the Asiatic continent, our commander directed his course eastward, in order to fall in with that of America; and on the 17th reached the latitude of 70. 33. and E. Long. 197. 41. Here they began to perceive that brightness in the horizon called by mariners the *blink of the ice*; and in 70. 41. they had got quite up to it, so that no farther progress could be made. Next day they made a shift to get as far as 70. 44.; but the ice was now as compact as a wall, and about ten or twelve feet in height. Its surface was extremely rugged, and farther to the northward appeared much higher. Its surface was covered with pools of water; and great numbers of sea-lions lay upon it, whose flesh they were now glad to use as food. Our commander continued to traverse the Icy sea till the 29th; but the obstructions becoming every day greater and greater, it was thought proper to give over all further attempts of finding a passage to Europe for that year. He did not, however, omit the investigation of the Asiatic and American coasts until he had fully ascertained the accuracy of Captain Beering's accounts as far as he went, and corrected the errors of M. Stœhlin. Great additions were thus made to the geographical knowledge of this part of the globe; and Mr Coxe observes, that "it reflects no small honour upon the British name, that our great navigator extended his discoveries much farther in one expedition, and at so great a distance from the point of his departure, than the Russians accomplished in a long series of years, and in parts belonging or contiguous to their own empire."

101 Their progress northward stopped by ice.

102 Arrival at Oonalashka.

An end of this celebrated navigator's discoveries, however, was now at hand. From Beering's straits he sailed for Oonalashka, where he arrived on the 2d of October, and staid for some time in order to repair his ships. While the carpenters were employed in this work, one-third of the people had permission to go on shore by turns, in order to gather berries, with which the island abounds, and which, though now beginning to decay, were of great service, in conjunction with the spruce beer, to preserve the people from the scurvy. Such a quantity of fish was likewise procured, as not only served to supply the ships for the present, but likewise allowed a great number to be carried out to sea; so that hence a considerable saving was made of the provisions of the ships, which was an article of very considerable consequence. On the 8th of the month our commander received a very singular present from some persons unknown, by the hands of an Oonalashka man named *Derramoushk*. It consisted of a rye-loaf, or rather a salmon-pye in the form of a loaf, and highly seasoned with pepper. This man had the like present for Captain Clerke, and each of them was accompanied with a note which none on board could understand: a few bottles of rum, with some wine and porter, were sent in exchange: it being supposed that such a present would be more acceptable than any other thing that could be spared. Corporal Lediard of the marines, an intelligent man, was at the same time directed to accompany Derramoushk, for the purpose of gaining a more satisfactory account of the country. On the tenth of the month he returned with three Russian seamen or furriers, who with several others resided at Egooshac, where they had a dwelling-house, some store-houses, and a sloop about 30 tons burden. One of these people was either master or mate of the vessel, and all of them were very sober and decent in their behaviour. The greatest difficulty arose from the want of an interpreter; for which reason the conversation was carried on by signs. However, the captain obtained a sight of two sea-charts, both of which he was allowed to copy. One of them included the sea of Penshinsk, part of the coast of Tartary down to the latitude 41°; the Kurile islands, and the peninsula of Kamtschatka. The other comprehended all the discoveries that had been made from the time of Captain Beering to the year 1777; but these were found to be very trifling. Indeed our navigator was assured by all the Russians whom he had occasion to see, that they knew of no other islands than those laid down in the charts just mentioned, and that none of them had ever seen any part of the American continent, excepting what lies opposite to the country of the Tschutski. With regard to the natives of Oonalashka, they are to appearance the most inoffensive and peaceable people in the world, not to be in a state of civilization; though perhaps this may be owing in some measure to the connection they have long had with the Russians. From the affinity observed between the language of the Esquimaux Greenlanders, and those of Norton's sound in N. Lat. 64. 55. there is great reason to believe that all those nations are of the same extraction; and if that be the case, there is little reason to doubt that a communication by sea exists between the eastern and western sides of the American continent; which, however, may very probably be shut up by ice in the winter time, or even for the most part throughout the year.

103 Character of the inhabitants.

104 A communication probable betwixt east and west coasts of America.

105 Consequences of Captain Cook's discoveries.

The return of Captain Cook to the Sandwich islands, with the lamentable catastrophe that ensued, have been already related under the former article. We shall now briefly enumerate the consequences of his discoveries with respect to the advancement of science. These are principally his having overthrown the hypothesis of a southern continent of immense extent, usually spoken of under the name of *Terra australis incognita*; his demonstration of the impracticability of a northern passage either by Asia or America to the East Indies; and his having established a sure method of preserving the health of seamen through the longest sea-voyages. It is remarked by the bishop of Carlisle, that one great advantage resulting from the late surveys of the globe, is the refutation of fanciful theories, too likely to give birth to impracticable undertakings. The ingenious reveries of speculative philosophers will now be obliged to submit, perhaps with reluctance, to the sober dictates of truth and experience; nor is it only by discouraging future unprofitable searches that the late voyages are likely to be of service to mankind, but likewise by lessening the dangers

dangers and diſtreſſes formerly experienced in thoſe ſeas which are within the actual line of commerce and navigation.

The intereſts of ſcience, as well as of commerce, are highly indebted to the labours of our illuſtrious navigator. Before his time almoſt half the ſurface of the globe was involved in obſcurity and confuſion: but now ſuch improvements have been made, that geography has aſſumed a new face, and become in a manner a new ſcience; having attained ſuch completeneſs as to leave only ſome leſs important parts to be explored by future voyagers. Other ſciences beſides geography have been advanced at the ſame time. Nautical aſtronomy, which was in its infancy when the late voyages were undertaken, is now brought to much greater perfection; and, during Captain Cook's laſt expedition, many even of the petty officers could take the diſtance of the moon from the ſun or from a ſtar, the moſt delicate of all obſervations, with ſufficient accuracy; and the officers of ſuperior rank would have been aſhamed to have it thought that they did not know how to obſerve for, and compute, the time at ſea: a thing before hardly mentioned among ſeamen. It muſt, however, be remembered, that a great part of the merit in this reſpect is due to the board of longitude. In conſequence of the attention of that board to the important object juſt mentioned, liberal rewards have been given to mathematicians for perfecting the lunar tables and facilitating calculations: and artiſts have been amply encouraged in the conſtruction of watches, and other inſtruments better adapted to the purpoſes of navigation than any that formerly exiſted.

A vaſt addition of knowledge has been gained with reſpect to the ebbing and flowing of the tides; the direction and force of the currents at ſea: the nature of the polarity of the needle, and the cauſe of its variations. Natural knowledge has been increaſed by experiments on the effects of gravity in different and very diſtant places; and from Captain Cook's having penetrated ſo far into the ſouthern regions, it is now aſcertained, that the phenomenon uſually called the *aurora borealis*, is not peculiar to high northern latitudes, but belongs equally to all cold climates, whether north or ſouth.

No ſcience, however, perhaps ſtands more indebted to theſe voyages than that of botany. At leaſt 1200 new ſpecies of plants have been added to thoſe formerly known; and every other department of natural hiſtory has received large additions. Beſides all this, there have been a vaſt many opportunities of obſerving human nature in its different ſituations. The iſlands viſited in the middle of the Pacific ocean are inhabited by people who, as far as could be obſerved, have continued unmixed with any different tribe ſince their firſt ſettlement. Hence a variety of important facts may be collected with reſpect to the attainments and deficiencies of the human race in an uncultivated ſtate, and in certain periods of ſociety. Even the curioſities brought from the newly diſcovered iſlands, and which enrich the Britiſh muſeum and the late Sir Aſhton Lever's (now Mr Parkinſon's) repoſitory, may be conſidered as a valuable acquiſition to this country, and affording no ſmall fund of inſtruction and entertainment.

There are few inquiries more generally intereſting than thoſe which relate to the migrations of the various colonies by which the different parts of the earth have been peopled. It was known in general, that the Aſiatic nation called the *Malayans*, poſſeſſed in former times much the greateſt trade of the Indies, and that their ſhips frequented not only all the the coaſts of Aſia, but even thoſe of Africa likewiſe, and particularly the large iſland of Madagaſcar; but that from Madagaſcar to the Marqueſas and Eaſter iſland, that is, nearly from the eaſt ſide of Africa till we approach the weſt coaſt of America, a ſpace including almoſt half the circumference of the globe, the ſame nation of the oriental world ſhould have made their ſettlements, and founded colonies throughout almoſt every intermediate ſtage of this immenſe tract, in iſlands at amazing diſtances from the mother continent, is a hiſtorical fact that before Captain Cook's voyages could not be known, or at leaſt but very imperfectly. This is proved, not only by a ſimilarity of manners and cuſtoms, but likewiſe by the affinity of language; and the collections of words which have been made from all the widely-diffuſed iſlands and countries viſited by Captain Cook, cannot fail to throw much light on the origin of nations, and the manner in which the earth was at firſt peopled.

Beſides this, information has been derived concerning another family of the earth formerly very much unknown. This was the nation of the Eſquimaux or Greenlanders, who had formerly been known to exiſt only on the north-eaſtern part of the American continent. From Captain Cook's accounts, however, it appears, that theſe people now inhabit alſo the coaſts and iſlands on the weſt ſide of America oppoſite to Kamtſchatka. From theſe accounts it appears alſo, that the people we ſpeak of have extended their migrations to Norton ſound, Oonalaſhka, and Prince William's ſound; that is, nearly to the diſtance of 1500 leagues from their ſtations in Greenland and the coaſt of Labradore. Nor does this curious fact reſt merely on the evidence ariſing from the ſimilitude of manners; for it ſtands confirmed by a table of words, exhibiting ſuch an affinity of language as muſt remove every doubt from the mind of the moſt ſcrupulous inquirer.

From the full confirmation of the vicinity of the two great continents of Aſia and America, it can no longer be ſuppoſed ridiculous to believe, that the latter received its inhabitants from the former; and by the facts recently diſcovered, a degree of further evidence is added to thoſe which might formerly be derived from nature concerning the authenticity of the Moſaic accounts. It is not indeed to be doubted, that the inſpired writings will ſtand the teſt of the moſt rigorous inveſtigation; nor will it ever be found, that true philoſophy and divine revelation, can militate againſt each other. The rational friends of religion are ſo far from dreading the ſpirit of inquiry, that they wiſh for nothing more than a candid and impartial examination of the ſubject, according to all the lights which the improved reaſon and enlarged ſcience of man can afford.

Another good effect of the voyages of Captain Cook is, that they have excited in other nations a zeal for ſimilar undertakings. By order of the French government, Meſſ. de la Peyrouſe and de Langle ſailed from Breſt in Auguſt 1785, in the frigates Bouſſole and Aſtrolabe, on an enterpriſe, the purpoſe of which was to

to improve geography, aſtronomy, natural hiſtory, and philoſophy, and to collect an account of the cuſtoms and manners of different nations. For the more effectual proſecution of the deſign, ſeveral gentlemen were appointed to go out upon the voyage, who were known to excel in different kinds of literature. The officers of the Bouſſole were men of the beſt information and firmeſt reſolution; and the crew contained a number of artificers in various branches of mechanics. Marine watches, &c. were provided, and M. Dagelet the aſtronomer was particularly directed to make obſervations with M. Condamine's invariable pendulum, to determine the difference in gravity, and to aſcertain the true proportion of the equatorial to the polar diameter of the earth. It has likewiſe been made evident, that notwithſtanding all that has been done by Captain Cook, there is ſtill room for a farther inveſtigation of the geography of the northern parts of the world. The object accordingly was taken up by the empreſs of Ruſſia, who committed the care of the enterpriſe to Captain Billings an Engliſhman in her majeſty's ſervice. We ſhall only make one obſervation more concerning the benefits likely to accrue from the voyages of Captain Cook, and that is relative to the ſettlement in Botany bay. Whatever may be ſuppoſed to accrue to the nation itſelf from the ſettlement, it muſt undoubtedly give the higheſt ſatisfaction to every friend to humanity to be informed, that thus a number of unhappy wretches will be effectually prevented from returning to their former ſcenes of temptation and guilt, which may open to them the means of induſtrious ſubſiſtence and moral reformation. If the ſettlement be conducted with wiſdom and prudence, indeed it is hard to ſay what beneficial conſequences may be derived from it, or to what height it may ariſe. Rome, the greateſt empire the world ever ſaw, proceeded from an origin little, if at all, ſuperior to Botany bay. For an account of this ſettlement ſee the article *New-Holland*.

One other object remains only farther to be conſidered with regard to theſe voyages, and that is the advantages which may reſult from them to the diſcovered people. Here, however, it may perhaps be difficult to ſettle matters with preciſion. From the preceding accounts, it muſt be evident that the intentions of Captain Cook were in the higheſt degree benevolent; and if at any time the people were the ſufferers, it muſt have been through their own fault. In one inſtance indeed it might be otherwiſe, and that is with reſpect to the venereal diſeaſe. The evidence in this caſe cannot be altogether ſatisfactory. Mr Samwell, who ſucceeded Mr Anderſon as ſurgeon of the Reſolution, has endeavoured to ſhow, that the natives of the lately explored parts of the world, and eſpecially of the Sandwich iſlands, were not injured by the Engliſh; and it was the conſtant care and ſolicitude of Captain Cook to prevent any infection from being communicated to the people where he came. But whether he was univerſally ſucceſsful in this reſpect or not, it is evident that the late voyages were undertaken with a view exceedingly different from thoſe of former times. The horrid cruelties of the Spaniſh conquerors of America cannot be remembered without concern for the cauſe of religion and human nature; but to undertake expeditions with a deſign of civilizing the world, and meliorating its condition, is certainly a noble object. From the long continued intercourſe betwixt this country and the South ſea iſlands, there cannot be any doubt that ſome degree of knowledge muſt already have been communicated to them. Their ſtock of ideas muſt naturally be enlarged by the number of uncommon obſervations which has been preſented to them, and new materials furniſhed for the exerciſe of their rational faculties. A conſiderable addition muſt be made to their immediate comfort and enjoyment by the introduction of uſeful animals and vegetables; and if the only benefit they ſhould ever receive from Britain ſhould be the having obtained freſh means of ſubſiſtence, this of itſelf muſt be conſidered as a valuable acquiſition. Greater conſequences, however, may ſoon be expected. The connexion formed with theſe people may be conſidered as the firſt ſtep towards their improvement; and thus the bleſſings of civilization may be ſpread among the various tribes of Indians in the Pacific ocean, which in time may prepare them for holding an honourable place among the nations of the earth.

106
Account of Captain Clerke's voyage.

As a ſupplement to this account of the diſcoveries made by Captain Cook himſelf, we ſhall here ſubjoin a narrative of the ſubſequent part of the voyage by Captain Clerke, &c. until the return of the ſhips to England. At the time of Captain Cook's death, the great point of a north-weſt paſſage remained in ſome meaſure to be ſtill determined: for though, by the event of the former attempt, it had been rendered highly improbable that they ſhould ſucceed in this, it was ſtill reſolved to try whether or not, at certain ſeaſons of the year, the ice might not be more open than they had hitherto found it. The firſt object that naturally occurred, however, was the recovery of Captain Cook's body; for which Mr King was of opinion that ſome vigorous meaſure ought inſtantly to be purſued. His motives for this, beſides the perſonal regard he had for the captain, were to abate the confidence which muſt be ſuppoſed to enſue on the part of the natives, which would probably incline them to dangerous attempts; and this the more particularly, as they had hitherto diſcovered much leſs fear of the fire-arms than other ſavage nations were accuſtomed to do. Mr Samwell alſo takes notice of the intrepidity of the natives in this reſpect; but aſcribes it, in the firſt inſtance, to ignorance of their effects; and in the next, to a notion, that as the effects of theſe arms were occaſioned by fire, they might be counteracted by water. For this purpoſe they dipped their war-mats in water; but finding themſelves equally vulnerable after this method had been purſued, they became more timid and cautious.

107
Method taken for the recovery of Captain Cook's body.

As matters ſtood at preſent, there was even reaſon to dread the conſequences of a general attack upon the ſhips: and therefore Mr King was the more confirmed in his opinion of the neceſſity of doing ſomething to convince them of the proweſs of their adverſaries. In theſe apprehenſions he was ſeconded by the opinion of the greater part of the officers on board; and nothing ſeemed more likely to encourage the iſlanders to make the attempt than an appearance of being inclined to an accommodation, which they would certainly attribute to weakneſs or fear. Captain Clerke, however, and thoſe who were in favour of conciliatory meaſures, urged,

urged, that the mischief was already irreparable; that the natives, by reason of their former friendship, had a strong claim to the regard of the English; and that the more particularly, as the late calamitous accident did not appear to have taken its rise from any premeditated design; they urged also the ignorance of the king concerning the theft, and the mistake of the islanders who had armed themselves on a supposition that some attempt would be made to carry off the king. To all this was added, that the ships were in want of refreshments, particularly water; that the Resolution's foremast would require seven or eight days before it could be properly repaired; and as the spring was fast advancing, the speedy prosecution of the voyage to the northward ought now to be the only object; that a vindictive contest with the natives might not only justify an imputation of needless cruelty, but would occasion great delay in the equipment of the ships.

In consequence of the prevalence of these sentiments lenient measures were adopted, though the behaviour of the natives continued to be very insolent. A great body still kept possession of the shore; many of whom came off in their canoes within pistol-shot of the ships, and provoking the people by every kind of insult and defiance. A train of negociations for Captain Cook's body took place; in which the natives showed the most hostile and treacherous disposition, and, as afterwards appeared, had cut the flesh from the bones and burnt it. A piece of about ten pounds weight was brought by two natives at the hazard of their lives, who gave information that the rest had been burnt, and that the bones were in the possession of the king and some of the principal chiefs. Information was given, at the same time, that the chiefs were very desirous of war, in order to revenge the death of their countrymen.

Thus it appeared that the pacific plan had answered no good purpose. No satisfactory answer had been given to the demands made of the bodies of the slain; nor was any progress made in the great work intended, viz. a reconciliation with the natives; they still remained on shore in an hostile posture, as if determined to oppose any endeavours that might be made by our people to land; at the same time that a landing was become absolutely necessary, in order to complete the stock of water. Had this spiritless conduct been persisted in, there is not the least doubt that neither this purpose or any other could have been effected. The insolence of the natives became every day greater and greater: insomuch that one of them had the audacity to come within musket shot of the Resolution, and, after throwing several stones, waved Captain Cook's hat over his head, while his countrymen on shore were exulting and encouraging his audacity. By this insult the people were so highly enraged, that coming on the quarter-deck in a body, they begged that they might no longer be obliged to put up with such reiterated provocation, but might be allowed to make use of the first opportunity of revenging the death of their captain. The necessity of more vigorous measures, therefore, being now apparent, a few discharges of the great guns, with the burning of a village and some other acts of severity, at last produced the mangled remains of Captain Cook. They were wrapped up in a bundle, in which were found both his hands entire, which were easily known by a scar in one of them dividing the fore-finger from the thumb the whole length of the metacarpal bone. Along with these was the skull, but with the scalp separated from it, and the bones of the face wanting; the scalp, with the ears adhering to it, and the hair cut short; the bones of both the arms, and the skin of the fore-arms hanging to them; the bones of the thighs and legs joined together, but without the feet. The ligaments of the joints were observed to be entire; the whole showing evident marks of being in the fire, except the hands which had the flesh remaining upon them, and were cut in several places and crammed with salt, most probably for the purpose of preserving them. The skull was not fractured; but the scalp had a cut in the back part of it. The lower jaw and feet were wanting, having been seized by different chiefs.

108 [Remains] [of Cook] [obtained.]

109 Unsuccessful attempts to make farther discoveries.

Having accomplished the purposes of their stay in this place, Captain Clerke set sail from Karakakooa bay in O-why-hee towards Mowee, with a design to explore the coasts of that island more fully than had been done, but were unable to accomplish their purpose; nor indeed was it in their power to accomplish any discovery of consequence among these islands. The only intelligence worth mentioning which they were able to procure was, that wars had ensued about the property of the goats which were left by Captain Cook on the island of Oneeheow, as has been already mentioned, and that during the contest all these poor animals, who had already begun to multiply, were destroyed; so that the benevolent attempts of our illustrious navigator in favour of these islanders had proved abortive.

On quitting the island of Oneeheow, our navigators set sail for another named Modoopappa, which they were assured by the natives lay within five hours sailing of Tahoora, a small island in the neighbourhood of Oneeheow. In this they proved unsuccessful; on which it was determined to steer for the coast of Kamtschatka. In the passage thither they arrived at the place where De Gama is said to have discovered a great extent of land; but of this they could discover no appearance. This imaginary continent is said to have been discovered by a navigator called John de Gama, but who seems also to have been imaginary, as no person can find out either the country where he lived, or the time when he made the discovery. We are informed by Muller, that the first account of it was published by Texeira in a chart of 1649, who places it between the latitude of 44 and 45 degrees, and about 160. east longitude, and calls it "land seen by John de Gama, in a voyage from China to New Spain." By the French geographers it is removed five degrees farther to the east. When they arrived at Kamtschatka they were entertained in the most hospitable manner, and furnished with every thing that could be procured in that desert and barren region. "In this wretched extremity of the earth (says the narrator of the voyage), beyond conception barbarous and inhospitable, out of the reach of civilization, bound and barricaded with ice, and covered with summer snow, we experienced the tenderest feelings of humanity, joined to a nobleness of mind and elevation of sentiment which would have done honour to any clime

110 Their favourable reception at Kamtschatka.

Cook's Discoveries.

clime or nation." From Major Behm, in particular, they received so many and so great obligations, that an handsome acknowledgment was made him by the Royal Society, as has been already observed. Even the sailors were so struck with gratitude, that they voluntarily requested that their allowance of grog might be withheld, in order to compliment the garrison of Bolcheretsk with the spirits; saying, that they knew brandy was extremely scarce in that country, the soldiers on shore having offered four roubles a bottle for it. The officers, however, would not allow them to suffer by their generosity in this inclement country and season of the year (the month of March not being yet expired); but in room of the small quantity of brandy which Major Behm consented to accept, substituted an equal quantity of rum.

111 Tschutski submit to the empress.

It is worth observing, that the kindness with which the empress had ordered the British navigators to be treated in this part of her dominions was amply rewarded, even with no less than the addition of a new kingdom to the Russian empire, which hitherto her arms had not been able to subdue. Among the northern Asiatics none had been able to maintain their independence except the Tschutski, who inhabit the north-east extremity of the continent. No attempt to subdue these people had been made since the year 1750, when the Russian forces had at last been obliged to retreat, after having lost their commanding officer. The Russians afterwards removed their frontier fortress from the river Anadyr to the Ingiga, which runs into the northern extremity of the sea of Okotsk, and gives its name to a gulf to the west of the sea of Penshinsk. On the day that Captains Clerke and Gore arrived at Bolcheretsk, Major Behm received dispatches from this fort, acquainting him that a party of the Tschutski had been there with voluntary offers of friendship and a tribute. That on asking the reason of such an unexpected alteration in their sentiments, they had acquainted his people that two large Russian boats had visited them towards the end of the preceding summer; that they had been shown the greatest kindness by the people who were in them, and had entered into a league of amity with them; and that, in consequence of this, they came to the Russian fort in order to settle a treaty upon terms agreeable to both nations. This incident had occasioned much speculation, and could never have been understood without the assistance of those who were now present; the large *Russian boats* having been in truth no other than the Resolution and Discovery, under Captains Cook and Clerke.

112 Vast quantity of fish.

About the middle of May the snow began to melt very fast in this inhospitable region, and the ships being now on their passage northward, met with an excellent opportunity of supplying themselves with fish. The beach was cleared of ice on the 15th of the month; from which time vast quantities came in from every quarter. Major Behm had ordered all the Kamtschadales to employ themselves in the service of the English ships; so that often they found it impossible to take on board the quantities that were sent. They chiefly consisted of herrings, trout, flat fish, and cod. These fish were here found in such plenty, that once the people of the Discovery surrounded such an amazing quantity with the seine, that they were obliged to throw out a very considerable number, lest the net should have been broken to pieces; and the cargo was still so abundant, that, besides having a stock for immediate use, they filled as many casks as they could conveniently spare for salting; and after sending on board the Resolution a tolerable quantity for the same purpose, they left behind several bushels on the beach.

113 Spirituous liquors pernicious in the sea-scurvy.

While they remained in this country an opportunity offered of observing the pernicious effects of spirituous liquors in producing the sea-scurvy. All the Russian soldiers were in a greater or lesser degree afflicted with that disorder, some of them being in the last stage of it; and it was particularly observed that a serjeant, with whom our people had kept up a most friendly intercourse, had, *in the course of a few days*, brought upon himself the most alarming scorbutic symptoms, by drinking too freely of the liquors with which he had been presented by the English. Captain Clerke soon relieved them by putting them under the care of the surgeons of the ships, and supplying them with sour-krout, and malt for sweet-wort. In consequence of this a surprising alteration was soon observed in the figures of most of them; and their speedy recovery was principally attributed to the sweet-wort.

114 Eruption of a volcano.

On the 12th of June they began to proceed northward along the coast of Kamtschatka, and three days after had an opportunity of observing an eruption of one of the volcanoes of that peninsula. On the 15th before day-light, they were surprised with a rumbling noise like distant thunder; and when the day appeared, found the decks and sides of the ships covered near an inch thick with fine dust like emery. The air was at the same time loaded and obscured with this substance; and in the neighbourhood of the volcano itself it was so thick that the body of the hill could not be discovered. The explosion became more loud at 12 o'clock, and during the afternoon, being succeeded by showers of cinders, generally of the size of pease, though some were as large as hazel-nuts. Along with these there also fell some small stones which had undergone no alteration from the action of the fire. In the evening there were dreadful claps of thunder, with bright flashes of lightning, which, with the darkness of the sky, and the sulphureous smell of the air, produced a most awful and tremendous effect. The ships were at this time about 24 miles distant from the volcano; and it appeared that the volcanic shower had been carried to a still greater distance, as they next day found the bottom of the sea to consist of such small stones as had fallen upon the decks of the ships. The mountain was still observed to be in a state of eruption on the 18th.

115 Voyage the northward.

For some time Captain Clerke kept the coast of Kamtschatka in view, with a design to make an accurate survey of it; but in this he was disappointed by foggy and squally weather; however, he determined the position of some remarkable promontories, and at last finding the season too far advanced to accomplish his design, set sail for Beering's straits, chiefly with a view to ascertain the situation of the projecting points of the coast.

On the 3d of July our navigators came in sight of the

Co…s Diſco…ies.

the iſland of St Lawrence, and another which was ſuppoſed to lie between it and Anderſon's iſland. The latter being entirely unknown to Captain Clerke, he was inclined to have approached it, but was unable to effect his purpoſe. All theſe iſlands as well as the coaſt of the Tſchutſki on the continent were covered with ſnow, and had a diſmal appearance.

In the preceding year Captain Cook had determined the ſituation of the iſlands of St Diomede to be in 65° 48′ latitude; but now being ſomewhat at a loſs to reconcile this with the poſition of the continent, they ſtood for ſome time over to the latter, till fully convinced of the accuracy of the former obſervation. At this time they approached within two or three leagues of the eaſtern cape of Aſia, which is an elevated round head of land extending about five miles from north to ſouth, and forms a peninſula connected with the continent by a narrow iſthmus of low land. It has a bold ſhore, and three lofty detached ſpiral rocks are ſeen off its northern part. It was ſtill encompaſſed with ice, and covered with ſnow. Here they found a ſtrong current ſetting to the northward, which at noon had occaſioned an error in the computation of the latitude of no leſs than 20 miles. A ſimilar effect had been obſerved the preceding year in paſſing this ſtrait. On ſteering to the north-eaſt the weather cleared up, ſo that they had a view of the eaſtern cape of Aſia, Cape Prince of Wales on the weſtern coaſt of America, with a remarkable peaked hill on the latter, and the two iſlands of St Diomede lying between them. Here they met with great numbers of very ſmall hawks, having a compreſſed bill rather large in proportion to the body; the colour dark brown, or rather black, the breaſt whitiſh, and towards the abdomen of a reddiſh hue.

…5 Ar… ſtop-pe… by the ice.

On the 6th of July, at 12 o'clock, the ſhips were in N. Lat. 67. 0. E. Long. 191. 6. when having already paſſed many large pieces of ice, and obſerved that in ſeveral places it adhered to the continent of Aſia, they were ſuddenly ſtopped about three in the afternoon by an extenſive body, which ſtretched towards the weſt. By this their hopes of reaching any higher latitude than what had been attained laſt year were conſiderably diminiſhed; but finding the courſe obſtructed on the Aſiatic ſide, they proceeded to the north-eaſtward, in order to explore the continent of America between the latitudes of 68 and 69°; which had laſt year been found impracticable on account of the foggy weather; but in this alſo they were partly diſappointed; for on the 7th, about ſix in the morning, they met with another large body of ice ſtretching from north-weſt to ſouth-eaſt; but not long afterwards, the horizon becoming clear, they had a view of the American coaſt at the diſtance of about ten leagues, extending from north-eaſt by eaſt, to eaſt, and lying between N. Lat. 68° and 68° 20′. As the ice was not very high, the view extended a great way over it, ſo that they could perceive it exhibiting a compact ſolid ſurface, and apparently adhering to the land. Soon after the weather became hazy, ſo that they loſt ſight of the land; and it being impoſſible to get nearer, they continued to ſteer northward cloſe by the ſide of the ice. This courſe was continued till next morning, during which time the ſhips paſſed ſome drift wood; but the morning following, the wind ſhifting to the north, they were obliged to ſtand to the weſtward. At two in the afternoon they were again cloſe to an immenſe expanſe of ice; which from the maſt-head ſeemed to conſiſt of very large compact bodies, united towards the exterior edge, though in the interior parts ſome pieces floated in the water; it extended from weſt-ſouth-weſt to north-eaſt by north. There was now a neceſſity for ſteering towards the ſouth, as the ſtrong northerly winds had drifted down ſuch numbers of looſe pieces that they had encompaſſed the ſhips for ſome time, and it was impoſſible to avoid very ſevere ſtrokes while ſailing among them. Thus, however, they reached the latitude of 69. 12. and E. Long. 188. 5.; but having now ſailed almoſt 40 leagues to the weſt along the edge of the ice without perceiving any opening, Captain Clerke determined to bear away ſouth by eaſt, the only quarter which was clear at preſent, and to wait till the ſeaſon was ſomewhat farther advanced before any further attempts were made. The intermediate time he propoſed to employ in ſurveying the bay of St Lawrence, and the coaſt ſituated to the ſouthward of it; as it muſt be a great ſatisfaction to have a harbour ſo near in caſe of the ſhip's receiving any damage from the ice; and the captain was alſo deſirous of paying another viſit to the Tſchutſki, eſpecially in conſequence of the accounts of them that had been given by Major Behm. In this navigation they killed ſeveral ſea-horſes, and had an opportunity of obſerving the ſtrength of parental affection in thoſe monſtrous animals. On the approach of the boats towards the ice, all of them took their young ones under their fins, and attempted to make their eſcape with them into the ſea. Some whoſe cubs were killed or wounded, and left floating upon the ſurface of the water, roſe again, and carried them down, ſometimes juſt as they were on the point of being taken into the boat; and could be traced bearing them to a conſiderable diſtance through the water, which was ſtained with their blood. They were afterwards obſerved bringing them at intervals above the ſurface, and again plunging under its ſurface with an horrid bellowing; and one female, whoſe young one had been killed and taken on board, became ſo furious, that ſhe ſtruck her tuſks through the bottom of the cutter.

117 Remarkable affection of the ſea-horſes towards the young.

118 The ſhips finally ſtopped by ice.

Our navigators ſtill found themſelves diſappointed in their attempts. On approaching the coaſt of the Tſchutſki they met with a large and compact body of ice, extending to the north-eaſt, ſouth-weſt, and ſouth-eaſt, as far as the eye could reach; ſo that they were again obliged to ſail back to the northward. Here alſo their courſe was ſoon ſtopped; for, on the 13th, being in N. Lat. 69. 37. and about the middle of the channel between the two continents, they once more fell in with a compact body of ice, of which they could perceive no limit. Captain Clerke therefore determined to make a final attempt on the coaſt of America, the paſſage northward having been found laſt year practicable much farther on that than the Aſiatic ſide. Thus they attained the latitude of 70. 8. at the diſtance, as was ſuppoſed, of 25 leagues from the coaſt of America; and ſome days after got about three minutes farther to the northward, about the diſtance of ſeven or eight leagues from the Icy Cape. This, however, was the utmoſt limit of the voyage to the north-eaſt; and they were ſoon obliged to relinquiſh

quish all hopes of proceeding farther on the American side. Another effort was still resolved on to try the practicability of a north-west passage; and for this purpose our navigators altered their direction on the 21st of July, passing through a great quantity of loose ice. About ten at night the main body was discovered at a very small distance, so that they were obliged to proceed to the southward. During this perilous navigation, the Discovery, after having almost got clear out from the ice, became so entangled by several large pieces, that her progress was stopped, and she immediately dropped to leeward, falling broadside foremost on the edge of a considerable body of ice, on which she struck with violence, there being an open sea to windward. At length the mass was either broken or moved so far, that the crew had an opportunity of making an effort to escape. But unluckily, before the ship gathered way sufficient to be under command, she fell to leeward a second time upon another piece of ice; and the swell rendering it unsafe to lie to windward, and finding no prospect of getting clear, they pushed into a small opening, and made the vessel fast to the ice with hooks. Here the Resolution for some time lost sight of her consort, which occasioned no small uneasiness in both vessels; but at length, on a change of wind, the Discovery, setting all her sails, forced a passage, though not without losing a considerable part of her sheathing, and becoming very leaky by reason of the blows she had received.

119 Dangerous situation of the Discovery.

Thus the two vessels continued to make every effort to penetrate through the immense quantities of ice with which those seas are filled winter and summer, but without success. Captain Clerke therefore finding that it was impossible either to get to the northward, or even to reach the Asiatic continent, the ships being also greatly damaged, determined to proceed southward to the bay of Awatska, on the Kamtschadale coast, to refit, and afterwards take a survey of the coasts of Japan before the winter should set in.

120 Of the extent of the Asiatic continent to the northward.

During this navigation, two general conclusions were adopted relative to the extent of the Asiatic coast, in opposition to the opinion of Mr Muller. One is, that the promontory, called the *East Cape*, is in reality the most easterly point of Asia; and that no part of that quarter of the globe extends farther than the longitude of 190° 22′ E. The other conclusion is, that the latitude of the most north-easterly point of Asia does not exceed 70° N. but is rather somewhat below it. As the present discoveries, however, were terminated on the Asiatic side on the 68th degree of latitude, the probable direction of the coast afterwards can only be conjectured. The only sources of knowledge in this case are the Russian charts and journals, and these in general are so defective and contradictory, that the particulars of their real discoveries can scarce be collected. Hence the Russian geographers are greatly divided in their opinions concerning the extent and figure of the peninsula of the Tschutski. Mr Muller, in a map published 1751, supposes it to extend north-east as far as the latitude of 75°, and E. Long. 190°, ending in a round cape, which he calls *Tschukotskoi Noss*. To the southward of this cape he supposes the coast to form a bay to the west, bounded in the latitude of 67° 18′ by Serdze Kamen, the most northerly point observed by Beering in his expedition in 1728. A new form is given to the whole peninsula in a map published by the academy at Petersburgh in 1776. Here its most north-easterly extremity is placed in N. Lat. 73°, E. Long. 178. 30.; and its most easterly point in N. Lat. 65. E. Long. 189. 30. All the other maps vary between these two situations: and the only thing in which all of them agree is the position of the East cape in N. Lat. 66. The form of the coast, however, is very erroneous in the map published by the academy, and may be entirely disregarded. In Mr Muller's map, the northern part of the coast has some resemblance to that laid down in Captain Cook's and Clerke's survey, as far as the latter extends; only that Mr Muller does not make it trend sufficiently to the west, but supposes it to recede only five degrees of longitude between the latitudes of 66° and 69°; whereas it really recedes almost ten.

We must next examine Mr Muller's authority for supposing the coast to bend round to the north and north-east in such a manner as to form a large promontory. Mr Coxe, whose accurate researches into this matter must give great weight to his opinion, thinks, that the extremity of the promontory was never doubled by any person except Deshneff and his party; who sailed, in the year 1648, from the river Kovyma, and are imagined to have got round to the river Anadyr. The account of this voyage, however, gives no geographical delineation of the coast, so that its figure must be determined by other circumstances; and from these it evidently appears, that the Tschukotskoi Noss of Deshneff is in reality the East cape of Captain Cook. Speaking of this noss, he says, that a person, with a favourable wind, may sail from the isthmus to the Anadyr in three days and three nights. This agrees entirely with the situation of the East cape, which is about 120 leagues from the mouth of the river Anadyr; and there being no other isthmus to the north between that and the latitude of 69°, it seems evident, that by this description he certainly means either the East cape or some other situated to the southward of it. In another place he says, that opposite to the isthmus there are two islands upon which some of the Tschutski nation were observed, having pieces of the teeth of sea-horses fixed in their lips; and this exactly coincides with the two islands that lie to the south-east of the East cape. Our navigators indeed did not observe any inhabitants upon these islands; but it is by no means improbable, that some of those of the American coast, whom the above description perfectly suits, might have accidentally been there at the time, and been mistaken for a tribe of Tschutski.

Other circumstances, though less decisive than those just mentioned, concur in the same proof. Deshneff says, that in sailing from the Kovyma to the Anadyr, a great promontory, which projects far into the sea, must be doubled; and that this promontory extends between north and north-east. From these expressions, perhaps, Mr Muller was induced to represent the country of the Tschutski in the form we find in his map; but if he had been acquainted with the position of the East cape as determined by Captain Cook, and the striking agreement between that and the promontory or isthmus in the circumstances above mentioned, it

it is most probable that he would not have deemed these expressions of sufficient weight to authorize his extending the north-eastern extremity of Asia either as far to the north or to the east as he has done.

Another authority used by Mr Muller seems to have been the deposition of the Cossack Popoff, taken at the Anadirskoi Ostrog in 1711. Popoff was sent by land, in company with several others, to demand tribute of the independent Tschutski tribes, who inhabited the country about the Nois. In the account of this journey, the distance betwixt Anadirsk and Tschukotskoi Nois is represented as a journey of ten weeks with loaded rein-deer. From such a vague account, indeed, we can judge but very little: but as the distance between the East cape and Anadirsk does not exceed 200 leagues, and consequently might be accomplished in the space above mentioned at the rate of 12 or 14 miles a day, we cannot reckon Popoff's account of its situation inconsistent with the supposition of its being the East cape. It may likewise be observed, that Popoff's route lay along the foot of a rock named *Matkol*, situated at the bottom of a spacious gulf, which Muller supposes to have been the bay he lays down between the latitudes of 66° and 72°; and he accordingly places the rock Matkol in the centre of it; but it seems more probable that it might be a part of the gulf of Anadyr, which they would undoubtedly pass in their journey towards the East cape.

But what seems to put the matter beyond all doubt, and to prove that the cape which Popoff visited cannot be to the northward of 69° Lat. is that part of his deposition which relates to an island lying off the Nois, from whence the opposite coast might be discerned; for as the opposite continents, in the latitude of 69°, diverge so far as to be upwards of 100 leagues distant, it is highly improbable that the Asiatic coast should again trend eastward in such a manner as to come almost in sight of that of America. As an additional proof of the position in question, we may observe, that the Tschukotskoi Nois is constantly laid down as dividing the sea of Kovyma from that of Anadyr; which could not possibly be the case if any large cape had projected to the north-east in the higher latitudes.

The next question to be determined is, to what degree of latitude the northern coast of Asia extends before it inclines directly westward? Captain Cook was always strongly inclined to believe, that the northern coast of this continent, from the Indigirka eastward, has hitherto been usually laid down above two degrees to the northward of its true situation; for which reason, and on the authority of a map that was in his possession, as well as from intelligence received at Oonalashka, he placed the mouth of the Kovyma in the latitude of 68°. Should he be right in his conjecture, it is probable that the coast of Asia does not anywhere extend beyond the latitude of 70° before it trends to the west; and consequently our navigators must have been only one degree from its northern extremity. This seems to be confirmed by the silence of the Russian navigators concerning any extent of continent to the northward of Shelatskoi Nois; nor do they mention any remarkable promontory, except the East cape, between the Anadyr and the Kovyma. Another particular which Deshneff relates may perhaps be deemed a farther confirmation of this opinion, viz. that he met with no obstruction from ice in sailing round the northern extremity of Asia; though he adds, that this sea is not at all times so free of it, which indeed appears evidently to be the case. That part of the continent which lies between Cape North and the mouth of the Kovyma is about 125 leagues in extent. A third part of this space, from Kovyma eastward, was explored in the year 1723 by Feodot Amoffoff, who informed Mr Muller that its direction was easterly. Since that time it has been surveyed with some accuracy by Shalauroff, whose chart makes it trend north-east-by-east as far as Shelatskoi Nois, which he places at the distance of about 43 leagues east of the Kovyma. The space, therefore, between the Nois and Cape North, somewhat more than 80 leagues, is the only part of the Russian dominions now remaining unexplored. But if the Kovyma be erroneously laid down in point of longitude as well as latitude, a supposition far from being improbable, the extent of the undiscovered coast will be considerably diminished.

The following are the reasons why it may be supposed that the mouth of the Kovyma is placed too far to the westward in the Russian charts: 1. Because the accounts that have been given of the navigation of the Frozen ocean from that river round the north-eastern extremity of Asia to the gulf of Anadyr, do not agree with the supposed distance between those places. 2. Because the distance from the Anadyr to the Kovyma over land is by some Russian travellers represented as a journey of no very great length, and easily performed. 3. Because the coast from the Shelatskoi Nois of Shalauroff appears to trend directly south-east towards the East cape. From all which it may be inferred, with some degree of probability, that only 60 miles of the northern Asiatic coast remain to be explored.

121
Impracticability of a north-west or north-east passage into the Pacific ocean.

With regard to a north-west passage from the Atlantic into the Pacific ocean, it is highly probable that no such thing exists to the southward of the 56th degree of latitude. If, in reality, it exists anywhere, it must certainly be either through Baffin's bay, or by the north of Greenland in the western hemisphere, or in the eastern, through the Frozen sea to the north of Siberia; so that in whichever continent it is seated the navigator must pass through Beering's straits.

All that remains now to be considered therefore is, the impracticability of penetrating into the Atlantic ocean through these straits. From the voyayes of our navigators it appears, that the sea to the northward of Beering's straits is more free from ice in August than in July, and perhaps may be still more so in some part of September. But after the autumnal equinox the length of the day diminishes so fast, that no farther thaw can be expected; and it would be unreasonable to attribute so great an effect to the warmth of the last fortnight of September as to imagine it capable of dispersing the ice from the most northern part of the American coast. Even admitting this to be possible, it must at least be allowed that it would be highly imprudent to endeavour to avoid the Icy cape, by running to the known parts of Baffin's bay, a distance of about 1260 miles, in so short a time as that passage can be supposed to be open. On the side of Asia there appears still less probability of success, as appears from the

Cook's Diſcoveries.

the teſtimony of the Ruſſian as well as the Engliſh navigators. The voyage of Deſhneff indeed proves the poſſibility of circumnavigating the north-eaſtern extremity of Aſia; but even this affords a very ſlender foundation to hope for any great benefit, as no perſon beſides himſelf appears to have ſucceeded in the attempt, though more than a century and a half has now elapſed ſince the time of his voyage. But even ſuppoſing that, in ſome very favourable ſeaſon, this cape might be doubled, ſtill the cape of Taimura remains, extending as far as the 78th degree of latitude, and round which none pretend ever to have ſailed.

Theſe arguments ſeem concluſive againſt any expectation of a north-weſt or north-eaſt paſſage to the Eaſt Indies, unleſs on the ſuppoſition of an open ſea very near the polar regions. The probability of getting into the polar ſeas is conſidered under the article POLE; and indeed from what has already been advanced muſt appear very little. Waving this ſubject therefore at preſent, we ſhall return to the remarks made by our navigators during their ſecond voyage.

122 Remarks during the voyage of Captain Clerke towards the Icy ſea.

In this they did little more than confirm what had been obſerved during the firſt: for it never was in their power to approach the continent of Aſia in any higher latitude than 67°, nor that of America in any part, excepting a few leagues, between 68° and 68° 20′, which they had not ſeen before. In both years the ice was met with ſooner on the Aſiatic than the American coaſt; but in 1779 they met with it in lower latitudes than in 1778. As they proceeded northward, the ice was found univerſally more compact and ſolid, though they were aſcertained at the ſame time that the greateſt part of what they met with was moveable. Its height on a medium was eſtimated at eight or ten feet; though ſome of the higheſt might be about 16 or 18. The currents were generally at the rate of one mile in the hour, and more generally ſet from the ſouth-weſt than from any other quarter. Their force, however, was ſo inconſiderable, whatever their direction might be, that no concluſion could poſſibly be drawn from them concerning the exiſtence or non-exiſtence of a northern paſſage. With regard to the temperature of the weather, July was found much colder than Auguſt. In the former, the thermometer was once at 20°, and very frequently at 30°; whereas during the laſt year it was very uncommon in Auguſt to have it as low as the freezing point. High winds were experienced in both ſeaſons, all of which blew from the ſouth-weſt. The air was foggy whenever the weather became calm; but the fogs were obſerved to accompany ſoutherly winds much more than others.

The ſtraits, in the neareſt approach of the continents to each other, in the latitude of 66°, are about 13 leagues over; beyond which they diverge to N. E. by E. and W. N. W.; ſo that in the latitude of 69°, their diſtance from each other is about 300 miles. A great reſemblance is obſerved betwixt the continents on both ſides of the ſtraits. Both are deſtitute of wood; the ſhores are low, with mountains further inland, riſing to a great height. The ſoundings in the mid way between them were from 29 to 30 fathoms, gradually decreaſing as either continent was approached; with this difference, however, that the water was ſomewhat ſhallower on the coaſt of America than that of Aſia, at an equal diſtance from land. The bottom, towards the middle, was a ſoft ſlimy mud; and near either ſhore was a browniſh ſand intermixed with a few ſhells and ſmall fragments of bones. There was but little tide or current, and what there was came from the weſt.

123 Death of Captain Clerke. See Clerk

Before the ſhips could reach the peninſula of Kamtſchatka, Captain Clerke expired; in conſequence of which the command of the Diſcovery devolved upon Mr King, Captain Gore being now the ſuperior officer. On the return to Kamtſchatka, Captain Clerke was buried in the ſpot on which a church was to be erected; it having been his own deſire to be interred in the church.

124 Return to Kamtſchatka, with deſcription of the bay of Awatſka.

By the time they arrived at this peninſula, the face of the country was greatly improved; the fields being covered with the moſt lively verdure, and every plant in the moſt flouriſhing ſtate. The eruption of the volcano which they had obſerved on their laſt departure from Kamtſchatka, had done little or no damage, notwithſtanding its violence. Several ſtones had fallen about the ſize of a gooſe's egg, but none larger. At this viſit it was obſerved by our navigators, that the complexions of the Ruſſians ſeemed to be much more unhealthy and ſallow than when they ſaw them formerly; and the Ruſſians made the ſame obſervation upon the complexions of their gueſts. As no certain cauſe for this alteration could be perceived, the blame was by both parties laid on the verdure of the country; which, by contraſting itſelf with the colour of the people, made the latter appear to diſadvantage.

Having repaired as well as they could the damages ſuſtained by the ſhips among the ice, our navigators now began to proceed on their voyage ſouthward; but the ſhattered condition of their veſſels, with the little time they had now to ſpare on voyages of diſcovery, after having been ſo long at ſea, now rendered them much leſs ſucceſsful than formerly. Before leaving the peninſula, however, they took care to give ſuch a deſcription of the bay of Awatſka as muſt be of great ſervice to future navigators. This bay lies in 52. 51. N. Lat. and 158. 48. E. Long. in the bight of another bay formed by Cape Gavareea to the ſouth, and Cheeponſkoi Noſs to the north. The latter of theſe bears from the former N. E. by N. and is 32 leagues diſtant. From Cape Gavareea to the entrance of Awatſka bay the coaſt takes a northerly direction, and extends about 11 leagues. It conſiſts of a chain of rugged cliffs and rocks, and in many parts preſents an appearance of bays or inlets; but on a nearer view, low grounds were perceived by which the headlands were connected. From the entrance of Awatſka bay, Cheeponſkoi Noſs bears E. N. E. diſtant 17 leagues. The ſhore on this ſide is flat and low, with hills behind gradually riſing to a conſiderable height. The latitude of Cape Gavareea is 52. 21. By this remarkable difference of the land on both ſides the cape, navigators may be directed in their courſe towards it from the ſouthward. When they approach it from the northward, Cheeponſkoi Noſs becomes very conſpicuous; it being a high projecting headland, and united to the continent by a large extent of level ground lower than the Noſs: and preſents the ſame appearance

appearance whether viewed from the north or south. Should the weather happen to be sufficiently clear to admit a view of the mountains both on the sea coast and in the neighbourhood, the situation of Awatska bay, may be known by the two high ones to the south of it. That nearest the bay is in the form of a sugar loaf, the other flat at top, and not quite so high. Three very conspicuous mountains appear on the north side of the bay; of which that to the west appears to be the highest; the next, being a volcano, is readily known by the smoke which it emits; the third is the most northerly, and might properly be called a cluster of mountains, as it presents several flat tops to view. When got within the capes, the entrance of the bay of Awatska to the north is pointed out by a light-house on a perpendicular headland. Many sunken rocks lie to the eastward of this headland, stretching two or three miles into the sea; and which with a moderate sea or swell will always show themselves. A small round island lies four miles to the south of the entrance, principally composed of high pointed rocks, one of which is very remarkable. The entrance into the bay is at first about three miles wide, and one and a half in the narrowest part; the length is four miles in a north-west direction. Within the mouth is a noble bason about 25 miles in circumference; in which are the harbours of Rakoweera to the east, Tarcinska, to the west, and St Peter and St Paul to the north.

On leaving Kamtschatka, it was unanimously judged improper to make any attempt to navigate the seas between the continent of Asia and Japan. Instead of this, it was proposed to steer to the eastward of that island, and in the way thither to sail along the Kuriles; examining particularly those that are situated nearest to the northern coast of Japan, which are said to be considerable, and neither subject to the Russians nor Japanese. In case they should have the good fortune to meet with some secure and commodious harbour in one of these islands, it was supposed that they might prove of considerable importance, as convenient places for shelter for subsequent navigators, who might be employed in exploring these seas, as the means of producing a commercial intercourse among the adjacent dominions of the two above-mentioned empires. The next object was to take a survey of the coasts of the islands of Japan; after which they designed to sail for the coast of China as far north as possible, and then sail along it southward to Macao.

In pursuance of this plan, they sailed along the coast of Kamtschatka, till they came to the southern point called *Cape Lopatka*, whose situation they determined to be in Lat. 51. 0. E. Long. 156. 45. To the north-west they observed a very lofty mountain, whose summit was lost in the clouds; and the same instant the first of the Kurile islands, named *Shoomska*, made its appearance in the direction of west, half south. The passage betwixt the southern extremity of Cape Lopatka and the island of Shoomska, though only one league in breadth, is extremely dangerous, both on account of the rapidity of the tides, and of the sunk rocks which lie off the cape. In the course of this voyage, they had occasion to observe, that a violent swell from the north-west frequently took place, though the wind had been for some time in the western quarter; a circumstance for which they seem to have been altogether unable to account.

Cook's Discoveries ‖ Coop.

The tempestuous weather which now occurred, prevented any discoveries from being made among the Kurile isles; however, they again sailed over the space assigned to the land of De Gama, without being able to find it; and, from comparing several accounts of the Russian navigators with one another, it was judged extremely probable, that the land of Jeso, so frequently laid down in former maps, is no other than the most southerly of the Kurile isles. On coming in view of the coast of Japan, they had the mortification to find that they could not approach the land by reason of the tempestuous weather and bad state of the ships; the coasts of these islands being extremely dangerous. Passing from thence in quest of the Bashee islands, they found amazing quantities of pumice-stone floating in the sea; so that they seemed inclined to believe, with Mr Muller, that if there had formerly been any part of the continent, or large island, called the *Land of Jeso*, it must have disappeared in a volcanic convulsion; which also must have been the case with that called the *Company's Land* and *Staten Island*. Though they had not the good fortune to find the Bashee islands, they discovered one in 24. 48. N. Lat. 141. 20. E. Long. which from its appearance, and the sulphureous smell emitted by it, they named *Sulphur island*. After this nothing remarkable occurred till their arrival at Canton in China, where, having staid for some time in order to put their ships in repair, they at last set sail for Britain; but through stress of weather were driven as far north as Stromness in Orkney. From thence Captain Gore sent a dispatch to the lords of the admiralty to inform them of his arrival; and on the 4th of October 1780, the ships reached the Nore, after an absence of four years, two months, and twenty-two days.

COOKERY, the art of preparing and dressing victuals for the table: An art in its simplest and ordinary modes, sufficiently familiar to every house-keeper; and, in its luxurious refinements, too copiously detailed in manuals and directories published for the purpose, to require any enlargement here, were it even a topic that at all deserved consideration in a work of this nature.

COOLERS, in *Medicine*, those remedies which were supposed to produce an immediate sense of cold, being such as have their parts in less motion than those of the organs of feeling; as fruits and all acid liquors. Or they are such as were supposed, by a particular viscidity or grossness of parts, to give the animal fluids a greater consistency than they had before, and consequently retard their motion, having less of that intestine force on which their heat depends: this property was ascribed to cucumbers and similar substances.

COOM, a term applied to the soot that gathers over an oven's mouth; and also to the black, greasy substance, which works out of the wheels of carriages.

COOMB, or COMB, *of corn*, a dry measure containing four bushels, or half a quarter.

COOP, in *Husbandry*, a tumbrel or cart enclosed with boards, and used to carry dung, grains, &c.

COOP, is also the name of a pen, or enclosed place, where

where lambs, poultry, &c. are ſhut up in order to be fed.

COOPER, an artificer who makes caſks, coops tubs and barrels, and all kinds of wooden veſſels which are bound together with hoops. It would appear, that the art of the cooper is of great antiquity, and ſoon attained all the perfection which it at preſent poſſeſſes.

But although this art is very ancient, there are ſome countries in which it is yet unknown; and in other countries from the ſcarcity of wood, or from ſome other cauſes, earthen veſſels and ſkins lined with pitch are uſed for containing liquors. The Latin word *dolium*, is uſually tranſlated "caſk;" but it was employed by the Romans to denote earthen veſſels uſed for the ſame purpoſes. The word *dolare*, to "plane, or ſmooth," from which dolium is derived, and the word *dolarius*, "a cooper," may be naturally enough applied, the former to the conſtruction of caſks, which are made of ſeveral pieces of the ſame tree planed and fitted for joining together, and the latter to the artificer himſelf.

Pliny aſcribes the invention of caſks to the people who lived at the foot of the Alps. In his time they lined them with pitch. From the year 70 of the Chriſtian era in the time of Tiberius and Veſpaſian the art of conſtructing veſſels of different pieces of wood ſeems to have been well known. Indeed, previous to this period, Varro and Columella, in detailing the precepts of rural economy, ſpeak diſtinctly of veſſels formed of different pieces, and bound together with circles of wood or hoops. The deſcription which they have given accords exactly with the conſtruction of caſks. The fabrication of caſks, on account of the great abundance of wood, was probably very early introduced into France. When this art was firſt practiſed in Britain is unknown; but it ſeems not improbable that it was derived from the French.

The figure of a caſk is that of two truncated cones, or rather conoids, joined together; for the lines are not ſtraight, as in the cone, but are curved from the vertex to the baſe. As the place where the junction ſeems to take place is the moſt capacious, it is commonly called the belly of the caſk. In the choice of wood, old, thick, and ſtraight trees are preferred, from which thin planks are hewn which are to be formed into ſtaves. In France, the wood is prepared in winter; the ſtaves and bottoms are then formed, and they are put together, or, in the language of the artificer, the caſk is mounted, in ſummer. Planing the ſtaves is one of the moſt difficult parts of the work; and it is at the ſame time one of the moſt important in the fabrication of caſks. In dreſſing ſtaves with the plane, the workman is directed to cut acroſs the wood; the reaſon of which is probably to prevent the inſtrument following the courſe of the fibres, which may not always be in the ſame plane with the ſurface of the ſtave, and thus render it of unequal thickneſs.

In the formation of the ſtaves, it ought to be recollected, that each is to conſtitute part of a double conoid. It muſt therefore be broader at the middle, and muſt gradually become narrower, but not in ſtraight lines, towards the extremities. The outſide of the ſtaves, acroſs the wood, muſt be wrought into the ſegment of a circle; and it muſt be thickeſt near the middle, growing gradually thinner towards the ends. Great experience, it is obvious, muſt be requiſite for the nice adjuſtment of the different curves to the ſize and ſhape of the caſk. Leſs attention, as it is leſs neceſſary, is paid to the rounding or dreſſing of the inſide of the ſtave.

After the ſtaves are dreſſed and ready to be arranged in a circular form, it might be ſuppoſed neceſſary for the purpoſe of making the ſeams tight, to trim the thin edges in ſuch a manner, that the contiguous ſtaves may be brought into firm contact throughout the whole joint, or ſloped ſimilar to the arch-ſtones of a bridge. But this is not the practice which is uſually followed by the artificer. Without attempting to ſlope them, ſo that the whole ſurface of the edge may touch in every point, he brings the contiguous ſtaves into contact only at the inner ſurface; and in this way, by driving the hoops hard, he can make a cloſer joint than could be done by ſloping them from the outer to the inner ſide. In this, perhaps, with giving the proper curvature to the ſtaves, conſiſts the principal part of the cooper's art.

Cooper, *Anthony Aſhley*, firſt earl of Shafteſbury, a moſt able ſtateſman, was the ſon of Sir John Cooper, Bart. of Rockburn in Hampſhire, and was born in 1621. He was elected member for Tewkeſbury, at 19 years of age, in the ſhort parliament that met April 13. 1640. He ſeems to have been well affected to the king's ſervice at the beginning of the civil wars; for he repaired to the king at Oxford with offers of aſſiſtance: but Prince Maurice breaking articles to a town in Dorſetſhire that he had got to receive him, furniſhed him with a pretence for going over to the parliament, from which he accepted a commiſſion. When Richard Cromwell was depoſed, and the Rump came again into power, they nominated Sir Anthony one of their council of ſtate, and a commiſſioner for managing the army. At that very time he had engaged in a ſecret correſpondence for reſtoring Charles II. and, upon the king's coming over, was ſworn of his privy council. He was one of the commiſſioners for the trial of the regicides; was ſoon after made chancellor of the exchequer, then a commiſſioner of the treaſury; in 1672 was created earl of Shafteſbury; and ſoon after was raiſed to the poſt of lord chancellor. He filled this office with great ability and integrity; and though the ſhort time he was at the helm was in a tempeſtuous ſeaſon, it is doing him juſtice to ſay, nothing could either diſtract or affright him. The great ſeal was taken from him in 1673, 12 months after his receiving it; but, though out of office, he ſtill made a diſtinguiſhed figure in parliament, for it was not in his nature to remain inactive. He drew upon himſelf the implacable hatred of the duke of York, by ſteadily promoting, if not originally inventing, the famous project of an excluſion-bill. When his enemies came into power, he found it neceſſary to conſult his ſafety, by retiring into Holland, where he died ſix weeks after his arrival, in 1683. While his great abilities are confeſſed by all, it has been his misfortune to have his hiſtory recorded by his enemies, who ſtudied to render him odious. Butler has given a very ſevere character of him in his Hudibras.

Cooper, *Anthony Aſhley*, earl of Shafteſbury, was ſon of Anthony earl of Shafteſbury, and grandſon of

Anthony first earl of Shaftesbury, lord high chancellor of England. He was born in 1671, at Exeter-house in London, where his grandfather lived, who from the time of his birth conceived so great an affection for him, that he undertook the care of his education; and he made so good a progress in learning, that he could read with ease both the Latin and Greek languages when only 11 years old. In 1683, his father carried him to the school at Winchester, where he was often insulted on his grandfather's account, whose memory was odious to the zealots for despotic power: he therefore prevailed with his father to consent to his desire of going abroad. After three years stay abroad, he returned to England in 1689, and was offered a seat in parliament in some of those boroughs where his family had an interest. But this offer he did not now accept, that he might not be interrupted in the course of his studies, which he prosecuted five years more with great vigour and success; till, on Sir John Trenchard's death, he was elected burgess for Pool. Soon after his coming into parliament, he had an opportunity given him of expressing that spirit of liberty by which he uniformly directed his conduct on all occasions. It was the bringing in and promoting "the act for regulating trials in cases of high treason." But the fatigues of attending the house of commons in a few years so impaired his health, that he was obliged to decline coming again into parliament after the dissolution in 1698. He then went to Holland, where the conversation of Mr Bayle, M. le Clerc, and several other learned and ingenious men, induced him to reside a twelvemonth. During this time, there was printed at London, in 8vo, an imperfect edition of Lord Ashley's Inquiry concerning Virtue. It had been surreptitiously taken from a rough draught, sketched when he was no more than 20 years of age. His lordship, who was greatly chagrined at this event, immediately bought up the impression before many books were sold, and set about completing the treatise, as it afterwards appeared in the second volume of the Characteristics. Soon after Lord Ashley's return to England, he became, by the decease of his father, earl of Shaftesbury. But his own private affairs hindered him from attending the house of lords till the second year of his peerage, when he was very earnest to support King William's measures, who was at that time projecting the grand alliance. So much was he in favour with King William, that he had the offer of secretary of state; but his declining constitution would not allow him to accept of it. Though he was disabled from engaging in business, the king consulted him on matters of very high importance; and it is pretty well known that he had the greatest share in composing that celebrated last speech of King William, December 31. 1701. On Queen Anne's accession to the throne, he returned to his retired manner of life, being no longer advised with concerning the public; and was then removed from the vice-admiralty of Dorset, which had been in the family for three generations. In 1703, he made a second journey to Holland, and returned to England the year following. The French prophets, soon after this, having by their enthusiastic extravagancies made a great noise throughout the nation, and among different opinions, some advising a prosecution, the lord Shaftesbury apprehended that such measures tended rather to inflame than to cure the disease. This was the origin of his Letter concerning Enthusiasm, which he sent to Lord Somers then president of the council; and which being approved of by that nobleman and other gentlemen to whom it was shown, was published in 1708, though without the name of the author, or that of the person to whom it was addressed. His Moralist, a philosophical Rhapsody, being a recital of certain conversations on natural and moral subjects, appeared in January 1709; and in the May following his *Sensus Communis*, an essay upon the freedom of Wit and Humour, in a Letter to a Friend. It was in the same year that he entered into the marriage state with Mrs Jane Ewer, the youngest daughter of Thomas Ewer, Esq. of Lee in Hertfordshire. By this lady, to whom his lordship was related, he had an only son, Anthony the late earl of Shaftesbury. In 1710, his Soliloquy, or Advice to an Author, was published at London in 8vo. While he was thus employing himself in literary composition, his health declined so fast, that it was recommended to him to seek assistance from a warmer climate. Accordingly, in July 1711, he set out for Naples, and pursuing his journey by way of France, was obliged to pass through the duke of Berwick's army, which at that time lay encamped near the borders of Piedmont. Here he was entertained by that famous general in the most friendly manner, and every assistance was given him to conduct him in safety to the duke of Savoy's dominions. Our noble author's removal to Italy was of no service to the re-establishment of his health; for after having resided at Naples about a year and a half, he departed this life on the 4th of February, O. S. 1712-13, in the 42d year of his age. The only pieces which he finished after he came to this city, were the Judgment of Hercules, and the Letter concerning Design, which last was added to that impression of the Characteristics which appeared in 1732. It was in 1711 that the first edition was published of all the Characteristics together, and in the order in which they now stand. But this publication not being entirely to his lordship's satisfaction, he chiefly employed the latter part of his life in preparing his writings for a more elegant edition; which was given to the world in 1713, soon after his decease. The several prints that were then first interspersed through the volumes were all invented by himself, and designed under his immediate inspection; and for this purpose he was at the pains of drawing up a most accurate set of instructions, the manuscript of which is still preserved in the family. That no mistakes might be committed, the earl did not leave to any other hands so much as the drudgery of correcting the press. In the three volumes of the Characteristics of Men, Manners, Opinions, and Times, he completed the whole of his works which he intended for the public eye. Not long before his death he had formed a scheme of writing a discourse on painting, sculpture, and the other arts of design, which, if he had lived to have finished it, might have proved a very pleasing and useful work, as he had a fine taste in subjects of that kind: but his premature decease prevented his making any great progress in the undertaking. The earl of Shaftesbury had an esteem for the works of the best English divines; one remarkable instance of which was displayed in his writing a Preface to a volume of Dr Whichcot's

Cooper.

Whichcot's Sermons, publiſhed in 1698. Copies of theſe ſermons had been taken in ſhort-hand, as they were delivered from the pulpit; and the earl had ſo high an opinion of them, that he not only introduced them to the world by his preface, but had them printed under his own particular inſpection. In his Letters to a Young Man at the univerſity, he ſpeaks of Biſhop Burnet and Dr Hoadly in terms of great applauſe, and has done juſtice to the merits of Tillotſon, Barrow, Chillingworth, and Hammond, as the chief pillars of the church againſt fanaticiſm. But whatever regard his lordſhip might have for ſome of our divines, it was to the writings of antiquity that his admiration was principally directed. Theſe were the conſtant objects of his ſtudy, and from them he formed his ſyſtem of philoſophy, which was of the civil, ſocial, and theiſtic kind.

Of Lord Shafteſbury's character, as a writer, different accounts have been given. As one of his greateſt admirers, may be mentioned Lord Monboddo; who, ſpeaking of his Rhapſodiſt in particular, does not heſitate to pronounce it not only the beſt dialogue in Engliſh, out of all degree of compariſon, but the ſublimeſt philoſophy: and, if we will join with it the Inquiry, the completeſt ſyſtem both of morality and theology, that we have in our language, and, at the ſame time, of the greateſt beauty and elegance for the ſtyle and compoſition.

Even ſeveral of the authors who have diſtinguiſhed themſelves by their direct oppoſition to many of the ſentiments which occur in the Characteriſtics, have nevertheleſs mixed no ſmall degree of applauſe with their cenſures. "I have again peruſed, with freſh pleaſure and freſh concern (ſays Mr Balguy, in his Letter to a Deiſt), the volumes of Characteriſtics—I heartily wiſh the noble author had been as unprejudiced in writing as I was in reading. If he had, I am perſuaded his readers would have found double pleaſure and double inſtruction. It ſeems to me, that his lordſhip had little or no temptation to purſue any ſingularities of opinion by way of diſtinction. His fine genius would ſufficiently have diſtinguiſhed him from vulgar authors in the high road of truth and ſenſe; on which account his deviations ſeem the more to be lamented. The purity and politeneſs of his ſtyle, and the delicacy of his ſentiments, are and muſt be acknowledged by all readers of taſte and ſincerity. But nevertheleſs, as his beauties are not eaſy to be overlooked, ſo neither are his blemiſhes. His works appear to be ſtained with ſo many groſs errors, and his fine thoughts are ſo often mingled with abſurdities, that however we may be charmed with the one, we are forced to condemn the other." Mr Balguy hath farther obſerved, with regard to the Inquiry concerning Virtue, which is the immediate object of his animadverſion, that though he cannot agree in every particular contained in it, he finds little more to do than to tell how much he admires; and that he thinks it indeed, in the main, a performance ſo juſt and exact as to deſerve higher praiſes than he is able to give it.

Dr Brown, in his eſſay on the Characteriſtics, obſerves that the earl of Shafteſbury hath in that performance mingled beauties and blots, faults and excellencies, with a liberal and unſparing hand. At the ſame time, the doctor applauds that generous ſpirit of freedom which ſhines throughout the whole. Another direct antagoniſt of the earl of Shafteſbury, Dr Leland, has obſerved, that no impartial man will deny him the praiſe of a fine genius. "The quality of the writer (continues the doctor), his lively and beautiful imagination, the delicacy of taſte he hath ſhown in many inſtances, and the graces and embelliſhments of his ſtyle, though perhaps ſometimes too affected, have procured him many admirers. To which may be added his refined ſentiments on the beauty and excellency of virtue, and that he hath often ſpoken honourably of a juſt and good Providence, which miniſters and governs the whole in the beſt manner; and hath ſtrongly aſſerted, in oppoſition to Mr Hobbes, the natural difference between good and evil; and that man was originally formed for ſociety, and the exerciſe of mutual kindneſs and benevolence; and not only ſo, but for religion and piety too. Theſe things have very much prejudiced many perſons in his favour, and prepared them for receiving, almoſt implicitly, whatever he hath advanced." Dr Johnſon, as we are informed by Sir John Hawkins, bore no good-will to Lord Shafteſbury; neither did he ſeem at all to reliſh the cant of the Shafteſburian ſchool, nor inclined to admit the pretenſions of thoſe who profeſſed it, to taſtes and perceptions which are not common to all men; a taſte in morals, in poetry and proſe writing, in painting, in ſculpture, in muſic, in architecture, and in government! A taſte that cenſured every production, and induced them to reprobate every effort of genius that fell ſhort of their own capricious ſtandard.

Biog. Brit. vol. iv.

The grand point in which our noble author has rendered himſelf juſtly obnoxious to the friends of religion, is his having interſperſed through the Characteriſtics a number of inſinuations that appear to be unfavourable to the cauſe of revelation. There have not however been wanting many among his admirers, who have thought that he ought not to be reckoned among the deiſtical writers. The author of animadverſions upon Dr Brown's three Eſſays on the Characteriſtics, obſerves, that it is "imprudent, to ſay no worſe, in ſome ſincere advocates for Chriſtianity, to reject the friendly advice and aſſiſtance of ſo maſterly a writer as the lord Shafteſbury, and to give him up to the Deiſts as a patron of infidelity." But it is matter of fact, and not conſiderations of prudence or imprudence, that muſt determine the queſtion. In ſupport of his lordſhip's having been a believer in our holy religion, may be alleged, his Preface to Whichcot's Sermons, and his Letters to a Student at the univerſity: in both which works he conſtantly expreſſes himſelf in ſuch language as ſeems to indicate that he was really a Chriſtian. And with regard to the letters, it may be remarked, that they were written in 1707, 1708, and 1709, not many years before his lordſhip's death. Nevertheleſs, there are in the Characteriſtics ſo many ſceptical paſſages, that he muſt be conſidered as having been a doubter at leaſt, if not an abſolute diſbeliever, with reſpect to revelation. But if he muſt be ranked among the Deiſts, we agree with the obſervation of one of his biographers, that he is a very different Deiſt from numbers who have appeared in that character; his general principles being much leſs exceptionable.

The ſtyle of Lord Shafteſbury's compoſitions is alſo a point upon which various and contradictory ſentiments

ments have been entertained. But for the fulleſt and moſt judicious criticiſm that has appeared upon that ſubject, we may refer the reader to Dr Blair's Lectures on Rhetoric and Belles Lettres, vol. i. p. 192, 193, 207, 208, 234, 263, and 396—398.

Cooper, *Samuel*, a very eminent Engliſh miniature painter, born in 1609, and bred under the care of his uncle John Hoſkins. He derived, however, his principal excellence from the ſtudy of the works of Vandyck, in whoſe time he lived; inſomuch that he was commonly ſtyled "Vandyck in little." His pencil was chiefly confined to the head, in which, with all its dependencies, eſpecially the hair, he was inimitable; but if he deſcended lower his incorrectneſs was notorious. He died in 1672; and his pieces are univerſally admired all over Europe, ſelling for incredible prices.—He had a brother, Alexander, likewiſe a good miniature painter, who became limner to Chriſtina queen of Sweden.

Cooper, *Thomas*, a pious and learned prelate in the reign of Queen Elizabeth, was born at Oxford about the year 1517. He was educated in the ſchool adjoining to Magdalene college, of which he was a choriſter, where alſo, in 1539, he was elected probationer, and fellow in the following year. About the year 1546, quitting his fellowſhip, he applied himſelf to the ſtudy of phyſic, in 1556 took the degree of bachelor in that faculty, and practiſed as phyſician at Oxford. Being inclined to the Proteſtant religion, probably this was only a prudent ſuſpenſion of his final intentions during the popiſh reign of Queen Mary; for, on the acceſſion of Elizabeth, he reſumed the ſtudy of divinity, became a celebrated preacher, was made dean of Chriſt-church, and vice-chancellor of the univerſity, having accumulated the degrees of bachelor and doctor in divinity. In 1569 he was made dean of Glouceſter; and, the year following, biſhop of Lincoln: whence, in 1584, he was tranſlated to the ſee of Wincheſter, in which city he died on the 28th of April 1594, and was buried in the cathedral there, on the ſouth ſide of the choir. The ſeveral writers who have mentioned Dr Cooper, unanimouſly gave him the character of an eloquent preacher, a learned divine, and a good man. He had the misfortune, while at Oxford, to marry a lady whoſe gallantries became notorious: neverthelefs he would not be divorced from her; knowing that he could not live without a wife, he did not chooſe "to charge his conſcience with the ſcandal of a ſecond marriage."—He wrote, 1. The Epitome of Chronicles from the 17th year after Chriſt to 1540, and thence after to 1560. 2. *Theſaurus linguæ Romanæ et Britannicæ*. This dictionary, which is an improvement upon Elyot's, was much admired by Queen Elizabeth, who thenceforward determined to promote the author. 3. A brief expoſition of ſuch chapters of the Old Teſtament as uſually are read in the church, at common prayer, on Sundays throughout the year. 4. An admonition to the people of England. 5. Sermons.

Cooper, *John Gilbert*, a polite modern writer, was born in 1723; and was deſcended from an ancient family in the county of Nottingham, whoſe fortune was injured in the laſt century by their attachment to the principles of monarchy. He reſided at Thurgarton priory in Nottinghamſhire, which was granted by King Henry VIII. to William Cooper, one of his anceſtors. This manſion Mr Cooper inherited from his father, who in 1739 was high ſheriff of the county; and tranſmitted it to his ſon, who filled the ſame reſpectable office in 1783. After paſſing through Weſtminſter ſchool under Dr John Nicoll, along with the late Lord Albemarle, Lord Buckinghamſhire, Major Johnſon, Mr George Aſhby, and many other eminent and ingenious men, he became in 1743 a fellow-commoner of Trinity-college, Cambridge, and reſided there two or three years; but quitted the univerſity on his marriage with Suſanna the daughter of William Wrighte, Eſq. ſon to the lord keeper of that name, and recorder of Leiceſter 1729—1763. In the year 1745 he commenced author by the publication of The Power of Harmony, a poem in 4to; and in 1746 and 1747 he produced ſeveral Eſſays and Poems under the ſignature of Philalethes, in a periodical work called *The Muſeum*, publiſhed by Mr Dodſley. In the ſame year he came forward as an author, with his name, by a work which received much aſſiſtance from his friend the Reverend John Jackſon of Leiceſter, who communicated ſeveral learned notes, in which he contrived to manifeſt his diſlike to his formidable antagoniſt Mr Warburton. It was entitled The Life of Socrates, collected from the Memorabilia of Xenophon, and the Dialogues of Plato, and illuſtrated farther by Ariſtotle, Diodorus Siculus, Cicero, Proclus, Apuleius, Maximus Tyrius, Boethius, Diogenes Laertius, Aulus Gellius, and others: 1749, 8vo. In this work Mr Cooper gave evident marks of ſuperior genius; warm, impetuous, and impatient of reſtraint. In 1754, Mr Cooper publiſhed his Letters on Taſte, 8vo; an elegant little volume, on which no ſmall ſhare of his reputation is founded; and in 1755, The Tomb of Shakeſpeare, a Viſion, 4to; a decent performance, but in which there is more of wit and application than of nature or genius. In 1756 he aſſiſted Mr Moore, by writing ſome numbers of the World; and attempted to rouſe the indignation of his countrymen againſt the Heſſians, at that juncture brought over to defend the nation, in a poem called the Genius of Britain, addreſſed to Mr Pitt. In 1758, he publiſhed Epiſtles to the Great, from Ariſtippus in Retirement, 4to; and The Call of Ariſtippus, Epiſtle IV. to Mark Akenſide, M. D. Alſo, A Father's Advice to his ſon, in 4to. In the Annual Regiſter of the ſame year is his Tranſlation of an Epiſtle from the King of Pruſſia to Monſieur Voltaire. In 1759, he publiſhed Ver Vert; or the Nunnery Parrot; an Heroic Poem, in four cantos, inſcribed to the Abbeſs of D***; tranſlated from the French of Monſieur Greſſet, 4to; reprinted in the firſt volume of Dilly's Repoſitory, 1777; and, in 1764, Poems on ſeveral ſubjects, by the Author of the Life of Socrates; with a prefatory Advertiſement by Mr Dodſley. In this little volume were included all the ſeparate poetical pieces which have been already mentioned, excepting Ver Vert, which is a ſprightly compoſition. Mr Cooper died at his father's houſe in May Fair, after a long and excruciating illneſs ariſing from the ſtone, April 14th 1769.

CO-ORDINATE, ſomething of equal order, rank, or degree with another.

COOT. See Fulica, Ornithology *Index*.

COPAIBA, or *Balſam of* Copaiba, a liquid reſi-

nous juice, flowing from incisions made in the trunk of the copaifera balsamum. See MATERIA MEDICA *Index*.

COPAIFERA, in *Botany*, a genus of plants belonging to the decandria class. See BOTANY *Index*.

COPAL, improperly called *gum copal*, is a gum of the resinous kind brought from New Spain, being the concrete juice of the *Rhus Copallinum*. It is employed as a varnish. See VARNISHING and CHEMISTRY *Index*.

COPARCENARY, the share or quota of a coparcener.

COPARCENERS, (from *con* and *particeps*, "partner;"), or PARCENERS; such as have equal portions in the inheritance of their ancestor.

Coparceners are so either by law or custom. Coparceners by law, are the issue female; which, in default of a male or heir, come equally to the lands of their ancestors. Coparceners by custom, are those who, by some peculiar custom of the country, challenge equal parts in such lands; as in Kent, by the custom of gavelkind. The crown of England is not subject to coparcenary.

COPE, an ecclesiastical ornament, usually worn by chanters and subchanters, when they officiate in solemnity. It reaches from the shoulders to the feet. The ancients called it *Pluviale*.—The word is also used for the roof or covering of a house, &c.

COPE is also the name of an ancient custom or tribute due to the king or lord of the soil, out of the lead-mines in some part of Derbyshire; of which Manlove saith thus:

> Egress and regress to the king's highway,
> The miners have; and *lot* and *cope* they pay;
> The thirteenth dish of ore within their mine,
> To the lord for *lot*, they pay at measuring time;
> Sixpence a load for *cope* the lord demands,
> And that is paid to the *burghmaster's* hands.

This word by Doomsday-book, as Mr Hagar hath interpreted it, signifies a hill: and *cope* is taken for the supreme cover, as the *cope of heaven*.

COPEL. See CUPEL.

COPENHAGEN, the capital of the kingdom of Denmark, situated on the eastern shore of the island of Zealand, upon a fine bay of the Baltic sea, not far from the strait called the Sound. E. Long. 13. 0. N. Lat. 55. 30.

The precise date of the foundation of this city is disputed; but the most probable account is, that it took its rise from a castle built on the spot in the year 1168, as a protection against the pirates which at that time swarmed in the Baltic. The conveniency of the situation, and the security afforded by the castle, soon induced a number of the inhabitants of Zealand to resort thither: but it was not distinguished by the royal residence until 1443, during the reign of Christopher of Bavaria; since which period it has been gradually enlarged and beautified, and is become the capital of Denmark.

Copenhagen is the best built city of the north; for although Petersburgh excels it in superb edifices, yet, as it contains no wooden houses, it does not display that striking contrast of meanness and magnificence; but in general exhibits a more equable and uniform appearance. The town is surrounded towards the land with regular ramparts and bastions, a broad ditch full of water, and a few outworks, its circumference measures between four and five miles. The streets are well paved, with a foot-way on each side, but too narrow and inconvenient for general use. The greatest part of the buildings are of brick; and a few are of free-stone brought from Germany. The houses of the nobility are in general splendid, and constructed in the Italian style of architecture: the palace, which was erected by Christian VI. is a large pile of building; the front is of stone, and the wings of brick stuccoed; the suite of apartments is princely; but the external appearance is more grand than elegant.

The busy spirit of commerce is visible in this city, which contains about 80,000 inhabitants. The haven is always crowded with merchant ships: and the streets are intersected by broad canals, which bring the merchandise close to the warehouses that line the quays. This city owes its principal beauty to a dreadful fire in 1728, that destroyed five churches and 67 streets, which have been since rebuilt in the modern style. The new part of the town, raised by the late king Frederic V. is extremely beautiful, scarcely inferior to Bath. It consists of an octagon, containing four uniform and elegant buildings of hewn stone, and of four broad streets leading to it in opposite directions. In the middle of the area stands an equestrian statue of Frederic V. in bronze, as big as life, which cost 80,000l. The Royal Museum, or Cabinet of Rarities, merits the attention of travellers. This collection, which was begun by Frederic III. is deposited in eight apartments, and ranged in the following order: animals, shells, minerals, paintings, antiquities, medals, dresses, arms and implements of the Laplanders.

Part of Copenhagen, which is called *Christianshafen*, is built upon the isle of Amak, which generally attracts the curiosity of foreigners; (see AMAK). From this place, to which the main city is joined by a bridge, the markets are supplied with fowl, beef, mutton, venison, corn, and culinary vegetables, which are produced here in the greatest abundance.

COPERNICAN, in general, something belonging to COPERNICUS. Hence

COPERNICAN *System* or *Hypothesis*, that system of the world wherein the sun is supposed to rest in the centre, and the planets, with the earth, to move in ellipses round him. See COPERNICUS.

COPERNICUS, NICOLAUS, an eminent astronomer, was born at Thorn in Prussia, Jan. 10. 1472. He was taught the Latin and Greek languages at home; and afterwards sent to Cracovia, where he studied philosophy and physic. His genius in the mean time was naturally turned to mathematics, which he pursued through all its various branches. He set out for Italy when he was 23 years of age; but staid at Bononia some time, for the sake of being with the celebrated astronomer of that place, Dominicus Maria: whose conversation, however, and company, he affected, not so much as a learner, as an assistant to him in making his observations. From thence he passed to Rome, where he was no sooner arrived than he was considered as not inferior to the famous Regiomontanus; and acquired, in short, so great a reputation, that he was chosen professor of mathematics, which he taught for a long time with great applause. He also made

Copernicus.

made some astronomical observations there about the year 1500. Returning to his own country some years after, he began to apply his vast knowledge in mathematics to correct the system of astronomy which then prevailed. He set himself to collect all the books which had been written by philosophers and astronomers, and to examine all the various hypotheses they had invented for the solution of the celestial phenomena, to try if a more symmetrical order and constitution of the parts of the world could not be discovered, and a more just and exquisite harmony in its motions established, than what the astronomers of those times so easily admitted. But of all their hypotheses none pleased him so well as the Pythagorean, which made the sun to be the centre of the system, and supposed the earth to move not only round the sun, but round its own axis also. He thought he discerned much beautiful order and proportion in this; and that all that embarrassment and perplexity from epicycles and excentrics, which attended the Ptolemaic hypothesis, would here be entirely removed.

This system, then, he began to consider, and to write upon, when he was about 35 years of age. He employed himself in contemplating the phenomena carefully; in making mathematical calculations; in examining the observations of the ancients, and in making new ones of his own; and after more than 20 years chiefly spent in this manner, he brought his scheme to perfection, and established that system of the world which goes by his name, and is now universally received, (see ASTRONOMY *Index*). His system, however, was then looked upon as a most dangerous heresy; for which he was thrown into prison by Pope Urban VIII. and not suffered to come out till he had recanted his opinion; that is, till he had renounced the testimony of his senses. He died the 24th of May 1543, in the 70th year of his age.

This extraordinary man had been made canon of Worms by his mother's brother, Lucas Wazelrodius, who was bishop of that place. He was not only the greatest of astronomers, but a perfect master of the Greek and Latin tongues; to all which he joined the greatest piety and innocence of manners.

The following is the account of the discoveries of Copernicus by Dr Smith, in his *Essays on Philosophical Subjects*.

" The confusion (says Dr Smith) in which the old hypothesis represented the heavenly bodies, was, as Corpernicus himself tells us, what first suggested to him the design of forming a new system, that these, the noblest works of nature, might no longer appear devoid of that harmony and proportion which discover themselves in her meanest productions. What most of all dissatisfied him was, the notion of the equalizing circle, which, by representing the revolutions of the celestial spheres as equable only when surveyed from a point that was different from their centres, introduced a real inequality into their motions; contrary to that most natural, and indeed fundamental idea, with which all the authors of astronomical systems, Plato, Eudoxus, Aristotle, even Hipparchus and Ptolemy themselves, had hitherto set out, that the real motions of such beautiful and divine objects must necessarily be perfectly regular, and go on in a manner as agreeable to the imagination as the objects themselves are to the senses. He began to consider, therefore, whether, by supposing the heavenly bodies to be arranged in a different order from that in which Aristotle and Hipparchus had placed them, this so much sought for uniformity might not be bestowed upon their motions. To discover this arrangement he examined all the obscure traditions delivered down to us, concerning every other hypothesis which the ancients had invented for the same purpose. He found, in Plutarch, that some Pythagoreans had represented the earth as revolving in the centre of the universe, like a wheel round its own axis; and that others, of the same sect had removed it from the centre, and represented it as revolving in the ecliptic like a star round the central fire. By this central fire he supposed they meant the sun; and though in this he was very widely mistaken, it was, it seems, upon this interpretation that he began to consider how such an hypothesis might be made to correspond to the appearances. The supposed authority of those old philosophers, if it did not originally suggest to him his system, seems at least to have confirmed him in an opinion which, it is not improbable, he had beforehand other reasons for embracing, notwithstanding what he himself would affirm to the contrary.

" It then occurred to him, that if the earth was supposed to revolve every day round its axis, from west to east, all the heavenly bodies would appear to revolve, in a contrary direction, from east to west. The diurnal revolution of the heavens, upon this hypothesis, might be only apparent; the firmament, which has no other sensible motion, might be perfectly at rest; while the sun, the moon, and the five planets, might have no other movement beside that eastward revolution which is peculiar to themselves. That, by supposing the earth to revolve with the planets round the sun, in an orbit, which comprehended within it the orbits of Venus and Mercury, but was comprehended within those of Mars, Jupiter, and Saturn, he could, without the embarrassment of epicycles, connect together the apparent annual revolutions of the sun, and the direct, retrograde, and stationary appearances of the planets; that while the earth really revolved round the sun on one side of the heavens, the sun would appear to revolve round the earth on the other; that while she really advanced in her annual course, he would appear to advance eastward in that movement which is peculiar to himself. That, by supposing the axis of the earth to be always parallel to itself, not to be quite perpendicular, but somewhat inclined to the plane of her orbit, and consequently to present to the sun the one pole when on the one side of him, and the other when on the other, he would account for the obliquity of the ecliptic; the sun's seemingly alternate progression from north to south, and from south to north; the consequent change of the seasons, and different lengths of days and nights in the different seasons.

" If this new hypothesis thus connected together all these appearances as happily as that of Ptolemy, there were others which it connected together much better. The three superior planets, when nearly in conjunction with the sun, appear always at the greatest distance from the earth; are smallest, and least sensible to the eye; and seem to revolve forward in their direct motion with the greatest rapidity. On the contrary, when in opposition to the sun, that is, when in their meridian about midnight,

midnight, they appear neareſt the earth, are largeſt, and moſt ſenſible to the eye, and ſeem to revolve backwards in their retrograde motion. To explain theſe appearances, the ſyſtem of Ptolemy ſuppoſed each of theſe planets to be at the upper part of their ſeveral epicycles in the one caſe, and at the lower in the other. But it afforded no ſatisfactory principle of connection, which could lead the mind eaſily to conceive how the epicycles of thoſe planets, whoſe ſpheres were ſo diſtant from the ſphere of the ſun, ſhould thus, if one may ſay ſo, keep time to his motion. The ſyſtem of Copernicus afforded this eaſily; and like a more ſimple machine, without the aſſiſtance of epicycles, connected together, by fewer movements, the complex appearances of the heavens. When the ſuperior planets appear nearly in conjunction with the ſun, they are then in the ſide of their orbits, which is almoſt oppoſite to, and moſt diſtant from, the earth, and therefore appear ſmalleſt and leaſt ſenſible to the eye. But as they then revolve in a direction which is almoſt contrary to that of the earth, they appear to advance forward with double velocity; as a ſhip that ſails in a contrary direction to another, appears from that other to ſail both with its own velocity and the velocity of that from which it is ſeen. On the contrary, when thoſe planets are in oppoſition to the ſun, they are on the ſame ſide of the ſun with the earth, are neareſt it, moſt ſenſible to the eye, and revolve in the ſame direction with it; but as their revolutions round the ſun are ſlower than that of the earth, they are neceſſarily left behind by it, and therefore ſeem to revolve backwards; as a ſhip which ſails ſlower than another, though it ſails in the ſame direction, appears from that other to ſail backwards. After the ſame manner, by the ſame annual revolution of the earth, he connected together the direct and retrograde motions of the two inferior planets, as well as the ſtationary appearances of all the five.

"Thus far did this new account of things render the appearances of the heavens more completely coherent than had been done by any of the former ſyſtems. It did this, too, by a more ſimple and intelligible, as well as more beautiful machinery. It repreſented the ſun, the great enlightener of the univerſe, whoſe body was alone larger than all the planets taken together, as eſtabliſhed immoveable in the centre, ſhedding light and heat on all the worlds that circulated around him in one uniform direction, but in longer or ſhorter periods according to their different diſtances. It took away the diurnal revolution of the firmament, whoſe rapidity, upon the old hypotheſis, was beyond what even thought could conceive. It not only delivered the imagination from the embarraſſment of epicycles, but from the difficulty of conceiving theſe two oppoſite motions going on at the ſame time, which the ſyſtem of Ptolemy and Ariſtotle beſtowed upon all the planets; I mean, their diurnal weſtward, and periodical eaſtward revolutions. The earth's revolution round its own axis took away the neceſſity for ſuppoſing the firſt, and the ſecond was eaſily conceived when by itſelf. The five planets, which ſeem, upon all other ſyſtems, to be objects of a ſpecies by themſelves, unlike to every thing to which the imagination has been accuſtomed, when ſuppoſed to revolve along with the earth round the ſun, were naturally apprehended to be objects of the ſame kind with the earth, habitable, opaque, and enlightened only by the rays of the ſun. And thus this hypotheſis, by claſſing them in the ſame ſpecies of things, with an object that is of all others the moſt familiar to us, took off that wonder and uncertainty which the ſtrangeneſs and ſingularity of their appearance had excited; and thus far, too, better anſwered the great end of philoſophy.

"Neither did the beauty and ſimplicity of this ſyſtem alone recommend it to the imagination; the novelty and unexpectedneſs of that view of nature which it opened to the fancy, excited more wonder and ſurpriſe than the ſtrangeſt of thoſe appearances, which it had been invented to render natural and familiar, and theſe ſentiments ſtill more endeared it. For though it is the end of philoſophy to allay that wonder which either the unuſual or ſeemingly disjointed appearances of nature excite, yet ſhe never triumphs ſo much as when, in order to connect together a few, in themſelves perhaps inconſiderable objects, ſhe has, if I may ſay ſo, created another conſtitution of things, more natural indeed, and ſuch as the imagination can more eaſily attend to, but more new, more contrary to common opinion and expectation, than any of thoſe appearances themſelves. As in the inſtance before us, in order to connect together ſome ſeeming irregularities in the motions of the planets, the moſt inconſiderable objects in the heavens, and of which the greater part of mankind have no occaſion to take any notice during the whole courſe of their lives, ſhe has, to talk in the hyperbolical language of Tycho Brahe, moved the earth from its foundations, ſtopt the revolution of the firmament, made the ſun ſtand ſtill, and ſubverted the whole order of the univerſe.

"Such were the advantages of this new hypotheſis, as they appeared to its author when he firſt invented it. But though that love of paradox, ſo natural to the learned, and that pleaſure which they are ſo apt to take in exciting, by the novelty of their ſuppoſed diſcoveries, the amazement of mankind, may, notwithſtanding what one of his diſciples tells us to the contrary, have had its weight in prompting Copernicus to adopt this ſyſtem; yet when he had completed his Treatiſe of Revolutions, and began coolly to conſider what a ſtrange doctrine he was about to offer to the world, he ſo much dreaded the prejudice of mankind againſt it, that, by a ſpecies of continence of all others the moſt difficult to a philoſopher, he detained it in his cloſet for thirty years together. At laſt, in the extremity of old age, he allowed it to be extorted from him, but died as ſoon as it was printed, and before it was publiſhed."

Copernicus, the name of an aſtronomical inſtrument, invented by Mr Whiſton, to exhibit the motion and phenomena of the planets, both primary and ſecondary. It is built upon the Copernican ſyſtem, and for that reaſon called by his name.

COPHTI, Cophts, or Copti, a name given to the Chriſtians of Egypt, who are of the ſect of Jacobites.

The critics are extremely divided about the origin and orthography of the word; ſome write it Cophti, others Cophtites, Cophtitæ, Copts, &c. Scaliger derives the name from Coptos, an anciently celebrated town of Egypt, the metropolis of the Thebaid. Kircher refutes this opinion, and maintains, that the word originally ſignifies "cut" and "circumſcribed;" and

was given these people by the Mahometans, by way of reproach, because of their practice of circumcising: but P. Sollier, another Jesuit, refutes this opinion. Scaliger afterwards changed his opinion, and derived the word from Αιγυπτος, the ancient name of Egypt, by retrenching the first syllable: but this opinion, too, P. Sollier disputes. John de Leo and others say, that the Egyptians anciently called their country *Elchibth*, or *Cibth*, from Cibth their first king, whence Cophtite, &c. others say from Cobtim second king of Egypt. Vansleb derives the word Copht from Copt, son of Misraim, grandson of Noah. All these etymologies P. Sollier rejects, on this principle, that were they true, the Egyptians ought all equally to be called *Cophti;* whereas, in effect, none but the Christians, and among those none but the Jacobites, bear the name, the Melchites not being comprehended under it. Hence he chooses to derive the word from the name *Jacobite*, retrenching the first syllable; whence Cobite, Cobea, Copta, and Cophta.

The Cophts have a patriarch who resides at Cairo, but he takes his title from Alexandria: he has no archbishop under him, but 11 or 12 bishops. The rest of the clergy, whether secular or regular, is composed of the orders of St Anthony, St Paul, and St Macarius, who have each their monasteries. Besides the orders of priests, deacons, and subdeacons, the Cophts have likewise archimandrites, the dignity whereof they confer with all the prayers and ceremonies of a strict ordination. This makes a considerable difference among the priests; and besides the rank and authority it gives them with regard to the religious, it comprehends the degree and functions of archpriests. By a custom of 600 years standing, if a priest elected bishop be not already archimandrite, that dignity must be conferred on him before episcopal ordination. The second person among the clergy, after the patriarch, is the titular patriarch of Jerusalem, who also resides at Cairo, because of the few Cophts at Jerusalem; he is, in effect, little more than the bishop of Cairo: only he goes to Jerusalem every Easter, and visits some other places in Palestine near Egypt, which own his jurisdiction. To him belongs the government of the Cophtic church, during the vacancy of the patriarchal see.

To be elected patriarch, it is necessary the person have lived all his life in continence; it is he confers the bishoprics. To be elected bishop, the person must be in the celibate; or, if he has been married, it must not be above once. The priests and inferior ministers are allowed to be married before ordination; but are not obliged to it, as Ludolphus erroneously observes. They have a great number of deacons, and even confer the dignity frequently on children. None but the lowest rank among the people commence ecclesiastics; whence arises that excessive ignorance found among them; yet the respect of the laity towards the clergy is very extraordinary. Their office is longer than the Roman office, and never changes in any thing: they have three liturgies, which they vary occasionally.

The monastic life is in great esteem among the Cophts: to be admitted into it, there is always required the consent of the bishop. The religious Cophts make a vow of perpetual chastity; renounce the world, and live with great austerity in deserts: they are obliged to sleep in their clothes and their girdle, on a mat stretched on the ground; and to prostrate themselves every evening 150 times, with their face and breast on the ground. They are all both men and women, of the lowest class of the people; and live on alms. The nunneries are properly hospitals; and few enter but widows reduced to beggary.

F. Roderic reduces the errors and opinions of the Cophts to the following heads: 1. That they put away their wives, and espouse others while the first are living. 2. That they have seven sacraments, viz. baptism, the eucharist, confirmation, ordination, faith, fasting, and prayer. 3. That they deny the Holy Spirit to proceed from the Son. 4. That they only allow of three œcumenical councils; those of Nice, Constantinople, and Ephesus. 5. That they only allow of one nature, will, and operation, in Jesus Christ, after the union of the humanity with the divinity. For their errors in discipline, they may be reduced, 1. To the practice of circumcising their children before baptism, which has obtained among them from the 12th century. 2. To their ordaining deacons at five years of age. 3. To their allowing of marriage in the second degree. 4. To their forbearing to eat blood; to which some add their belief of a baptism by fire, which they confer by applying a hot iron to their forehead or cheeks. —Others palliate these errors, and show that many of them are rather abuses of particular persons than doctrines of the sect. This seems to be the case with regard to their polygamy, eating of blood, marrying in the second degree, and the baptism of fire; for circumcision, it is not practised as a ceremony of religion, nor as of any divine appointment, but merely as a custom, which they derive from the Ishmaelites; and which, perhaps, may have had its origin from a view to health and decency in those hot countries.

The Cophts, at different times, have made several reunions with the Latins; but always in appearance only, and under some necessity of their affairs. In the time of Pope Paul IV. a Syrian was dispatched to Rome from the patriarch of Alexandria, with letters to that pope; wherein he acknowledged his authority, and promised obedience; desiring a person might be dispatched to Alexandria; to treat about a reunion of his church to that of Rome; pursuant to which, Pius IV. successor to Paul, chose F. Roderic, a Jesuit, whom he dispatched in 1561, in quality of apostolical nuncio. But the Jesuit, upon a conference with two Cophts deputed for that purpose by the patriarch, was made to know, that the titles of father of fathers, pastor of pastors, and master of all churches, which the patriarch had bestowed on the pope in his letters, were no more than mere matters of civility and compliment; and that it was in this manner the patriarch used to write to his friends: they added, that since the council of Chalcedon, and the establishment of several patriarchs independent of one another, each was chief and master of his own church. This was the answer the patriarch gave the pope, after he had received a sum of money remitted to him from Rome, by the hands of the Venetian consul.

COPHTIC, or COPTIC, the language of the Cophts, the ancient language of the Egyptians, mixed with a

a great deal of Greek, the characters it is written in being all Greek. It has a form and construction peculiar to itself: it has no inflections of the nouns or verbs; but expresses number, case, gender, person, mood, tense, and possessive pronouns, by letters and particles prefixed.

F. Kircher is the first who published a grammar and vocabulary of the Cophtic. There is not known any book extant in the Cophtic, except translations of the Holy Scriptures, or of ecclesiastical offices; or others that have relation thereto, as dictionaries, &c.

The ancient Cophtic is now no longer found but in books; the language now used throughout the country is Arabic. The old Cophtic, which Kircher maintains to be a mother-tongue, and independent of all others, had been much altered by the Greeks: for besides that it has borrowed all its characters from the Greek, with a very little variation, a great number of the words are pure Greek. Vossius, indeed, asserts, that there was no Cophtic language till after Egypt became subject to the Arabs. The language, according to him, is a mixture of Greek and Arabic: the very name thereof not being in the world till after the Arabs were masters of the country. But this, M. Simon observes, proves nothing; except that what was anciently called *Egyptian*, has since by the Arabs been called *Cophtic*, by a corruption of speech. There are, it is true, Arabic words in the Cophtic; yet this by no means proves but that there was a language before that time, either Cophtic or Egyptian. Pietro de la Valle observes, that the Cophts have entirely lost their ancient tongue; that it is now no longer understood among them; that they have nothing extant therein but some sacred books; and that they still say mass in it.

All their other books have been translated into Arabic, which is their vulgar tongue; and this has occasioned the originals to be lost: it is added, that they rehearse the epistles and gospels in the mass twice; once in Arabic and once in Cophtic. Indeed, if we believe F. Vansleb, the Cophts say the mass in Arabic, all but the epistles and gospels, which they rehearse both in that and Cophtic.

COPHTIC *Bible*. See BIBLE.

COPHTIC *Liturgies* are three; one attributed to Basil, another to St Gregory, and the third to Cyril: they are translated into Arabic for the use of the priests and people.

COPIATA, under the western empire, a grave-digger. In the first ages of the church there were clerks destined for this employment. In the year 357 Constantine made a law in favour of the priests copiatæ, i. e. of those who had the care of interments; whereby he exempts them from the lustral contribution which all other traders paid. It was under him also that they first began to be called *copiatæ*, q. d. clerks destined for bodily labour, from *κοπος*, or *κοπω scindo, cedo, ferio*, "I cut, beat," &c. Before that time they were called *decani* and *lecticarii*; perhaps because they were divided by decades or tens, each whereof had a bier or litter for the carriage of the dead bodies. Their place among the clerks was the next in order before the chantors.

COPING *of a wall*, the top or cover of a wall, made sloping to carry off the water.

COPING *over*, in *Carpentry*, a sort of hanging over, not square to its upright, but bevelling on its under side till it end in an edge.

COPIST, in diplomatic science, signifies a transcriber or copier of deeds, books, &c.

COPPA, in *Law*, a cop or cock of grass, hay, or corn, divided into titheable portions; as the tenth cock, &c. This word in strictness denotes the gathering or laying up the corn in cops or heaps, as the method is for barley or oats, &c. not bound up, that it may be the more fairly and justly tithed: and in Kent they still retain the word, a *cop* or *cap* of hay, straw, &c.

COPPEL. See CUPEL.

COPPER, one of the metals, called by the alchemists *Venus*, on account of its facility of uniting with a great number of different metallic substances. Its colour, when pure, is pale red, and its specific gravity from 8.7 to 9.3, which depends not only on its degree of purity, but also on its condensation by hammering. See CHEMISTRY *Index*.

COPPERAS, a name given to the factitious sulphate of iron. See CHEMISTRY *Index*.

COPPERPLATE. See ENGRAVING.

COPPICE, or COPSE, a little wood, consisting of under-woods, or such as may be raised either by sowing or planting.

COPTOS, in *Ancient Geography*, a famous trading town of the Thebais, inhabited by Egyptians and Arabs, some distance from the Nile; others place it in a small island in the Nile, on which, however, it had a port. Here Isis, on hearing of the death of Osiris, cut one of her locks, and put on mourning; and hence the name *Coptos*, signifying privation. A proof this of the antiquity of the place. And for this reason the Isiaci, or priests of Isis, were bald, according to Juvenal.

COPULATION, the act of generation, or the congress of the male and female, otherwise called *coition*. See GENERATION.

COPY, in a law sense, a transcript of a writing or instrument, made for the use and satisfaction of some of the parties concerned, or in order to preserve the memory thereof.

COPY is also used for an imitation of any original work; particularly a painting, draught, figure, &c.

COPY, among printers, denotes the manuscript or original of a book given to print from.

Copy-Hold, a tenure for which a tenant has nothing to show but the copy of the rolls made by the steward of the lord's court.

It is called a base tenure; because the tenant holds the land at the will of the lord. However, it is not simply at the will of the lord, but according to the custom of the manor by which such estate is descendible, and the tenant's heirs may inherit it; and a copy-holder, so long as he does his services, and does not break the custom, cannot be ejected by the lord; and if he be, he shall have trespass against him. See the articles TENURE and VILLENAGE.

Copy-Holder, one who is admitted tenant of lands or tenements within a manor, which time out of mind, by use and custom of the manor, have been demisable, and demised to such as will take them in fee-simple, or fee-tail, for life, years, or at will, according to the custom

custom of the manor by copy of court-roll; but is generally where the tenant has such estate either in fee or for three lives.

Copy-Right, the right which an author may be supposed to have in his own original literary compositions; so that no other person, without his leave, may publish or make profit of the copies. When a man by the exertion of his rational powers has produced an original work, he has clearly a right to dispose of that identical work as he pleases; and any attempt to take it from him, or vary the disposition he has made of it, is an invasion of his right of property. Now the identity of a literary composition consists entirely in the sentiment and the language; the same conceptions clothed in the same words, must necessarily be the same composition: and whatever method be taken of conveying that composition to the ear, or to the eye of another, by recital, by writing, or by printing, in any number of copies, or at any period of time, it is always the identical work of the author which is so conveyed; and no other man (it hath been thought) can have a right to convey or transfer it without his consent, either tacitly or expressly given. This consent may perhaps be tacitly given when an author permits his work to be published without any reserve of right, and without stamping on it any marks of ownership; it is then a present to the public, like the building of a church, or the laying out a new highway: but in case of a bargain for a single impression, or a total sale or gift of the copy-right; in the one case the reversion hath been thought to continue in the original proprietor; in the other the whole property, with its exclusive rights, to be perpetually transferred to the grantee. On the other hand, it is urged, that though the exclusive right of the manuscript, and all which it contains, belongs undoubtedly to the owner before it is printed or published; yet from the instant of publication, the exclusive right of an author or his assigns to the sole communication of his ideas immediately vanishes and evaporates; as being a right of too subtile and unsubstantial a nature to become the subject of property at the common law, and only capable of being guarded by positive statute and special provisions of the magistrate.

The Roman law adjudged, that if one man wrote any thing, though ever so elegantly, on the paper or parchment of another, the writing should belong to the original owner of the materials on which it was written: meaning certainly nothing more thereby than the mere mechanical operation of writing, for which it directed the scribe to receive a satisfaction: especially as, in works of genius and invention, such as a picture painted on another man's canvas, the same law gave the canvas to the painter. We find no other mention in the law of any property in the works of the understanding, though the sale of literary copies, for the purposes of recital or multiplication, is certainly as ancient as the times of Terence, Martial, and Statius. Neither with us in Britain hath there been (till very lately) any final determination upon the right of authors at the common law. It was determined in the case of *Miller* v. *Taylor*, in *B. R. Pasch.* 9 Geo. III. 1760, that an exclusive copy-right in authors subsisted by the common law. But afterwards, in the case of *Donaldson*, v. *Becket*, before the house of lords, which was finally determined 22d February 1774, it was held, that no copy-right subsists in authors, after the expiration of the several terms created by the statute 8 Ann. c. 19. This statute declares, that the author and his assigns shall have the whole liberty of printing and reprinting his works for the term of 14 years, and no longer; and also protects that property by additional penalties and forfeitures; directing farther, that, if at the end of that term, the author himself be living, the right shall then return to him for another term of the same duration.

COQUES, Gonzalo, an esteemed painter of portraits and conversations, was born at Antwerp in 1618, and was a disciple of the old David Ryckaert; under whose direction he applied himself diligently to cultivate those promising talents which he possessed; not only by practising the best rules administered to him by his instructor, but also by studying nature with singular attention. He was a great admirer of Vandyck; and fixing on the manner of that great artist as his model, had the happiness of so far succeeding, that next to him he was esteemed equal to any other painter of his time. In the school of Ryckaert he had been accustomed to paint conversations, and he frequently composed subjects of fancy like Teniers, Ostade, and his master; and by that habit he introduced a very agreeable style of portrait-painting, in a kind of historical conversation, which seemed much more acceptable to persons of taste than the general manner of painting portraits, and procured him great reputation and riches. In that way he composed several fine pictures for King Charles I. and likewise several for the archduke Leopold, and the prince of Orange; which latter prince, as a mark of respect, presented Coques with a rich gold chain, and a gold medal, on which the bust of that prince was impressed. He died in 1684. He had an excellent pencil; his portraits were well designed, with easy natural attitudes; he disposed the figures in his composition so as to avoid confusion or embarrassment: he gave an extraordinary clearness of colour to his heads and hands; and his touch was free, firm, and broad, a circumstance very uncommon in works of a small size.

COQUIMBO, a port town of Chili, in South America, situated at the mouth of a river of the same name, which discharges itself into the Pacific ocean. W. Long. 75. 10. N. Lat. 30. 8.

COR caroli, in *Astronomy*, an extra-constellated star in the northern hemisphere, situated between the *Coma Berenicis* and *Ursa major*, so called by Dr Halley in honour of King Charles.

Cor-Hydræ, a fixed star of the first magnitude, in the constellation of Hydra.

Cor-Leonis, in *Astronomy*, a fixed star of the first magnitude in the constellation Leo.

Cor-Meille, a noted plant, common in the highlands of Scotland. Its roots dried are the support of the highlanders in long journeys, amidst the barren hills destitute of the supports of life; and a small quantity, like the alimentary powders, will for a long time repel the attacks of hunger. Infused in liquor it is an agreeable beverage, and, like the nepenthe of the Greeks, exhilarates the mind. From the similitude of

of ſound in the name, it ſeems to be the ſame with chara, the root diſcovered by the ſoldiers of Cæſar at Dyrrhachium, which ſteeped in milk was ſuch a relief to the famiſhed army. Or we may reaſonably believe it to have been the Caledonian food deſcribed by Dio, of which the quantity of a bean would prevent both hunger and thirſt; and this, ſays the hiſtorian, they have ready for all occaſions.

CORACIAS, the ROLLER, a genus of birds of the order of picæ. See ORNITHOLOGY *Index*.

CORACO-BRACHIALIS, in *Anatomy*, the name of a muſcle in the arm, ſerving to raiſe it upwards.

CORACOIDES, in *Anatomy*, a ſmall ſhort proceſs of the ſcapula. See ANATOMY *Index*.

CORACOMANTES, in antiquity, perſons who foretold events from their obſervations on crows.

CORALLINA, or CORAL, in *Zoology*, a genus belonging to the order of vermes zoophyta. See HELMINTHOLOGY *Index*.

CORAL FISHERY. Red coral is found in the Mediterranean, on the ſhores of Provence, from Cape de la Couronne to that of St Tropez; about the iſles of Majorca and Minorca; on the ſouth of Sicily; on the coaſts of Africa; and laſtly, in the Ethiopic ocean, about Cape Negro.

CORAL-Stone, a name for a kind of red and white agate which breaks in veins, and is found in Italy and ſome parts of Saxony. That of Rochlitz in Saxony is the moſt celebrated, and is found in globules which have a kind of cruſt about them.

CORALLINES, a genus belonging to the vermes zoophyta. See HELMINTHOLOGY *Index*.

CORALLODENDRON. See ERYTHRINA, BOTANY *Index*.

CORALLOIDES (FRUTICES). See ESCHARA and KERATOPHYTA.

CORAM, CAPTAIN THOMAS, a gentleman remarkably diſtinguiſhed by his humanity, was born about the year 1668, and ſpent the early part of his life in the ſtation of maſter of a veſſel trading to our colonies. Afterwards reſiding in the eaſtern part of the metropolis, among ſea-faring people, where buſineſs often obliged him to come early into the city, and return late, he frequently ſaw young children expoſed in the ſtreets through the indigence or cruelty of their parents. This excited his compaſſion and induced him to project the foundation of an hoſpital for foundlings. In this humane deſign he laboured with indefatigable diligence for ſeventeen years; and by his application procured a number of the nobility and gentry to patronize and carry the ſcheme into execution, and at length obtained the royal charter for it. He was alſo highly inſtrumental in promoting the trade of America, by procuring a bounty upon naval ſtores imported from our colonies. He was likewiſe eminently concerned in ſetting on foot the colonies of Georgia and Nova Scotia. His laſt charitable deſign, in which he lived to make ſome progreſs, was a ſcheme for uniting the North American Indians more cloſely to the Britiſh intereſt, by an eſtabliſhment for the education of Indian girls. In ſhort, he ſpent the greateſt part of life in labouring for the public, and experienced a fate too common in thoſe who devote their talents to ſuch laudable purpoſes; being at laſt indebted for ſubſiſtence to the voluntary ſubſcriptions of ſome public-ſpirited perſons, at the head of whom was the late Frederic prince of Wales. Captain Coram died in 1751; and was interred, at his own deſire, in a vault under the chapel of the Foundling Hoſpital.

CORAN, or ALCORAN. See ALCORAN.

CORAX, the trivial name of a ſpecies of CORVUS. See ORNITHOLOGY *Index*.

CORANICH, among the Scotch and Iriſh, the cuſtom of ſinging at funerals, anciently prevalent in thoſe countries, and ſtill practiſed in ſeveral parts. Of this cuſtom Mr Pennant gives the following account. "I had not the fortune to be preſent at any in North Britain; but formerly aſſiſted at one in the ſouth of Ireland, where it was performed in the fulneſs of horror. The cries are called by the Iriſh the *ulogohne* and *hullulu*; two words very expreſſive of the ſound uttered on theſe occaſions; and being of Celtic ſtock, etymologiſts would ſwear to be the origin of the ολολυγων of the Greeks and *ululatus* of the Latins. Virgil is very fond of uſing the laſt whenever any of his females are diſtreſſed; as are others of the Roman poets, and generally on occaſions ſimilar to this. It was my fortune to arrive at a certain town in Kerry at the time that a perſon of ſome diſtinction departed this life; my curioſity led me to the houſe, where the funeral ſeemed conducted in the pureſt claſſical form.

Quodcunque aſpiceret luctus, gemituſque ſonabant,
Formaque non taciti funeris intus erat.

In ſhort, the *conclamatio* was ſet up by the friends in the ſame manner as Virgil deſcribes that conſequential of Dido's death;

Lamentis, gemituque, et fœmineo ululatu
Tecta fremunt.

Immediately after this followed another ceremony, fully deſcribed by Camden in his account of the manners of the ancient Iriſh; the earneſt expoſtulations and reproaches given to the deceaſed for quitting this world, were ſhe enjoyed ſo many bleſſings, ſo good a huſband, and ſuch fine children. This cuſtom is alſo of great antiquity, for Euryalus's mother makes the ſame addreſs to her dead ſon.

——Tunc illa ſenectæ
Sera meæ requies? potuiſti reliquere ſolam,
Crudelis?

But when the time approached for carrying out the corpſe, the cry was redoubled,

Tremulis ululatibus æthera complent;

a numerous band of females waiting in the outer court to attend the hearſe, and to pay in chorus the laſt tribute of their voices. The habit of this ſorrowing train, and the neglect of their perſons, were admirably ſuited to the occaſion; their robes were black and flowing, reſembling the ancient palla; their feet naked, their hair long and diſhevelled: I might truly ſay,

Ut qui conducti plorant in funera, dicunt,
Et faciunt prope plura dolentibus exanimo.

The corpſe was carried ſlowly along the verge of a moſt beautiful lake, the ululatus was continued, and the

the whole proceffion ended among the venerable ruins of an old abbey."

CORBAN, in Jewifh antiquity, were thofe offerings which had life, in oppofition to the *minchah*, or thofe which had not. It is derived from the word *karab*, which fignifies "to approach;" becaufe the victims were brought to the door of the tabernacle. The corban were always looked upon as the moft facred offerings. The Jews are reproached with defeating, by means of the corban, the precept of the fifth commandment, which enjoins the refpect due to parents. For when a child had no mind to relieve the wants of his father or mother, he would fay to them, "It is a gift (*corban*) by whatfoever thou mighteft be profited by me;" i. e. "I have devoted that to God which you afk of me, and it is no longer mine to give."

CORBAN is alfo a ceremony which the Mahometans perform at the foot of Mount Arrafat in Arabia, near Mecca. It confifts in killing a great number of fheep, and diftributing them among the poor.

CORBEILS, in *Fortification*, little bafkets about a foot and a half high, eight inches wide at the bottom and twelve at the top; which being filled with earth, are frequently fet one againft another upon the parapet or elfewhere, leaving certain port holes, from whence to fire upon the enemy under covert without being feen by them.

CORBEL, in *Architecture*, the reprefentation of a bafket, fometimes feen on the heads of caryatides. The word is alfo ufed for the vafe, or tambour, of the Corinthian column; fo called from its refemblance to a bafket, or becaufe it was firft formed on the model of a bafket.

CORBEL, or *Corbil*, is alfo ufed, in building, for a fhort piece of timber placed in a wall, with its end fticking out fix or eight inches, as occafion ferves, in manner of a fhouldering-piece. The under part of the end thus fticking out is fometimes cut into the form of a boultin; fometimes of an ogee, and fometimes of a face, &c. according to the workman's fancy; the upper fide being plain and flat.

CORBEL is alfo ufed by fome architects for a niche or hollow left in walls for images, figures, or ftatues to ftand in.

CORBET, RICHARD, bifhop of Norwich, and an eminent poet, was born at Ewell in Surrey, toward the latter end of the 16th century; and educated at Oxford, where he was efteemed one of the moft celebrated wits of the univerfity. Entering into holy orders, he became a popular preacher, and was made chaplain to King James I.: when, after feveral preferments in the church, he was, in 1629, made bifhop of Oxford; and, in 1632, was tranflated to the fee of Norwich. He was very hofpitable, and always a generous encourager of public defigns. He died in 1635. There have been feveral editions of his poems publifhed under the title of *Poemata Stromata*.

CORBEY, a town of Picardy in France, with a famous abbey of Benedictine monks. It is feated on the river Somme, 10 miles eaft of Amiens, and 75 north of Paris. E. Long. 2. 35. N. Lat. 49. 55.

CORCELET, in *Entomology*, is that part of the body of an infect which is analogous in its fituation to the breaft in other animals. Many have called it the breaft in thefe alfo, but improperly; becaufe the breaft of other animals is the place of the lungs and trachea, but thefe organs are in the fly clafs diftributed through the whole body.

CORCHORUS, a genus of plants belonging to the polyandria clafs; and in the natural method ranking under the 37th order, *Columneæ*. See BOTANY *Index*.

CORCULUM, a diminutive from *cor* "the heart," little heart; the effence of a feed, and principle of life of the future plant, attached to and contained within the lobes. It confifts of two parts, termed by Linnæus PLUMULA and ROSTELLUM. The former is the *radicula* of Grew and other naturalifts. The corculum is in fact the embryo of the future vegetable; and is attached by two trunks of veffels to the lobes at their union. The firft of its two parts mounts upward, and becomes the trunk. The other ftrikes into the ground, and is the rudiment of the root. The lobes and heart of the feed are diftinctly vifible in the bean, and other feeds of that clafs, efpecially after remaining fome time in water or earth.

The principle of life is feated either at the fummit or bafe of the feed. From this circumftance are conftructed the two firft claffes in Cæfalpinus's method, containing trees and fhrubs only.

CORCYRA, in *Ancient Geography*, an ifland in the Ionian fea, oppofite to Thefprotia a diftrict of Epirus, called *Scheria* and *Phæacia* by Homer. In Callimachus it is called *Drepane;* its moft ancient name, according to the Scholiaft, from the curvity of its figure. Famous for the fhipwreck of Ulyffes and the gardens of Alcinous. Now *Corfu*.

CORCYRA, a cognominal town of the ifland; formerly powerful, and capable of coping with mighty ftates; fituated about the middle of the eaft fide of the ifland, called *The Town of the Phæacians* by Homer. Now *Corfu*, from the Κορυφω of the middle age, the name of the citadel. It was a colony of the Corinthians. *Corcyræi*, the people. E. Long. 19. 48. Lat. 39. 50.

CORCYRA *Nigra*, an ifland in the Adriatic, on the coaft of Dalmatia (Pliny); called *Melæna* by the Greeks, to diftinguifh it from the ifland in the Ionian fea. The epithet *Nigra* was added, from its woods of tall trees with which it is almoft covered. Now *Curzola*.

CORD, or CHORD, an affemblage of feveral threads of hemp, cabled or twifted together by means of a wheel. See CORDAGE. The word comes from the Greek χορδη, which properly fignifies an inteftine or gut, of which cords may be made. See CHORD.

Magical CORD, an inftrument in great ufe among the Laplanders, and by them fuppofed to be endued with a number of virtues. It is a cord or rope with three knots tied in it. They ufe many magical rites and ceremonies in the tying of this cord; and, when thus prepared, it is fuppofed to have power over the winds; and they will fell, by means of it, a good wind, or at leaft the promife of one, to a fhip. If they untie only one of thefe knots, a moderate gale fucceeds; if two, it is much ftronger: and if three, a ftorm is fure to follow.

CORD *of Wood*, a certain quantity of wood for burning,

ing, so called because formerly measured with a cord. The dimensions of a statute cord of wood are eight feet long, four feet high, and four feet broad.

CORD-*Wood*, is new wood, and such as, when brought by water, comes on board a vessel, in opposition to that which is floated.

CORDAGE, a term used in general, for all sorts of cord, whether small, middling, or great. See ROPE.

The naval cordage of the earlier ages was in all probability only thongs of leather. These primitive ropes were retained by the Caledonians in the third century. The nations to the north of the Baltic had them in the ninth or tenth centuries: and the inhabitants of the western isles of Scotland make use of them at present; cutting the skin of a seal, or the raw and salted hide of a cow, into long pieces, and fastening the plough to their horses with them, or even twisting them into strong ropes of 20 or 30 fathoms length. But these, in the south of our island, and on the continent, were early superseded by the use of iron chains. The very maritime and commercial nation of the Veneti, that were so ultimately connected with the Belgæ of Britain, used iron chains for their cables in the days of Cæsar. But in the more distant and refined countries of the south, both thongs and these had long given place to the use of vegetable threads and the arts of combining them into strength. In this manner the Greeks appear to have used the common rushes of their country, and the Carthaginians the spartum or broom of Spain. And as all the cordage of the Romans was made of these materials at their last descent on our island, so the art of manufacturing them would be necessarily introduced with the Roman settlements among the Britons. Under the direction of Roman artists their thongs of leather would naturally be laid aside, and the junci, or rushes of the plains, worked up into cordage. And what remarkably coincides with this opinion is, that the remains of old cables and ropes are still distinguished among the British sailors by the name of *old junk*.

The nations of Roman Britain, and the tribes of Caledonia and Ireland, had inherited, from their earliest ancestors, many of the ruder arts of navigation. Their ships were large open boats, framed of light timbers ribbed with hurdles and lined with hides. These were furnished with masts and sails. The latter were formed of hides, as the tackle was of thongs. They were actually of hides among the Veneti, as late as the days of Cæsar; and they were never furled but only bound to the mast. But these slight sea-boats, and their rude furniture, would soon be dismissed by the provincials for the more substantial vessels and more artificial sails of the Romans. The Roman sails, which were composed of flax in the days of Agricola, were afterwards made of hemp; and our own are therefore denominated *cannabis* or *canvas* by our mariners at present. And about the same period assuredly did the junk of the British cordage give way to the same materials; the use of hempen ropes upon land, and of hempen nets for hunting, being very common among the Romans in the first century.

CORDATED, an appellation frequently given by naturalists to things somewhat resembling a heart.

CORDED, in *Heraldry*. A cross corded, some authors take for a cross wound or wrenched about with cords: others, with more probability, take it for a cross made of two pieces of wood.

CORDELERAS, mountains of South America, otherwise called ANDES.

CORDELIER, a Franciscan, or religious of the order of St Francis. The Cordeliers are clothed in thick gray cloth, with a little cowl, a chaperon, and cloak of the same; having a girdle of rope or cord tied with three knots; whence the name.—They are otherwise called *Minor Friars*, their original name. The denomination *Cordelier* is said to have been first given them in the war of St Louis against the infidels; wherein the Friars Minor having repulsed the barbarians, and that king having inquired their name, it was answered, they were people *cordeliez*, "tied with ropes." The Cordeliers are to a man professed Scotists.

CORDEMOI, GERALDE, a learned philosopher and historian, born at Paris, made himself known to M. Bossuet, who placed him about the dauphin in the quality of reader. He instructed that young prince with great assiduity; and in 1675 was received into the French academy. He wrote a general history of France during the first races of the French kings, in two vols; and six discourses on the distinction between Body and Soul, which were printed together in 1702 in quarto. He died in 1684. M. Cordemoi followed the principles of Descartes.

CORDIA, a genus of plants belonging to the pentandria class, and in the natural method ranking under the 41st order, *Asperifoliæ*. See BOTANY *Index*.

CORDIAL, in *Medicine*, whatever raises the spirits, and gives them a sudden strength and cheerfulness; as wine, spirits, the effluvia of flowers, fruit, and many other substances.

CORDON, in *Fortification*, a row of stones, made round on the outside, and set between the wall of the fortress which lies aslope, and the parapet which stands perpendicular, after such a manner, that this difference may not be offensive to the eye; whence the cordons serve only as an ornament, ranging round about the place, being only used in fortifications of stone-work: for in those made with earth the void space is filled up with pointed stakes.

CORDUBA, in *Ancient Geography*, an illustrious city of Bætica, on the right or north side of the Bætis. Built by Marcellus, according to Strabo; but which Marcellus is not so clear. It was the first colony sent into those parts by the Romans; and surnamed *Patricia*, because at first inhabited by principal men, both of the Romans and natives. It is mentioned by Sil. Italicus in the second Punic war; and hence it is probable the first Marcellus was the founder, and not the Marcellus engaged in the civil war between Cæsar and Pompey. It was famous for the birth of the two Senecas and of Lucan (Martial), and for its rich produce in oil (Statius, Martial). Still retaining its name a little altered. W. Long. 5. Lat. 37. 45.

CORDOUA, or CORDOVA, a city of Andalusia in Spain, situated on the river Guadalquiver, in a very extensive plain. The circumference is large, but it is not peopled in proportion to its extent, for there are

Cordoua.

a great many orchards and gardens within the walls. There are many ſuperb ſtructures, palaces, churches, and religious houſes; particularly the cathedral, which is very magnificent: It was formerly a moſque when the Moors poſſeſſed the town; for which reaſon it ſtill retains the name of *Mezquita*, which has the ſame meaning. The cathedral is very rich in plate; four of the ſilver candleſticks coſt 850l. a-piece. The revenue of the ſee amounts to 3500l. per annum; but as the biſhops cannot deviſe by will, all they die poſſeſſed of eſcheats to the crown. The ſquare called the *Plaza Major* is ſurrounded with very fine houſes, under which are piazzas. The trade is flouriſhing on account of the river; and conſiſts of wine, ſilk, and Cordovan leather. In the neighbourhood of this place are a vaſt number of orange and lemon trees, which renders their fruits exceeding cheap. The beſt horſes in Spain come from hence.

Cordova was the ancient *Corduba* mentioned in the preceding article. After the fall of the Roman empire, it was ſubjected to the dominion of the Goths; but in the eighth century it was raiſed by the Mooriſh princes to a ſtate of ſplendor unequalled in any other part of the world. In the year 755, Abdoulrahman, only heir-male of the Ommiad line, having paſſed over from Africa at the head of a few deſperate followers, found means to raiſe a rebellion in Spain; when, after a battle fought on the banks of the Guadalquiver, in which he overthrew the lieutenant of the Abaſſid caliph of Damaſcus, he became king of all the Mooriſh poſſeſſions in the ſouth of Spain, and in 759 fixed his royal reſidence at Cordova. Then began thoſe flouriſhing ages of Arabian gallantry and magnificence which rendered the Moors of Spain ſuperior to all their cotemporaries in arts and arms, and made Cordova one of the moſt ſplendid cities of the world. Agriculture and commerce proſpered under the happy ſway of this hero; and the face of the country was changed from a ſcene of deſolation, which the long wars and harſh government of the viceroys had brought on, into a moſt populous flouriſhing ſtate, exceeding in riches, number of inhabitants, activity, and induſtry, any prior or ſubſequent era of the Spaniſh hiſtory. He added new fortifications to the town, built himſelf a magnificent palace with delicious gardens, laid cauſeways through the marſhes, made excellent roads to open ready communication between the great towns, and in 786 began the great moſque, which he did not live to finiſh.

During the courſe of two centuries, this court continued to be the reſort of all profeſſors of the polite arts, and of ſuch as valued themſelves upon their military and knightly accompliſhments; while the reſt of Europe was buried in ignorance, debaſed by brutality of manners, or diſtracted by ſuperſtitious diſputes. England, weakened by its heptarchy, was too inconſiderable even to be mentioned in the political hiſtory of the times. France, though it had a gleam of reputation under Charlemagne, was ſtill a barbarous unpoliſhed nation; and Italy was in utter confuſion; the frequent revolutions and change of maſters rendering it impoſſible for learning, or any thing good, to acquire a permanent footing in ſo unſtable a ſoil: Greece, though ſtill in poſſeſſion of the arts and luxury of ancient Rome, had loſt all vigour, and ſeemed abſorbed in the moſt futile of all purſuits, viz. that of ſcholaſtic argument and religious ſubtilities.

The reſidence of the Ommiad caliphs was long conſpicuous for its ſupreme magnificence, and the crowds of learned men who were allured to it by the protection offered by its ſovereigns, the beauty of the country, the wholeſomeneſs of the climate, and the variety of pleaſures that returned inceſſantly in one enchanting round.

Cordova became the centre of politeneſs, induſtry, and genius. Tilts and tournaments, with other coſtly ſhows, were long the darling paſtimes of a wealthy happy people; and this was the only kingdom in the weſt where geometry, aſtronomy, and phyſic, were regularly ſtudied and practiſed. Muſic was no leſs honoured; for we find, that in 844 a famous muſician called *Ali Zeriab* came to ſettle at Cordova, and formed ſeveral pupils, who were ſuppoſed to equal the moſt celebrated performers that were ever known even in the Eaſt. That architecture was greatly encouraged, we need no other proof than the great and expenſive fabrics undertaken and completed by many of theſe Spaniſh monarchs. Whatever faults may be juſtly condemned in their manner by the connoiſſeur, accuſtomed to the chaſte noble graces of the Grecian proportions, certainly nobody can behold what remains of theſe Mooriſh edifices, without being ſtrongly impreſſed with a high idea of the genius of the artiſts, as well as the grandeur of the prince who carried their plans into execution.

The ſultans not only gave the moſt diſtinguiſhed protection to arts and ſciences, and to the perſons learned in any of them, but were themſelves eminently verſed in various branches of knowledge. Alkahem II. collected ſo immenſe a quantity of manuſcripts that before the end of his reign the royal library contained no leſs than 600,000 volumes, of which the very catalogue filled 40 huge folios. The univerſity of Cordova was founded by him, and under ſuch favourable auſpices roſe to the higheſt pitch of celebrity.

Abdoulrahman was ſucceeded by his ſon Hiſſem, whoſe paſſion for glory and architecture was not in the leaſt inferior to that of his father. He put the finiſhing hand to the moſque, which the plunder of the ſouthern provinces of France enabled him to complete in the courſe of a few years. The bridge over the Guadalquiver was a work of Hiſſem's after his own plan.

Alkahem ſucceeded Hiſſem.

Abdoulrahman II. was alſo paſſionately fond of building. He was the firſt that brought the ſupplies of water to Cordova by means of leaden pipes laid upon aqueducts of ſtone. The quantity was ſo conſiderable, that every part of the palace, the moſques, baths, ſquares, and public edifices, had all of them their fountains conſtantly playing. A great many of theſe works ſtill ſubſiſt. He paved the whole city, and erected ſeveral moſques.

After him reigned Mahomet Almundar, Abdallah, and Abdoulrahman III. who ſurpaſſed all his predeceſſors in ſplendor, riches, and expence. His ſubjects vied with each other in profuſion and magnificence. This monarch was ſucceeded by his ſon Alkahem II. who left a minor to ſucceed him, and the kingdom to be governed by the famous viſir Mahomet Abenamir, ſurnamed

Cordoua || Corea.

named *Almanzor*, or "the defender," from his great victories and wise conduct. His descendants inherited from him the visirship, and a power as absolute as if they had been caliphs, until the weakness of the sovereigns encouraged, and the insolence of the ministers provoked, the grandees to disturb the state with their jealousies and dissensions. These broils occasioned such a series of civil war and anarchy, as overthrew the throne of Cordova, and destroyed the whole race of Abdoulrahman. Thus the glorious edifice, founded by the valour and prudence of that conqueror, and cemented by similar virtues in many of his successors, sunk into nothing as soon as the sceptre devolved upon weak enervated princes, whose indolence and incapacity transferred the management of every thing to a visir. Many petty kingdoms sprung up out of the ruins of this mighty empire; and the Christians soon found opportunities of destroying, by separate attacks, that tremendous power, which when united had proved an overmatch for their utmost force.

New Cordoua, a considerable town of South America, in the province of Tucuman, with a bishop's see, 175 miles from St Jago. W. Long. 62. 5. S. Lat. 32. 10.

CORDOUAN, a famous pharos or light-house of France, in Guienne, at the mouth of the river Girond. The architecture is extremely fine; and it is placed there to hinder vessels from running on the sand-banks at the mouth of the river. W. Long. 1. 9. N. Lat. 45. 36.

CORDUS, Valerius, a learned botanist, was the son of Ericius Cordus, a physician and poet of Germany. Having learned the languages, he applied himself to the study of botany, in the prosecution of which he examined the mountains of Germany, and travelled into Italy; but being wounded in the leg by the kick of a horse, died at Rome in 1554. He wrote Remarks on Dioscorides, and other works.

CORDWAINERS, or Cordiners, the term whereby the statutes denominate *shoemakers*. The word is formed from the French *cordonnier*, which Menage derives from *corduan*, a kind of leather brought from Cordoua, whereof they formerly made the upper leathers of their shoes. Others derive it from *corde*, "rope," because anciently shoes were made of cords; as they still are in some parts of Spain, under the name of *alpargates*. But the former etymology is better warranted; for, in effect, the French workmen who prepare the corduas are still called *cordouanniers*.

In Paris they have two pious societies under the title of *freres cordonniers*, "brothers shoemakers," established by authority towards the middle of the 17th century; the one under the protection of St Crispin *, the other of St Crispianus, two saints who had formerly honoured the profession. They live in community, and under fixed statutes and officers; by which they are directed both in their spiritual and secular concerns. The produce of their shoes goes into a common stock, to furnish necessaries for their support; the rest to be distributed among the poor.

* See *Crispin*.

COREA, a peninsula lying to the north-east of China, between 99 and 109 degrees of E. Long. and between 32 and 46 of N. Lat. It is divided into 8 provinces, which contain 40 cities of the 1st rank, 51 of the 2d, and 70 of the 3d. The capital of the whole is Han-ching, where the king resides. The Jesuits say, the people are well made, of a sweet and tractable disposition, and fond of learning, music, and dancing, and in general resemble the Chinese. The houses are mean, being covered with thatch; and they have no beds, but lie on the floor. They have little silk, and therefore make use of linen cloth in its room. Their trade consists in white paper, pencils, ginseng, gold, silver, iron, yellow varnish, fowls whose tails are three feet long, horses no more than three feet in height, sable skins, castor, and mineral salt. In general it is a fertile country, though abounding in mountains. It is tributary to China.

M. Grosier relates an observation concerning the natural history of Corea, which, in his opinion, furnishes a new proof of the revolutions which the surface of our globe has undergone. An ancient Chinese book asserts, that the city where Kipe, the king of Corea, established his court, was built in a place which forms at present a part of the territories of *Yong-ping-fou*, a city of the first class in the province of Petcheli. "If this (says he) be admitted as a fact, we may from thence conclude, that these territories formerly belonged to Corea; and that the gulf of Lea-tong, which at present separates this kingdom from the province of Petcheli, did not then exist, and that it has been formed since; for it is not probable that the sovereign would have fixed his residence without the boundaries of his kingdom, or in a place where he was separated from it by a wide and extensive sea. This conjecture is confirmed by certain facts admitted by the Chinese. Thus when *Yu*, surnamed the *Great*, undertook to drain and carry off the waters which had inundated the low grounds of several provinces, he began by the river Hoang-ho, the overflowing of which caused the greatest devastation. He went in search of its source to the bosom of Tartary, from whence he directed its course across the provinces of Chan-si, Chen-si, Honan, and Petcheli. Towards its mouth, in order to weaken the rapidity of its waters, he divided them into nine channels, through which he caused the river discharge itself into the eastern sea near the mountain of *Kie-che-chan*, which then formed a promontory. Since that time to the present, that is, about 3950 years, the river Hoang-ho has departed so much from its ancient course, that its mouth at present is about six degrees farther south. We must also remark, that the mountain Kie-che-chan, which was formerly united to the main land of Yong-ping-fou, stands at present in the sea at the distance of about 50 leagues to the south of that city. If the sea has been able to cover with its waters that extent of territory which at present forms part of the gulf of Lea-tong, may we not be allowed to suppose that like inundations may have formed successively the whole of that gulf, the ancient existence of which seems so ill to agree with the residence of the kings of Corea in the territory of Yong-ping-fou? It is true, the Chinese history makes no mention of so considerable a physical revolution: but it is equally silent with regard to the 500 *lys* (50 leagues) extent of ground which is at present covered by the sea beyond the mountains of Kie-che-chan. Besides, of all the changes which the surface of our globe experiences, those only are

are mentioned in hiſtory, which happen ſuddenly, and which conſequently make more impreſſion on the minds of men.

Corea chiefly produces wheat, rice, and ginſeng, with a kind of palm tree which yields a gum capable of producing a yellow varniſh little inferior to gilding. Hence alſo are exported caſtor and ſable ſkins; alſo gold, ſilver, iron, and foſſil ſalt; a kind of ſmall bruſhes for painting, made of the hair of a wolf's tail, are likewiſe manufactured here, which are exported to China and highly eſteemed there. The ſea coaſts abound in fiſh, and great numbers of whales are found there every year towards the north-eaſt. Several of theſe, it is ſaid, have in their bodies the harpoons of the French and Dutch, from whom they have eſcaped in the northern extremities of Europe; which ſeems to indicate a paſſage from the European into the Aſiatic ſeas round the continents of Europe and Aſia.

A conſiderable quantity of the paper of Corea is annually imported into China; indeed the tribute due to the emperor is partly paid with it every year. It is made of cotton, and is as ſtrong as cloth, being written upon with a ſmall hair-bruſh or pencil; but muſt be done over with alum-water before it can be written upon in the European manner. It is not purchaſed by the Chineſe for writing, but for filling up the ſquares of their ſaſh-windows; becauſe, when oiled, it reſiſts the wind and rain better than that of China. It is uſed likewiſe as wrapping paper; and is serviceable to the tailors, who rub it between their hands until it becomes as ſoft and flexible as the fineſt cotton cloth, inſtead of which it is often employed in lining clothes. It has alſo this ſingular property, that if it be too thick for the purpoſe intended, it may be eaſily ſplit into two or three leaves, each of which is even ſtronger than the beſt paper of China.

The Coreans are well made, ingenious, brave, and tractable; are fond of dancing, and ſhow great docility in acquiring the ſciences, to which they apply with great ardour, and which they honour in a particular manner. The northern Coreans are larger ſized and more robuſt than thoſe of the ſouth; have a taſte for arms, and become excellent ſoldiers. Their arms are croſsbows and long ſabres. Men of learning are diſtinguiſhed from other claſſes of people by two plumes of feathers in their caps; and when merchants preſent the Coreans with any books for ſale, they dreſs themſelves in the richeſt attire, and burn perfumes before they treat concerning the price.

The Coreans mourn three years, as in China, for a father or mother: but the time of mourning for a brother is confined to three months. Their dead are not interred until three years after their deceaſe; and when the ceremony of interment is performed, they place around the tomb the clothes, chariot, and horſes of the deceaſed, with whatever elſe he ſhowed the greateſt fondneſs for while alive; all which they leave to be carried off by the aſſiſtants. Their houſes, as in China, conſiſt only of one ſtory, and are very ill built; in the country being compoſed of earth, and in cities generally of brick, but all thatched with ſtraw; the walls of their cities are conſtructed after the Chineſe manner, with ſquare turrets, battlements, and arched gates. Their writing, dreſs, religious ceremonies, and creed, as well as the greater part of their cuſtoms, are borrowed from the Chineſe. Their women, however, are leſs confined, and have the liberty of appearing in public with the other ſex, for which they are often ridiculed by their neighbours. They differ from the Chineſe alſo in their ceremonies of marriage, and in the manner of contracting it; the parties in this country taking the liberty to chooſe for themſelves, without conſulting the inclinations of their parents, or ſuffering them to throw any obſtacles in their way.

COREIA, in antiquity, a feſtival in honour of Proſerpine, named *Core*, Κορη, which, in the Moloſſian dialect ſignifies a beautiful woman.

CORELLI, ARCANGELO, the famous Italian muſician and compoſer, a native of Fuſignano, in the territory of Bologna, was born in 1653. He entertained an early propenſity to the violin; and as he advanced in years, laboured inceſſantly in the practice of that inſtrument. About the year 1672, his curioſity led him to viſit Paris, probably with a view to attend the improvements which were making in muſic under the influence of Cardinal Mazarin, and in conſequence of the eſtabliſhment of a royal academy; but notwithſtanding the character which he brought with him, he was driven back to Rome by Lully, whoſe jealous temper could not brook ſo formidable a rival as this illuſtrious Italian. In the year 1680 he viſited Germany, and met with a reception ſuitable to his merit from moſt of the German princes, particularly the elector of Bavaria; in whoſe ſervice he was retained, and continued for ſome time. After about five years ſtay abroad, he returned again to Rome, and there purſued his ſtudies with great aſſiduity.

The proficiency of Corelli on his favourite inſtrument the violin was ſo great, that the fame of it ſpread throughout Europe. The ſtyle of his performance was learned, elegant, and pathetic; and his tone firm and even. Mr Geminiani, who was well acquainted with, and had ſtudied it, uſed to reſemble it to a ſweet trumpet. A perſon who had heard him perform ſays, that whilſt he was playing on the violin, it was uſual for his countenance to be diſturbed, his eyes to become as red as fire, and his eye-balls to roll as in agony.

Corelli was highly favoured by that great patron of poetry and muſic, Cardinal Ottoboni. Creſcembini ſays, that he regulated the muſical academy held at the palace of his eminence every Monday afternoon. Here it was that Mr Handel became acquainted with him; and in this academy a ſerenata of Mr Handel, entitled *Il Trionfo del Tempo*, was performed, the overture to which was in a ſtyle ſo new and ſingular, that Corelli was confounded in his firſt attempt to play it.

During the reſidence of Corelli at Rome, beſides thoſe of his own country, many perſons were ambitious of becoming his diſciples, and learning the practice of the violin from the greateſt maſter on that inſtrument the world had then heard of. Of theſe it is ſaid the late Lord Edgecumbe was one: and that the fine mezzotinto print of Corelli by Smith was ſcraped from a picture painted by Mr Hugh Howard at Rome for that nobleman.

Corelli died at Rome in 1713; and was buried in the church of the Rotunda, otherwiſe called the Pan-

theon, in the firſt chapel on the left hand of the entrance. Over the place of his interment is a ſepulchral monument to his honour, with a marble buſt thereon, erected at the expence of Philip William, count palatine of the Rhine, under the care and direction of Cardinal Ottoboni.

For many years after his deceaſe, this excellent muſician was commemorated by a ſolemn muſical performance in the Pantheon, on the anniverſary of his death. In the year 1730 an eminent maſter, now living, was preſent at that ſolemnity, who relates that at it the third and eighth of his concertos were performed by a numerous band, among whom were many who had been the pupils of the author. He adds, that theſe two pieces were performed in a ſlow, diſtinct, and firm manner, without graces, and juſt as they are wrote; and from hence concludes, that this was the manner in which they were played by the author himſelf.

He died poſſeſſed of about 6000l. ſterling. He was a paſſionate admirer of pictures, and lived in an uninterrupted friendſhip with Carlo Cignani and Carlo Marat: theſe two eminent painters were rivals for his favour; and for a ſeries of years preſented him at times with pictures, as well of other maſters as of their own painting. The conſequence was, that Corelli became poſſeſſed of a large and valuable collection of original paintings; all which, together with the ſum abovementioned, he bequeathed to his dear friend and patron Cardinal Ottoboni, who, reſerving the pictures to himſelf, generouſly diſtributed the reſt of his effects among the relations of the teſtator.

Corelli is ſaid to have been remarkable for the mildneſs of his temper and the modeſty of his deportment; nevertheleſs, he was not inſenſible of the reſpect due to his ſkill and exquiſite performance. Cibber, in the Apology for his Life, p. 340. relates, that when he was playing a ſolo at Cardinal Ottoboni's, he diſcovered the cardinal and another perſon engaged in diſcourſe, upon which he laid down his inſtrument; and being aſked the reaſon, gave for anſwer, that he feared the muſic interrupted their converſation.

The compoſitions of Corelli are celebrated for the harmony reſulting from the union of all the parts; but the fineneſs of the airs is another diſtinguiſhing characteriſtic of them: the allemand in the 10th ſolo is as remarkable for ſpirit and force, as that in the 11th is for its enchanting delicacy; his jigs are in a ſtyle peculiarly his own: and that in the 5th ſolo was never equalled. In the gavot movements in the 2d and 4th operas, the melody is diſtributed with great judgment among the ſeveral parts. In his minuets alone he ſeems to fail; Bononcini, Mr Handel, and Guiſeppe Martini, have excelled him in this kind of airs.

It is ſaid there is in every nation a ſtyle both in ſpeaking and writing, which never becomes obſolete; a certain mode of phraſeology, ſo conſonant and congenial to the analogy and principles of its reſpective language, as to remain ſettled and unaltered. This, but with much greater latitude, may be ſaid of muſic; and accordingly it may be obſerved of the compoſitions of Corelli, not only that they are equally intelligible to the learned and unlearned, but that the impreſſions made by them have been found to be as durable as general. His muſic is the language of nature; and, for a ſeries of years, all that heard it became ſenſible of its effects: of this there cannot be a ſtronger proof than that, amidſt all the innovations which the love of change had introduced, it continued to be performed, and was heard with delight, in churches, in theatres, at public ſolemnities and feſtivities, in all the cities of Europe, for near 40 years. Men remembered, and would refer to paſſages in it as to a claſſic author; and even at this day, the maſters of the ſcience do not heſitate to pronounce of the compoſitions of Corelli, that, of fine harmony and elegant modulation, they are the moſt perfect exemplars.

COREOPSIS, Tickseeded Sunflower; a genus of plants belonging to the ſyngeneſia claſs; and in the natural method ranking under the 49th order, *Compoſitæ*. See Botany *Index*.

CORFE castle, a borough-town in Dorſetſhire in England, which takes its name from a ſtrong caſtle, belonging to the crown, that ſtood there, but which is now in ruins. It ſends two members to parliament. W. Long. 2. 8. N. Lat. 50. 33.

CORFU, an iſland in the Ionian ſea, at the mouth of the gulf of Venice, formerly called *Corcyra* and *Phæacia*, famous for the gardens of Alcinous. It belongs at preſent to the Venetians; and forms the bulwark of Chriſtendom againſt the Turks, who have often attempted to reduce it, but without ſucceſs. It is well fortified, and has 50 caſtles; and the number of the inhabitants is ſaid to be about 50,000. The inhabitants are of the Greek church; and the Venetians ſend them a governor and magiſtrates, which are changed every two years. The ſoil is very fruitful, and produces a great deal of wine, olives, and ſeveral other fruits, particularly figs, which are exceedingly good. The chief city is likewiſe called *Corfu*: ſee the following article.

Corfu, a city of the iſland of that name, belonging to the Venetians. It is a large place, ſtrongly fortified, and defended by a garriſon of about 10,000 men; which, however, in the opinión of a late traveller, do not appear adequate to the extent of the fortifications. A number of very excellent braſs and iron cannon are mounted on the different forts, which, he obſerves, are ſo divided, that it would take treble the number of their garriſon to defend them. However, the republic of Venice is generally at peace with the different European nations, and the ancient power of the Turks being much decayed, they have little to apprehend; though to prevent any ſudden ſurpriſe, the Venetians keep a formidable ſquadron in the harbour of Corfu, and the works have been much improved by Major-General Paterſon.—In the late war they had with the Turks, this town was attacked by an army of 80,000 men, and attempted to be ſtormed ſeveral times by the enemy; but the garriſon, which conſiſted of 12,000 men, under the command of Count Schulenburg, made ſo brave and gallant a defence, that they always repulſed them, and obliged them to raiſe the ſiege, and abandon the place with conſiderable loſs. For this piece of ſervice the republic has cauſed a magnificent ſtatue to be erected in memory of the count, with an elegant Latin inſcription, ſetting forth the many eminent ſervices of his military atchievements. The circumference of the city is about four miles; the number of

inhabitants

inhabitants on the whole iſland is computed at about 50,000, the greateſt part of whom are Greeks.

This iſland is the reſidence of the governor-general, whoſe juriſdiction extends over all the iſlands ſubject to the republic of Venice, in the Levant ſeas, and is conſidered as one of the greateſt honours they can confer on a ſubject. He is always a nobleman of the firſt rank, and has his appointment for three years only, in which time he makes a tolerable addition to his fortune, and on his return to Venice is generally advanced to the honours of the ſenate. In the city are many handſome Greek churches, the principal of which is that of St Speridione, or the cathedral. It is embelliſhed with ſome excellent paintings, and moſt ſuperbly ornamented. The body of the ſaint from whom it was named, is preſerved entire in a rich ſhrine within the church. The Greeks are moſt of them ſuch fanatics as to be continually offering their devotions at this ſhrine, believing that through the interceſſion of the ſaint they will obtain all their wants; and that by offerings of money their ſins will be forgiven them; by which means the church has amaſſed an immenſe treaſure. The relic of the ſaint is depoſited in a ſilver coffin, richly decorated with precious ſtones. It is in an amazing ſtate of preſervation: he having died in the iſland of Cyprus upwards of 700 years ago; and after remaining 400 years there, was tranſported to this place.—Beſides the grand fleet, the Venetians have another of galleys, that are manned by convicts whoſe crimes are not of ſuch a nature as to merit death. The chief diverſions of this place in the winter are operas; they have always a company of comedians for the ſeaſon from Naples. In the ſummer they paſs their time in walking upon the ramparts; few except the governor and great officers of ſtate are permitted to keep carriages. The Corfu people perfectly reſemble the Zanteots in their manners (ſee ZANTE); though it muſt be obſerved, in praiſe of the former, that aſſaſſinations are uncommon among them, their laws being too ſevere to permit ſuch practices with impunity. E. Long. 19. 48. N. Lat. 39. 50.

CORIA, a town of Spain, in the kingdom of Leon and province of Eſtremadura, towards the confines of Portugal, with a biſhop's ſee. It is ſeated on a little river called *Alagon*, in a very fertile plain. There is nothing remarkable but the cathedral church, except at a little diſtance a river without a bridge, and a bridge without a river. This was cauſed by an earthquake, which turned the river another way. W. Long. 6. 46. N. Lat. 39. 59.

CORIANDRUM, CORIANDER; a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 45th order, *Umbellatæ*. See BOTANY *Index*.

CORIARIA, *Tanners* or *Myrtle-leafed* SUMACH; a genus of plants belonging to the diœcia claſs; and in the natural method ranking under the 54th order, *Miſcellaneæ*. See BOTANY *Index*. This plant is much uſed in the ſouth of France, where it grows naturally, for tanning of leather, whence its name of *tanner's ſumach*. It alſo dyes a beautiful black colour.

CORIDOR, or CORRIDOR, in *Fortification*, a road or way along the edge of the ditch, without-ſide; encompaſſing the whole fortification. The word comes from the Italian *coridore*, or the Spaniſh *coridor*. It is alſo called the *covert-way*, becauſe covered with a glacis, or eſplanade, ſerving it as a parapet.—The coridor is about 20 yards broad.

CORIDOR is alſo uſed in architecture for a gallery or long aiſle around a building, leading to ſeveral chambers at a diſtance from each other, ſometimes wholly incloſed, and ſometimes open on one ſide.

CORINNA, a Grecian lady, celebrated for her beauty and poetic talents, was born at Theſſu, a city of Bœotia, and was the diſciple of Myrtis another Grecian lady. Her verſes were ſo eſteemed by the Greeks, that they gave her the name of the *lyric muſe*. She lived in the time of Pindar, about 495 years before Chriſt; and is ſaid to have gained the prize of lyric poetry from that poet; but Pauſanias obſerves that her beauty made the judges partial.

CORINTH, a celebrated city of antiquity, for ſome time the moſt illuſtrious of all the Greek cities. It is ſaid to have been founded 1514 years before Chriſt, by Siſyphus the ſon of Molus, and grandfather of Ulyſſes. Various reaſons are given for its name, but moſt authors derive it from *Corinthus* the ſon of Pelops. It was ſituated on the ſouth part of the iſthmus which joins the Peloponneſus, now the Morea, to the continent. It conſiſted of a citadel built upon an eminence, and thence named *Acrocorinthus*; beſides which it had two maritime towns ſubject to it, named *Lechæum* and *Cenchreæ*. The whole ſtate extended ſcarce half a degree in length or breadth; but ſo advantageouſly were the above-mentioned ports ſituated, that they might have gained the Corinthians a ſuperiority, if not a command, over all Greece, had not their advantageous ſituation inclined them to commerce rather than war. For their citadel was almoſt impregnable; and commanding both the Ionian and Ægean ſeas, they could eaſily cut off all communication from one half of Greece with the other; for which reaſon this city was called one of the fetters of Greece.

But as the genius of the Corinthians led them to commerce rather than martial exploits, their city became the fineſt in all Greece. It was adorned with the moſt ſumptuous buildings, as temples, palaces, theatres, porticoes, &c. all of them enriched with a beautiful kind of columns, which from the city were called *Corinthian*. But though the Corinthians ſeldom or never engaged in a war with a view of enlarging but rather of defending their little ſtate, they did not forget to cultivate a good diſcipline both in time of peace and of war. Hence many brave and experienced generals have been furniſhed by Corinth to the other Grecian cities, and it was not uncommon for the latter to prefer a Corinthian general to any of their own.

This city continued to preſerve its liberty till the year before Chriſt 146, when it was pillaged and burnt by the Romans. It was at that time the ſtrongeſt place in the world: but the inhabitants were ſo diſheartened by a preceding defeat, and the death of their general, that they had not preſence of mind enough even to ſhut their gates. The Roman conſul Mummius, was ſo much ſurpriſed at this, that at firſt he could ſcarce believe it; but afterwards fearing an ambuſcade, he advanced with all poſſible caution. As he met with no reſiſtance, his ſoldiers had nothing to do but de-

ſtroy

ftroy the few inhabitants that had not fled, and plunder the city. Such of the men as had ftaid were all put to the fword, and the women were fold for flaves. After this the city was ranfacked by the greedy foldiers, and the fpoils of it are faid to have been immenfe. There were more veffels of all forts of metal, more fine pictures and ftatues done by the greateft mafters, in Corinth, than in any other city in the world. All the princes of Europe and Afia who had any tafte in painting and fculpture furnifhed themfelves here with the richeft moveables: here were caft the fineft ftatues for temples and palaces, and all the liberal arts brought to their greateft perfection. Many ineftimable pieces of the moft famous painters and ftatuaries fell into the hands of the ignorant foldiers, who either deftroyed them, or parted with them for a trifle. Polybius the hiftorian was an eye witnefs to this barbarifm of the Romans. He had the mortification to fee two of them playing at dice on a famous picture of Ariftides, which was accounted one of the wonders of the world. The piece was a Bacchus, fo exquifitely done, that it was proverbially faid of any extraordinary performance, "It is as well done as the *Bacchus of Ariftides*." This mafterly piece of painting, however, the foldiers willingly exchanged for a more convenient table to play upon. But when the fpoils of Corinth were put up to fale, Attalus king of Pergamus offering for it 600,000 fefterces, near 5000l. of our money, Mummius was furprifed at fuch a high price offered for a picture, and imagined there muft be fome magical virtue in it. He therefore interpofed his authority, and carried it to Rome, notwithftanding the complaints of Attalus. Here this famous picture was lodged in the temple of Ceres, where it was at laft deftroyed by fire, together with the temple. Another extraordinary inftance of the ftupidity of Mummius is, that when the pictures were put on board the tranfports, he told the mafters of the veffels very ferioufly, that if any of the things were either loft or fpoiled, he would oblige them to find others at their own coft; as if any other pieces could have fupplied the lofs of thofe ineftimable originals, done by the greateft mafters in Greece. When the city was thoroughly pillaged, fire was fet to all the corners of it at the fame time. The flames grew more violent as they drew near the centre, and at laft uniting there made one prodigious conflagration. At this time the famous metalline mixture is faid to have been made, which could never afterwards be imitated by art. The gold, filver, and brafs, which the Corinthians had concealed, were melted, and ran down the ftreets in ftreams, and when the flames were extinguifhed, a new metal was found, compofed of feveral different ones, and greatly efteemed in after ages.

The town lay defolate until Julius Cæfar fettled there a Roman colony; when, in moving the rubbifh and digging, many vafes were found of brafs or earth finely emboffed. The price given for thofe curiofities excited induftry in the new inhabitants. They left no burying-place unexamined; and Rome, it is faid, was filled with the furniture of the fepulchres of Corinth.

Strabo was at Corinth foon after its reftoration by the Romans. He defcribes the fite as follows. "A lofty mountain, in perpendicular height as much as three ftadia and a half (near half a mile, the afcent 30 ftadia ($3\frac{1}{4}$ miles,) ends in a pointed fummit called *Acrocorinthus*. Of this the portion to the north is the moft fteep: beneath which lies the city on a level area at the foot of the Acrocorinthus. The circuit of the city alone has been 40 ftadia (5 miles), and as much of it as was unfheltered by the mountain has been walled about. Within the inclofure was comprehended alfo the Acrocorinthus, where the mountain was capable of receiving a wall; and as we afcended, the veftiges were plain; fo that the whole circumference exceeded 85 ftadia (near 11 miles). On the other fides, the mountain is lefs fteep, but rifes very high, and is vifible all around. Upon the fummit is a fmall temple of Venus; and below it the fpring Pirene, which does not overflow, but is always full of pellucid and potable water. They fay it unites with fome other hidden veins, and forms the fpring at the mountain foot, running into the city, and affording a fufficient fupply for the ufe of the inhabitants. In the city is plenty of wells, and in the Acrocorinthus, as they fay, for we did not fee any. There they relate the winged horfe Pegafus was taken as he was drinking, by Bellerophon. Below Pirene is the Sifypheum, fome temple or palace of white ftone, the remains not inconfiderable. From the fummit is beheld to the north Parnaffus and Helicon, lofty mountains covered with fnow; and below both, to the weft, the Criffean gulf bounded by Phocis, by Bœotia and the Megaris, and by Corinthia and Sicyonia oppofite to Phocis. Beyond all thefe are the mountains called the *Oneian*, ftretching as far as Bœotia and Cithæron from the Scironian rocks on the road to Attica." Strabo faw likewife Cleon from thence. Cenchreæ was then a village. Lechæum had fome inhabitants.

New Corinth had flourifhed 217 years when it was vifited by Paufanias. It had then a few antiquities, many temples and ftatues, efpecially about the agora or market-place, and feveral baths. The emperor Hadrian introduced water from a famous fpring at Stymphalus in Arcadia; and it had various fountains alike copious and ornamental. The ftream of one iffued from a dolphin, on which was a brazen Neptune; of another, from the hoof of Pegafus, on whom Bellerophon was mounted. On the right hand, coming along the road leading from the market-place toward Sicyon, was the odeum and the theatre, by which was a temple of Minerva. The old gymnafium was at a diftance. Going from the market-place toward Lechæum was a gate on which were placed Phæton and the Sun in gilded chariots. Pirene entered a fountain of white marble, from which the current paffed in an open channel. They fuppofed the metal called *Corinthian brafs* to have been immerged while red hot in this water. On the way up to the Acrocorinthus were temples, ftatues, and altars; and the gate next Tenea, a village with a temple of Apollo, fixty ftadia, or feven miles and a half diftant, on the road to Mycenæ. At Lechæum was a temple and a brazen image of Neptune. At Cenchreæ were temples; and by the way from the city a grove of cyprefs trees, fepulchres, and monuments. Oppofite was *the Bath of Helen*, water tepid and falt, flowing plentifully from a rock into the fea. Mummius had ruined the

the theatre of Corinth, and the munificence of the great Athenian Atticus Herodes was displayed in an edifice with a roof inferior to few of the most celebrated structures in Greece.

The Roman colony was reserved to suffer the same calamity as the Greek city, and from a conqueror more terrible than Mummius, Alaric the savage destroyer of Athens and universal Greece. In a country harassed with frequent wars, as the Peloponnesus has since been, the Acrocorinthus was a post too consequential to be neglected. It was besieged and taken in 1456 by Mahomet II.: the despots or lords of the Morea, brothers of the Greek emperor who was killed in defending Constantinople, refusing payment of the arrears of the tribute, which had been imposed by Sultan Morat in 1447. The country became subject to the Turks, except such maritime places as were in the possession of the Venetians; and many of the principal inhabitants were carried away to Constantinople. Corinth, with the Morea, was yielded to the republic at the conclusion of the war in 1698, and again by it to the Turks in 1715.

Corinth retains its old name, and is of considerable extent, standing on a high ground, beneath the Acrocorinthus, with an easy descent toward the gulf of Lepanto; the houses scattered or in parcels, except in the bazar or market-place. Cypresses, among which tower the domes of mosques, with corn-fields, and gardens of lemon and orange trees, are interspersed. The air is reputed bad in summer, and in autumn exceedingly unhealthy. Wheler relates, that from the top of the Acrocorinthus or citadel, he enjoyed one of the most agreeable prospects which this world can afford. He guessed the walls to be about two miles in compass, inclosing mosques, with houses and churches mostly in ruins. An hour was consumed in going up on horseback. It was a mile to the foot of the hill; and from hence the way was very steep with many traverses. The families living below were much infested by corsairs, and on every alarm flocked up to the castle.

According to Dr Chandler, Corinth has preserved but few monuments of its Greek or Roman citizens. The chief remains, he informs us, are at the south-west corner of the town, and above the bazar or market; 11 columns supporting their architraves, of the Doric order, fluted, and wanting in height near half the common proportion to the diameter. Within them, towards the western end, is one taller, though not entire, which, it is likely, contributed to sustain the roof. They have been found to be stone, not marble; and appeared brown, perhaps from a crust formed on the outside. The ruin he judges to be of very remote antiquity, and a portion of a fabric erected not only before the Greek city was destroyed, but before the Doric order had attained to maturity. He suspects it to have been the Sisypheum mentioned by Strabo. North of the bazar stands a large mass of brickwork, a remnant, it may be conjectured, of a bath, or of the gymnasium.

The inhabitants are most of them Christians of the Greek church, who are allowed liberty of conscience by the Turks. E. Long. 28. 13. N. Lat. 38. 14.

Corinth, *the isthmus of*, in the Morea, is a neck of land which joins the Morea to Greece, and reaches from the gulf of Lepanto to that of Egina. Julius Cæsar, Caligula, and Nero, attempted to cut a channel through it, but in vain; and they therefore afterwards built a wall across it, which they called *Hexamilium*, because it was six miles in length. This was demolished by Amurath II. and afterwards rebuilt by the Venetians, but was levelled a second time by Mahomet II.

CORINTHIAN, in general, denotes something belonging to Corinth: thus we say, Corinthian brass, Corinthian order, &c.

Corinthian Brass. See Brass and Corinth.

Corinthian Order, in *Architecture*, the fourth order of architecture, according to Scamozzi; but M. Le Clerc makes it the fifth, being the most noble and delicate of all the five. See Architecture, N° 47.

CORIO, Bernardine, an historian, born of an illustrious family at Milan, in the year 1460. He was secretary of state to that duchy; and Lewis duke of Sforza appointed him to write the history of Milan. He died in 1500. The best edition of his history is that of 1503, in folio. It is printed in Italian, and is very scarce.

CORIOLANUS, C. Marcius, a famous Roman captain, took Corioli a town of the Volsci, whence he had his surname; at last, disgusting the people, he was banished Rome by the tribune Decius. He went to the Volsci, and persuading them to take up arms against the Romans, they encamped within four miles of the city. He would not listen to proposals of peace, till he was prevailed upon by his wife Veturia, and his mother Volumnia, who were followed by all the Roman ladies in tears. He was put to death by the Volsci as a traitor that had made them quit their conquest: upon which the Roman ladies went into mourning; and in the same place where his blood was spilled there was a temple consecrated to feminine virtue.

CORIS, a genus of plants belonging to the pentandria class. See Botany *Index*.

Coris is also used in the East Indies for a kind of shells which pass for money.

CORISPERMUM, Tickseed, a genus of plants belonging to the monandria class, and in the natural method ranking under the 12th order, *Holoraceæ*. See Botany *Index*.

CORITANI, in *Ancient Geography*, a people of Britain, occupying widely the inland parts, as Northampton, Leicester, Rutland, Lincoln, Nottingham, and Derbyshires, (Camden).

CORK, the bark of a tree of the same name, *Quercus Suber*, Lin. See Quercus, Botany *Index*.

To take off the bark, an incision is made from the top to the bottom of the tree, and at each extremity another round the tree, perpendicular to the first. When the tree is 15 years old, it may be barked for eight years successively; and the quality of the bark improves with the age of the tree. When stripped from the tree, which does not therefore die, the bark is piled up in a pond or ditch, and loaded with heavy stones to flatten it, and reduce it into tables: hence it is removed to be dried; and when sufficiently dry, put in bales for carriage. If care be not taken to strip the

bark, it ſplits and peels of itſelf; being puſhed up by another bark formed underneath.

The cork-tree, as well as the uſes to which the bark is applied, was known both to the Greeks and Romans. Pliny informs us that the Romans employed it to ſtop all kinds of veſſels; but the uſe of it for this purpoſe does not appear to have been very common till the invention of glaſs bottles, of which, according to Profeſſor Beckman, there is no mention before the 15th century.

Other vegetable productions have been ſometimes employed inſtead of cork. The *Spondias Lutea*, a tree which grows in South America, particularly in moiſt places, and which is there called *monbin* or *monbain*, is ſometimes brought to England for the purpoſe of ſtopping veſſels. The roots of liquorice are applied to the ſame uſe, and on that account, this plant is much cultivated in Sclavonia, and exported to other countries. A tree called *nyſſa*, which grows in North America, has been found alſo to anſwer as a ſubſtitute for cork.

The chief uſe of cork is, to put in ſhoes, ſlippers, &c. and to ſtop bottles. The Spaniards burn it to make that kind of light black called *Spaniſh black*, which is uſed by painters. The Egyptians made coffins of cork; which being lined with a reſinous compoſition, preſerved dead bodies uncorrupted. The Spaniards line ſtone walls with it, which not only renders them very warm, but corrects the moiſture of the air.

Foſſil-Cork, a name given to a kind of ſtone which is a ſpecies of amianthus, conſiſting of flexible fibres looſely interwoven, and ſomewhat reſembling vegetable cork. It is the lighteſt of all ſtones; by fire it is infuſible. It poſſeſſes the general qualities of amianthus. See *Mountain Cork*, MINERALOGY *Index*.

CORK, in Latin *comitatus Corcagienſis*, a county of the province of Munſter in Ireland. It is the moſt populous and conſiderable county of the kingdom, next to that of Dublin, containing near a million of acres, and being divided into 15 baronies. It is bounded on the north-eaſt by the county of Waterford; on the weſt by Kerry; by Limerick on the north; and by the ſea on the ſouth and ſouth-eaſt. Including Deſmond it is 85 miles in length and 50 in breadth; but is very unequal both ways. Though a conſiderable part of the country is foggy, mountainous and barren, yet by the induſtry of the inhabitants it is pretty well cultivated and improved, and contains ſeveral good towns and harbours.

CORK, a city of Ireland, and capital of the county of that name. It is an epiſcopal ſee, and is the largeſt and moſt populous of any in the kingdom, Dublin alone excepted. It is ſituated on the river Lee, 15 miles from its mouth. It is a place of great trade, the harbour here being one of the fineſt in the world. Though ſmaller veſſels can come up to the quay, yet the larger generally ride at a place called *Paſſage*. This city, together with its liberties, makes a county. It was built or rather fortified by the Danes, in the ninth century. The greateſt part of it ſtands on a marſhy iſland ſurrounded by the river Lee, which alſo runs through the city, and divides it into ſeveral canals. On this account ſome have thought the air very moiſt and unwholeſome. Complaints have alſo been made againſt the water as impure; but, from comparing the bills of mortality with thoſe of other cities, it appears that the city of Cork is far from being unhealthy. This hath been accounted for from the influx of the tide, by which a ſtagnation of air is prevented. The firſt charter of Cork was beſtowed by Henry III. and afterwards ratified by Edward I. Edward II. and Edward III. Edward IV. granted a new charter; and the city received many favours from the ſucceeding monarchs. King James I. gave the citizens a new and ample charter; and King Charles I. what is called the Great Charter, by which, among others, a clauſe in King James's charter was enforced, making this city a county of itſelf. The ſee of Cork is reputed worth 2700l. a-year. The chapter conſiſts of a dean, chanter, chancellor, treaſurer, archdeacon, and twelve prebendaries. The church is dedicated to St Barr or Finbarr; and the dioceſe is divided into five deaneries. There is very little to be found in ancient writers concerning the foundation of the cathedral of Cork; yet it is generally aſcribed to St Barr in the ſeventh century. Many of its biſhops have been great benefactors to it. Through length of time the church became quite ruinous; but it hath lately been completely rebuilt, and is now an elegant modern ſtructure. To defray the expence, the parliament laid a tax on all coals conſumed in the city of Cork. The deanery is reputed to be worth 400l. a-year.

Cork is much improved and enlarged; ſeveral broad ſtreets have been lately added, by filling up the canals that formerly ran through them, and are now built up with elegant houſes: the parade is very ſpacious, and is adorned with an equeſtrian ſtatue of King George II. It hath the largeſt export in the kingdom, particularly of beef, hides, tallow, butter, fiſh, and other proviſions. It is partly ſituated on ſeveral iſlands, formed by the river Lee, which are banked and quayed in, ſomewhat like the towns in Holland; and partly on riſing grounds, on the north and ſouth ſides of the river. The earl of Marlborough beſieged and took it from King James's army in 1690; when the duke of Grafton, who ſerved as a volunteer, was ſlain in the attack. It contains about 8600 houſes, and upwards of 70,000 inhabitants. It hath twelve companies of foot quartered in the barracks. Beſides a ſtately cathedral, built from the foundation, between 1725 and 1735, by the produce of a duty upon coals, as above noticed, it is adorned with ſeveral handſome pariſh churches. It has alſo an elegant exchange for the merchants, a new and beautiful cuſtomhouſe, a town-hall, ſeveral fine hoſpitals, and various other public ſtructures. The city poſſeſſes an annual revenue of about 1300l. out of which the mayor enjoys for his ſalary and the ſupport of his dignity 500l. The wealth and grandeur of Cork ariſe from its capacious and commodious haven, where almoſt any number of ſhips may lie with eaſe and ſafety. According to ſome accounts, when there has been no war, 1200 veſſels have reſorted hither in a year. Ships from England, bound to all parts of the Weſt Indies, take in here a great part of their proviſions; and on the ſame account the haven of Cork is viſited by thoſe alſo of moſt other nations. The ſlaughtering ſeaſon continues from the month of Auguſt to the latter end of January; in which ſpace it has been computed, that they

they kill and cure seldom fewer than 100,000 head of black cattle. The rest of their exports consist of butter, candles, hides raw and tanned, linen cloth, pork, calves, lambs, and rabbit skins, tallow, wool for England, linen and woollen yarn, and worsted. The merchants of Cork carry on a very extensive trade to almost all parts of the known world; so that their commerce is annually increasing. The produce of the customs some years since exceeded 60,000l. and the number of ships that they employ is double to what it was forty years ago. The only thing that seemed to be wanting to the security of the port of Cork was supplied in the earl of Chesterfield's memorable administration, by building a fort on the great island, to command the entrance of the haven. The outlets of Cork are cheerful and pleasant. The country around the city, on both sides of the river, is hilly and picturesque; and the harbour called the *Cove*, is one of the best in the world; the entrance is safe, and the whole navy of England might ride in it, secure from every wind that blows. Ships of burden, however, are obliged to unload at Passage, five miles and a half from Cork, the channel not admitting vessels of above 150 tons.

Cork *Jacket* or *Waistcoat*, is an invention of one Mr Dubourg, a gentleman very fond of swimming, but subject to the cramp, which led him to consider of some method by which he might enjoy his favourite diversion with safety. The waistcoat is composed of four pieces of cork, two for the breasts and two for the back; each pretty near in length and breadth to the quarters of a waistcoat without flaps; the whole is covered with coarse canvass, with two holes to put the arms through; there is a space left between the two back-pieces, and the same betwixt each back and breast-piece, that they may fit the easier to the body. Thus the waistcoat is only open before, and may be fastened on the wearer with strings; or, if it should be thought more secure, with buckles and leather straps. This waistcoat does not weigh above 12 ounces, and may be made up for about five or six shillings expence. Mr Dubourg tried his waistcoat in the Thames, and found that it not only supported him on the water, but that two men could not sink him, though they used their utmost efforts for that purpose. If those who use the sea occasionally, and especially those who are obliged to be almost constantly there, were to have those waistcoats, it would be next to impossible that they should be drowned. It would also be of vast service to those that, for the sake of health, bathe in the sea; and even the most delicate and timorous young lady might by the help of one of these jackets venture into a rough sea. See *Air-Jacket* and *Bamboo-Habit*.

CORMANDEL. See COROMANDEL.

COR-MASS, the name of a grand procession, said to have been established at Dunkirk during the dominion of Charles V. and renewed on St John's day, the 24th of June. After the celebration of high mass, the procession, consisting of the several tradesmen of the town, begins. Each person has a burning taper of wax in his hand: and after each company comes a pageant, followed by the patron-saint, usually of solid silver, richly wrought and adorned. The companies are followed by music; and after the musicians, the friars in the habits of their order, the secular priests, and then the abbot magnificently adorned, and preceded by the host. Machines likewise of various fantastical forms and devices, and as variously accoutered, form a part of the show on this occasion; which is described as one of the most superb and magnificent in the world, by an eye-witness, in 1755.

Cor-mass, Corn.

CORMORANT, a corruption of corvorant. See PELICANUS, ORNITHOLOGY *Index*.

CORN, the grain or seeds of plants separated from the spica or ear, and used for making bread.

There are several species of corn, such as wheat, rye, and barley, millet and rice, oats, maize, and lentils, pease, and a number of other kinds; each of which has its usefulness and propriety.

Europe, in every part of it; Egypt, and some other cantons of Africa, particularly the coasts of Barbary; and some parts of America cultivated by the Europeans, particularly New England, New France, and Acadia, are the places which produce corn. Other countries have maize and rice in lieu of it; and some parts of America, both in the islands and continents, simple roots, such as potatoes and miniec.—Egypt was anciently the most fertile of all other countries in corn; as appears both from sacred and profane history. It furnished a good part of the people subject to the Roman empire, and was called the *dry nurse of Rome and Italy*. Britain, France, and Poland, seem now in the place of Egypt, and with their superfluities support a good part of Europe.

For the first discovery and culture of corn, authors are much divided; the common opinion is, that in the first ages men lived on the spontaneous fruits of the earth; as acorns, and the nut or mast produced by the beech; which, they say, took its name *fagus*, from the Greek φαγω, *I eat*. It is added that they had not either the use of corn, or the art of preparing or making it eatable.

Ceres has the credit of being the first that showed the use of corn, on which account she was placed among the gods; others gave the honour to Triptolemus; others share it between the two, making Ceres the first discoverer, and Triptolemus, the first planter and cultivator of corn. Diodorus Siculus ascribes the whole to Isis; on which Polydore Virgil observes, he does not differ from the rest; Isis and Ceres being in reality the same. The Athenians pretend it was among them the art began; and the Cretans or Candiots, Sicilians, and Egyptians, lay claim to the same. Some think the title of the Sicilians best supported, that being the country of Ceres: and authors add, she did not teach the secret to the Athenians, till she had first instructed her own countrymen. Others say, Ceres passed first into Attica, thence into Crete, and, last of all, into Sicily: many of the learned, however, maintain it was in Egypt the art of cultivating corn first began; and it is certain there was corn in Egypt and the East long before the time of Ceres.

Corn is very different from fruits, with respect to the manner of its preservation; and is capable of being preserved in public granaries, for pressing occasions, and of being kept for several centuries.—A little time after the siege of Metz, under Henry II. of France, in the year 1578, the duc d'Espernon laid up vast stores of corn in the citadel; which was preserved in good plight to the year 1707, when the French

French king and his retinue, paffing that way, ate bread baked thereof.

The chief thing that contributes to the prefervation of corn is a cruft which forms on its furface, by the germination of the grain next underneath, to the thicknefs of an inch and a half. On that at Metz people walked, without its giving the leaft way. At Sedan was a granary cut in a rock, wherein a heap of corn was preferved a hundred and ten years: it was covered with a cruft a foot thick.

For the prefervation of corn, the firft method is to let it remain in the fpike; the only expedient for conveying it to the iflands and provinces of America. The inhabitants of thofe countries fave it in the ear, and raife it to maturity by that precaution: but this method of preferving it is attended with feveral inconveniencies among us; corn is apt to rot or fprout, if any the leaft moifture is in the heap; the rats likewife infeft it, and our want of ftraw alfo obliges us to feparate the grain from the ear. The fecond is to turn out and winnow it frequently; or to pour it through a trough or mill-hopper, from one floor to another; being thus moved and aired every 15 days, for the firft 6 months, it will require lefs labour for the future, if lodged in a dry place: but if, through neglect, mites fhould be allowed to flide into the heap, they will foon reduce the corn to a heap of duft: this muft be avoided by moving the corn anew, and rubbing the places adjacent with oils and herbs, whofe ftrong odour may chace them away; for which garlic and dwarf-elder are very effectual; they may likewife be expofed to the open fun, which immediately kills them. When the corn has been preferved from all impurities for the fpace of two years, and has exhaled all its fires, it may be kept for 50 or even 100 years, by lodging it in pits covered with ftrong planks clofely joined together; but the fafer way is to cover the heap with quicklime, which fhould be diffolved by fprinkling it over with a fmall quantity of water; this caufes the grains to fhoot to the depth of two or three fingers; and inclofes them with an incruftation, as above mentioned, through which neither air nor infects can penetrate.

Indian Corn, or *Maize.* See Zea, Botany *Index.*

Corn *Butterfly*, method of deftroying it. See Agriculture *Index.*

Corn-*Crake.* See Rallus, Ornithology *Index.*

Corn *Mill*, a water-engine for grinding corn. See Mechanics.

Corn, in *Farriery.* See Farriery *Index.*

CORNS, in *Surgery*, hard excrefcences, confifting of indurations of the fkin arifing on the toes, and fometimes on the fides of the feet, where they are much expofed to the preffure of the fhoes. By degrees they prefs themfelves farther down between the mufcular fibres on thefe parts, and by their irritation occafion extreme pain. Many cures have been prefcribed, but the total removal of them is always found to be attended with great difficulty. It has been recommended to foften them with plafters, and then to pull them up by the roots, to apply cauftic, &c. but the beft cure is to bath them frequently in warm water, and pare away as much as poffible of the indurated fkin without drawing blood.

CORNAGE, an ancient tenure, the fervice whereof was to blow a horn when any invafion of the Scots was perceived. This tenure was very frequent in the northern counties near the Picts wall; but by ftat. 12 Car. II. all tenures are converted into free and common focage.—An old rental calls cornage, *newtgeldt*, q. d. *neat-geld.* Lord Coke fays, in old books it is called *horngeld.*

CORNARISTS, in ecclefiaftical hiftory, the difciples of Theodore Cornhert, an enthufiaftic fecretary of the ftates of Holland. He wrote at the fame time againft the Catholics, Lutherans, and Calvinifts. He maintained that every religious communion needed reformation; but he added, that no perfon had a right to engage in accomplifhing it without a miffion fupported by miracles. He was alfo of opinion, that a perfon might be a good Chriftian without being a member of any vifible church.

CORNARIUS, or Haguenbot, *John*, a celebrated German phyfician, born at Zwickow in Saxony. His preceptor made him change his name of Haguenbot to that of Cornarius, under which he is moft known. At 20 years of age he taught grammar, and explained the Greek and Latin poets and orators to his fcholars; and at 23 was licentiate in medicine. He found fault with moft of the remedies provided by the apothecaries; and obferving, that the greateft part of the phyficians taught their pupils only what is to be found in Avicenna, Rhafis, and other Arabian phyficians, he carefully fought for the writings of the beft phyficians of Greece, and employed about 15 years in tranflating them into Latin, efpecially the works of Hippocrates, Aetius, Eginetes, and a part of thofe of Galen. Meanwhile he practifed phyfic with reputation at Zwickow, Frankfort, Marpurg, Nordhaufen, and Jena, where he died of an apoplexy in 1558, aged 58. He alfo wrote fome medicinal treatifes; publifhed editions of fome poems of the ancients on medicine and botany; and tranflated fome of the works of the fathers, particularly thofe of Bafil, and a part of thofe of Epiphanius.

CORNARO, Lewis, a Venetian of noble extraction, memorable for having lived healthful and active to above 100 years of age by a rigid courfe of temperance. By the ill conduct of fome of his relations he was deprived of the dignity of a noble Venetian; and feeing himfelf excluded from all employments under the republic, he fettled at Padua. In his youth he was of a weak conftitution; and by irregular indulgence reduced himfelf at about 40 years of age to the brink of the grave, under a complication of diforders; at which extremity he was told that he had no other chance for his life but by becoming fober and temperate. Being wife enough to adopt this wholefome counfel, he reduced himfelf to a regimen of which there are very few examples. He allowed himfelf no more than 12 ounces of food and 14 ounces of liquor each day; which became fo habitual to him, that when he was above 70 years of age, the experiment of adding two ounces to each by the advice of his friends, had like to have proved fatal to him. At 83 he wrote a treatife which has been tranflated into Englifh, and often printed, entitled, "Sure and Certain Methods of attaining a Long and Healthful Life;" in which he relates his own ftory, and extols temperance to a degree of enthufiafm. At length the yolk of an egg became fufficient

sufficient for a meal, and sometimes for two, until he died with much ease and composure in 1566. The writer of the Spectator, N° 195, confirms the fact from the authority of the Venetian ambassador at that time, who was a descendant of the Cornaro family.

CORNAVII, (Ptolemy), a people of Britain beginning in the very heart of the island, and extending to Chester. Now *Warwick, Worcester, Salop, Stafford,* and *Cheshire* (Camden).

CORNEA TUNICA, in *Anatomy*, the second coat of the eye; so called from its substance resembling the horn of a lantern, in Latin *cornu*. See ANATOMY *Index*.

CORNEILLE, PETER, a celebrated French poet, was born at Rouen in the year 1606. He was brought up to the bar, which he attended for some little time; but formed with a genius too elevated for such a profession, and having no turn for business, he soon deserted it. An affair of gallantry occasioned his writing his first piece, entitled *Melite;* which had prodigious success. Encouraged by the applause of the public, he wrote the Cid, and the other tragedies that have immortalized his name. In his dramatic works he discovers a majesty, a strength and elevation of genius, scarce to be found in any other of the French poets; and, like our immortal Shakespeare, seems better acquainted with nature than with the rules of critics. Corneille was received into the French academy in 1647, and died dean of that academy in 1684, aged 78. Besides his dramatic pieces, he wrote a translation, in French verse, of the "Imitation of Jesus Christ," &c. The best edition of his works is that of 1682, in 4 vols 12mo.

CORNEILLE, *Thomas*, brother of the former, was a member of the French academy and of that of inscriptions. He discovered in his youth a great inclination to poetry; and at length published several dramatic pieces in 5 vols 12mo, some of which were applauded by the public, and acted with success. He also wrote, 1. A translation of Ovid's Metamorphoses, and some of Ovid's Epistles; 2. Remarks on Vauglas; 3. A Dictionary of Arts, 2 vols folio; and, 4. An Universal Geographical and Historical Dictionary, in 3 vols folio.

CORNEILLE, *Michael*, a celebrated painter, was born at Paris in the year 1642; and was instructed by his father, who was himself a painter of great merit. Having gained a prize at the academy, young Corneille obtained a pension from Louis XIV.; and was sent to Rome, where that prince had founded a school for young artists of genius. Having studied there some time, he gave up his pension, and applied to the antique with great care. He is said to have equalled Carache in drawing, but in colouring he was deficient. Upon his return from Rome, he was chosen professor in the academy of Paris; and was employed by the above prince in all the great works he was carrying on at Versailles and Trianon, where are still to be seen some noble efforts of his genius.

CORNEL-TREE. See CORNUS, BOTANY *Index*.

CORNELIA, daughter of Scipio Africanus, was the mother of Tiberius and Caius Gracchus. She was courted by a king, but she preferred being the wife of a Roman citizen to that of a monarch. Her virtues have been deservedly commended, as well as the wholesome principles she inculcated in her two sons. When a Campanian lady made once a show of her jewels at Cornelia's house, and entreated her to favour her with a sight of her own, Cornelia produced her two sons, saying, "These are the only jewels of which I can boast."

CORNELIA LEX, de civitate, was enacted, in the year of Rome 670, by L. Corn. Sylla. It confirmed the Sulpician law, and required that the citizens of the eight newly elected tribes should be divided among the 35 ancient tribes.—Another, *de judiciis*, in 673, by the same. It ordained, that the prætor should always observe the same invariable method in judicial proceedings, and that the process should not depend upon his will.—Another *de sumptibus*, by the same. It limited the expences which generally attended funerals.—Another *de religione*, by the same, in 677. It restored to the college of priests the privilege of choosing the priests, which by the Domitian law had been lodged in the hands of the people.—Another, *de municipiis*, by the same; which revoked all the privileges which had been some time before granted to the several towns that had assisted Marius and Cinna in the civil wars.—Another *de magistratibus*, by the same; which gave the power of bearing honours, and being promoted before the legal age, to those who had followed the interest of Sylla; while the sons and partizans of his enemies, who had been proscribed, were deprived of the privilege of standing for any office in the state.—Another *de magistratibus*, by the same, in 673. It ordained, that no person should exercise the same office within ten years distance, or be invested with two different magistracies in one year.—Another, *de magistratibus*, by the same, in 673. It divested the tribunes of the privilege of making laws, interfering, holding assemblies, and receiving appeals. All such as had been tribunes were incapable of holding any other office in the state by that law.—Another, *de majestate*, by the same, in 670. It made it treason to lend an army out of a province or engage in a war without orders, to influence the soldiers to spare or ransom a captive general of the enemy, to pardon the leaders of robbers or pirates, or for the absence of a Roman citizen to a foreign court without previous leave. The punishment was *aquæ et ignis interdictio.*—Another by the same. It gave the power to a man accused of murder, either by poison, weapons, or false accusations, and the setting fire to buildings, to choose whether the jury that tried him should give their verdict *clam* or *palam*, *viva voce*, or by ballot. Another by the same, which made it *aquæ et ignis interdictio* to such as were guilty of forgery, concealing and altering of wills, corruption, false accusations, and the debasing or counterfeiting of the public coin. All such as were accessory to this offence were deemed as guilty as the offender.—Another, *de pecuniis repetundis;* by which a man convicted of peculation or extortion in the provinces was condemned to suffer the *aquæ et ignis interdictio.*—Another, by the same; which gave the power to such as were sent into the provinces with any government, of retaining their command and appointment without a renewal of it by the senate, as was before observed.—Another by the same; which ordained, that the lands of proscribed persons should be common, especially those about Volaterræ and Fesulæ in Etruria, which Sylla divided among his soldiers.—Another by C. Cornelius tribune of

of the people, in 686. It ordained, that no perſon ſhould be exempted from any law according to the general cuſtom, unleſs 200 ſenators were preſent in the ſenate; and no perſon thus exempted could hinder the bill of his exemption from being carried to the people for their concurrence.—Another, by Naſſica, in 582, to make war againſt Perſeus, ſon of Philip king of Macedon, if he did not give proper ſatisfaction to the Roman people.

CORNELIAN. See CARNELIAN.

CORNER, in a general ſenſe, the ſame with ANGLE.

CORNET, in the military art of the ancients, an inſtrument much in the nature of a trumpet; which when it only ſounded, the enſigns were to march alone without the ſoldiers; whereas when the trumpet only ſounded, the ſoldiers were to move without the enſigns. The cornets and buccinæ ſounded the charge and retreat; and the cornets and trumpets ſounded during the courſe of the battle. See Plate CLXIV.

CORNET, in modern military economy, denotes an officer in the cavalry who bears the enſign or colours of a troop.

The cornet is the third officer in the company, and commands in the abſence of the captain and lieutenant. He takes his title from his enſign, which is ſquare; and is ſuppoſed to be called by that name from *cornu*, becauſe placed on the wings, which form a kind of points or horns of the army. Others derive the name from *coronet;* alleging, that it was the ancient cuſtom for theſe officers to wear coronets or garlands on their heads.

CORNEUS, the name by which Linnæus calls a kind of tin ore, found in black columns, with irregular ſides, and terminating in priſms.

CORNICHE, CORNISH, or CORNICE, in *Architecture*, the uppermoſt member of the entablature of a column, as that which crowns the order. See ARCHITECTURE, Chap. I. and the Plates.

CORNICHE, is alſo uſed, in general, for all little projectures in maſonry or joinery, even where there are no columns, as the corniche of a chimney, beaufet, &c.

CORNICHE Ring, in a piece of ordnance, is that next from the muzzle-ring, backward.

CORNICULARIUS, in antiquity, an officer in the Roman army, whoſe buſineſs was to aid and aſſiſt the military tribune in quality of a lieutenant.

The *cornicularii* went the rounds in lieu of the tribune, viſited the watch, and were nearly what the aids major are in the French army.

The denomination *cornicularius* was given them from a little horn, called *corniculum*, which they uſed in giving orders to the ſoldiers: though Salmaſius derives it from *corniculum*, the creſt of a head-piece; it being an obſervation of Pliny, that they wore iron or braſs horns on their helmets; and that theſe were called *cornicula*.

In the *Notitia Imperii* we find a kind of ſecretary or regiſter of the ſame name. His buſineſs was to attend the judge, and enter down his ſentiments and deciſions. The critics derive the word, in this ſenſe, from *corniculum*, a little horn to put ink in.

CORNICULUM, in *Ancient Geography*, a town of the Sabines, to the eaſt of Cruſtumerium, towards the Anio. It was burnt down by Tarquin; but reſtored again, after the expulſion of the kings, (Florus). Now in ruins, called *il Monte Genaro*, (Holſtenius).

CORNISH DIAMOND, a name given by many people to the cryſtals found in digging the mines of tin in Cornwall. See CORNWALL.

CORNIX, the trivial name of a ſpecies of CORVUS. See CORVUS, ORNITHOLOGY *Index*.

CORNU. See HORN.

CORNU Ammonis, in *Natural Hiſtory*, foſſil ſhells, called alſo *ſerpent-ſtones*, or *ſnake-ſtones*.

They are found of all ſizes, from the breadth of a ſixpence to more than two feet in diameter, and ſome even larger; ſome of them rounded, others greatly compreſſed, and lodged in different ſtrata of ſtones and clays; ſome again are ſmooth, and others variouſly ridged, their ſtriæ and ridges being either ſtraight, irregularly crooked, or undulated. See *SNAKE-Stones*.

CORNU Cervi. See HARTSHORN.

CORNUCOPIA, among the ancient poets, a horn out of which proceeded plenty of all things; by a particular privilege which Jupiter granted his nurſe, ſuppoſed to be the goat Amalthea. The fable is thus interpreted: That in Libya there is a little territory ſhaped not unlike a bullock's horn, exceedingly fertile, given by King Ammon to his daughter, Amalthea, whom the poets feign to have been Jupiter's nurſe.

In *Architecture* and *Sculpture* the cornucopia, or horn of plenty, is repreſented under the figure of a large horn, out of which iſſue fruits, flowers, &c. On medals, F. Joubert obſerves, the cornucopia is given to all deities.

CORNUCOPIÆ, in *Botany*, a genus of plants belonging to the triandria claſs; and in the natural method ranking under the 4th order, *Graminæ*. See BOTANY *Index*.

CORNUS, CORNEL-TREE, CORNELIAN CHERRY, or DOG-WOOD; a genus of plants belonging to the tetrandria claſs; and in the natural method ranking under the 47th order, *Stellatæ*.

CORNUTIA, a genus of plants, belonging to the didynamia claſs, and in the natural method ranking under the 40th order, *Perſonatæ*. See BOTANY *Index*.

CORNWALL, the moſt weſterly county of England, bounded by the Britiſh channel on the ſouth, and the Briſtol channel on the north, the two ſeas meeting near the Land's End on the weſt, and on the eaſt by the river Tamar, which ſeparates it from Devonſhire. Its name is ſuppoſed by ſome to be compounded of *carn*, ſignifying "a rock" in the Britiſh language, and *Gauls* or *Waules*, the name the Saxons gave to the Britons. Others, however, think it is derived from the Latin *cornu*, or the Britiſh *kern*, "a horn;" on account of its running out into the ſea ſomewhat in the form of a horn. Hither the ancient Britons (as well as in Wales) retired on the intruſion of the Saxons, where they oppoſed their further conqueſts. In this part of the iſland they formed a kingdom that exiſted for many years after under different princes, amongſt whom were Ambroſius Aurelius, and the juſtly celebrated Arthur; nor were they ſubdued till the middle of the 7th century, from which time Cornwall was conſidered as ſubject to the Weſt Saxon kings, who began their ſovereignty in 519, and continued it till 828, under 18 ſovereigns, the laſt of whom was the great Egbert, who ſubdued

dued all the others; and by uniting them, formed the kingdom of England, when this country was included in the county of Devon, then the 9th division; and that accounts for Alfred's not mentioning Cornwall, which, on forming the circuits after the Norman conquest, is included in the western circuit. In 1337, Edward III. erected it into a dukedom, and invested with it *Edward the Black Prince*. But this, according to the express words of the grant, is limited to the first born son and heir, on which account Richard II. was created duke of Cornwall by charter. So was Henry V. by his father Henry IV. Henry VI. delivered the duchy to his son Prince Edward, and Edward IV. created his son Edward V. duke of Cornwall, as did Henry VII. his son, afterwards Henry VIII. upon the death of his elder brother Arthur. James I. created his son Henry duke of Cornwall, which title on his decease came to his brother Charles. The eldest sons of succeeding kings have enjoyed this title by inheritance. These not only appoint the sheriff, but all writs, deeds, &c. are in their name, and not in the king's; and they have also peculiar royalties and prerogatives distinct from the crown, for which they appoint the officers. This county is 80 miles long, 40 broad, and 250 in circumference; containing 960,000 acres, and 126,000 inhabitants. It is divided into 9 hundreds; has 27 market towns, viz. Launceston, Truro, Falmouth, Helston, Saltash, Bodmyn, St Ives, Tregony, Camelford, Fowey, St Germains, Penryn, Callington, St Austle, East Looe, Padstow, St Colomb, Pensance, Grampond, Leskard, Lestwithiel, St Mawes, St Michael, Newport, Market Jew, Stratton, and Redruth; 1230 villages, 191 parishes, 89 vicarages: provides 640 men to the militia, and pays 8 parts of the land-tax. Its chief rivers are the Tamar, Fale, Cober, Looe, Camel, Fowe, Haile, Lemara, Kense, and Aire. Its principal capes or headlands are the Land's-end, the Lizard, Cape Cornwall, Deadman's-head, Rame-head, &c. and a cluster of islands, 144 in number, called the *Scilly isles*, supposed formerly to have been joined to the main land, though now 30 miles distant; abounding with antiquities, particularly druidical.

As Cornwall is surrounded by the sea on all sides except the east, its climate is somewhat different from that of the other parts of Britain. The reasons of this difference will be easily understood from what is observed concerning the climate of America. The summers in Cornwall are less hot, and the winters less cold, than in other parts of England, and the spring and harvest are observed to be more backward. High and sudden winds are also more common in this than in other counties of England. The county is rocky and mountainous; but the mountains are rich in metals, especially tin and copper. The valleys are very pleasant and fertile, yielding great plenty both of corn and pasture. The lands near the sea-coast are manured and fertilized with sea-weed, and a kind of sand formed by the particles of broken shells as they are dashed against each other by the sea. Cattle of all sorts are smaller here than in the other counties of England; and the wool of the sheep, which are mostly without horns, is very fine, and the flesh, both of them and the black cattle, extremely delicate. The county is well supplied with fish from the sea and the many rivers with which it is watered. The most noted of the sea-fish is the pilchard; of which prodigious quantities are caught from July to November, and exported to different parts, especially to Spain. It is said that a million have been sometimes taken at a single draught. The natives are remarkable for their strength and activity, as well as their dexterity in wrestling, in which exercise the Cornish hug is highly extolled.

This county has been long famous for its mines of different metals; but the principal produce is tin. The Phenicians early visited these coasts for this article, some think 400 or 450 years before Christ; and the mines continued to be wrought with various success at different periods. In the time of King John they appear to have yielded no great emolument; the right of working them being wholly in the king as earl of Cornwall, and the mines farmed by the Jews for 100 merks; and according to this proportion the 10th of it, 6l. 13s. 4d. is at this day paid by the crown to the bishop of Exeter. In the time of Richard king of the Romans and earl of Cornwall, the tin-mines were immensely rich; the Jews being farmed out to him by his brother Henry III. what interest they had was at his disposal. The Spanish tin-mines being stopped by the Moors, and none discovered in Germany, the Malabar coast, or the Spanish West Indies, Cornwall and its earls had all the trade of Europe for it. The Jews being banished the kingdom, 18 Edw. I. they were again neglected till the gentlemen of Blackmore, lords of seven tithings best stored at that time with tin, obtained of Edmund earl of Cornwall, son of Richard king of the Romans, a charter under his own seal, with more explicit grants of privileges, courts, pleas, parliaments, and the toll-tin or $\frac{1}{15}$th of all the tin raised. At this time too the right of bounding or dividing tin-grounds into separate partitions for the encouragement of searching for it seems to have been first appointed, or at least adjusted. This charter was confirmed 33 Edward I. and the Cornish separated from the Devonshire tinners. Their laws, particularly recited in Plowden's Commentaries, p. 237, were further explained 50 Edw. III. confirmed and enlarged by parliament, 8 Rich. II. 3 Ed. IV. 1 Ed. VI. 1 and 2 P. and M. and 2 Eliz. and the whole society divided into four parts under one general warden to do justice in law and equity, from whose sentence lies an appeal to the duke of Cornwall in council, or for want of a duke of Cornwall to the crown. The lord-warden appoints a vice-warden to determine all stannery disputes every month: he also constitutes four stewards, one for each of the precincts before mentioned, who hold their courts every three weeks, and decide by juries of six persons, with an appeal reserved to the vice-warden, lord warden, and lord of the prince's council. In difficult cases the lord-warden, by commission, issues his precept to the four principal towns of the stannery districts, who each choose six members; and these twenty-four stannators constitute the parliament of tinners. Each stannator chooses an assistant, making a kind of standing council in a different apartment to give information to the prince. Whatever is enacted by the body of tinners must be signed by the stannators, the lord-warden, or his deputy, and by the duke or the king, and thenceforward has with regard to tin affairs all the authority of an act of the whole

Cornwall.

whole legiſlature. Five towns are appointed in the moſt convenient parts of the county for the tinners to bring their tin to every quarter of a year. Theſe are Leſkard, Leſtwithiel, Truro, Helſton, and Penſance, the laſt added by Charles II. for the conveniency of the weſtern tinners. In the time of Henry VIII. there were but two coinages at Midſummer and Michaelmas; two more at Chriſtmas and Lady-day were added, for which the tinners pay an acknowledgment called *Poſt groats*, or 4d. for every hundred of white tin then coined. The officers appointed by the duke aſſay it; and if well purified ſtamp it by a hammer with the duchy ſeal, the arms of Richard earl of Cornwall, a lion rampant G. crowned O. within a bordure of bezants S; and this is a permiſſion to the coiner to ſell, and is called *coining the tin*. Every hundred of white tin ſo coined pays to the duke 4s. The tin of the whole county, which, in Carew's time, in the laſt century, amounted to 30,000l. or 40,000l. yearly, has for 24 years laſt paſt amounted one year with another to 180,000l. or 190,000l. ſterling. Of this the duke of Cornwall receives for his 4s. duty on every hundred of white tin above 10,000l. yearly: the bounders or proprietors of the ſoil about $\frac{1}{6}$th at a medium clear, or about 30,000l. yearly; the remainder goes to the adventurers in the mine, who are at all the charge of working. Tin is found collected and fixed in lodes and floors, or in grains and bunches in the natural rock, or looſe and detached in ſingle ſeparate ſtones called *ſhodes* or *ſtreams*, or in a continued courſe of ſuch ſtones called the *beuheyl* or *living ſtream*, or in an arenaceous pulverized ſtate. It is moſt eaſily diſcovered by tracing the lodes by the ſcattered fragments of them called *ſhodes*, by leave of the lord of the ſoil or the bounder. The tin being divided among the lords and adventurers, is ſtamped and worked at the mill; and being thus dreſſed is carried under the name of *black tin* to the melting-houſe, where it is melted by Welſh pit-coal, and poured into blocks of 320lb. weight, and carried to the coinage town. Mundic, a ſcarce metal or mineral ore, of a white, braſſy, or brown colour, is found in large quantities, intermixed with tin, copper, and lead, and ſometimes by itſelf. Iron ore is found in Cornwall, but the working it does not anſwer. There is no richer copper, nor a greater variety, any where than in this county. Silver, if really found here in the reigns of Edward I. and II. has been rarely found ſince, nor do the lead mines anſwer. Very late diſcoveries have proved that Cornwall has more gold than was formerly imagined. What is called the *Corniſh diamond* is a figured cryſtal generally hexagonal and pyramidical, or columnar, or both, of a fine clear water, and of all our baſtard diamonds in this nation eſteemed the beſt, and ſome of different colours, black, yellow, &c. The clearer theſe are, the better they will bear engraving for ſeals.

In privileges and language Cornwall ſeems to be another kingdom. By 21 Elizabeth it was ordered that all duty on Corniſh cloth exported ſhould be remitted to every Engliſhman within the duchy of Cornwall. This was firſt granted by the Black Prince, in conſideration of their paying 4s. for the coinage of every hundred of tin; whereas Devonſhire pays no more than 8d. They have alſo by grant from Richard earl of Cornwall, confirmed 25 Henry III. freedom to take ſand out of the ſea and carry it through the country for manure; whereupon in the following reign, on an inquiſition made, we find a complaint that Saltaſh had lately taken 12s. yearly for each barge that carried ſand up the Tamar; whereas nothing ought to have been demanded. They ſtill continue this ancient method of improving their land, carrying it ten miles up into the country, and great part of the way on horſes backs. Mr Ray ſuppoſes the virtue of this ſand depends chiefly on the ſalt mixed with it, which is ſo copious that in many places ſalt is boiled up out of a lixivium made of the ſea ſand; and the reaſon why ſand when it has lain long in the ſun and wind proves leſs enriching and uſeful is, that the dews and rain evaporate great part of its ſalt. They had likewiſe a privilege of trading to all parts of the world, granted them by Charles I. in recompenſe of their loyalty.

The number of boroughs in this ſmall county was greatly increaſed by Edward VI. who added ſeven to the original ſix, Mary two, Elizabeth ſix, making in all 21, ſending 40 members beſides the county two. Eight of theſe boroughs had an immediate or remote connection with the demeſne lands of the duchy; the reſt belonged to religious houſes, or powerful families, or were old boroughs, which had legal immunities granted to them by their princes or lords.

The Corniſh language is a dialect of that which till the Saxons came in was common to all Britain, and more anciently to Ireland and Gaul; but the inhabitants of this iſland being diſperſed before thoſe conqueſts, and driven into Wales and Cornwall, and thence into Bretagne, the ſame language, for want of frequent intercourſe, became differently pronounced and written, and in different degrees mixed with different languages. Hence came the Welſh, the Corniſh and the Armoric dialects, whoſe radicals are ſo much alike that they are known and admitted by the inhabitants of either country; but the grammar ſo varied that they cannot converſe. The Corniſh is reckoned the moſt pleaſing of the three. It was ſpoken ſo generally here down to the reign of Henry VIII. that Dr John Moreman, vicar of Mynhinet, is ſaid to have been the firſt who taught his pariſhioners the Lord's prayer, the creed, and ten commandments in Engliſh, and at the Reformation the natives deſired the ſervice in Engliſh. The older people in ſome pariſhes retained their original language to the middle of the laſt century: and the laſt ſermon was preached in it in 1678. When Mr Ray was here, 1662, he could find but one perſon who could write this language; and it is now ſo nearly extinct, that Mr Barrington, in 1768, could only find one old woman who could ſcold in it, and ſhe is ſince dead.

CORODY. See REVENUE.

Corolla.

COROLLA, among botaniſts, the moſt conſpicuous part of a flower, ſurrounding the organs of generation, and compoſed of one or more flower-leaves, moſt commonly called *petals*, to diſtinguiſh them from the leaves of the plant; according as there is one, two, or three of theſe petals, the corolla is ſaid to be monopetalous, dipetalous, tripetalous, &c.

COROLLARY is a conſequence drawn from ſomething already advanced or demonſtrated: thus, it being demonſtrated that a triangle which has two equal ſides,

fides, has alfo two angles equal; this corollary will follow that a triangle which has three fides equal, has alfo its three angles equal.

COROLISTÆ, a name by which Linnæus diftinguifhes thofe fyftematic botanifts who have arranged vegetables from the regularity, figure, number, and other circumftances, of the petals, or beautiful coloured leaves of the flowers. The beft fyftems of this kind are thofe of Rivinus and Tournefort. The former proceeds upon the regularity and number of the petals; the latter, with much more certainty, on their regularity and figure.

COROLLULA, a term ufed by botanifts to exprefs the little partial flowers which make up the compound ones.

COROMANDEL, the eaftern coaft of the peninfula on this fide the Ganges in Afia. It is bounded on the north by Golconda, on the eaft by the bay of Bengal, on the fouth by Madura, and on the weft by Bifnagar. This coaft fo much refembles that of Orixa, that the Abbé Raynal choofes to confider them as one, and gives to both the general name of *Coromandel*. Here an exceffive heat reigns from the beginning of May to the end of October. It begins at nine in the morning, and continues till nine in the evening. During the night it is allayed by a fea-breeze from the fouth-eaft; and moft commonly this refrefhing gale begins at three in the afternoon. The air is lefs inflamed during the reft of the year, though in all feafons it is very hot. It rains almoft continually during the months of November and December. This immenfe tract is covered with a parched fand for the extent of two miles, and fometimes only one mile along the coaft.

This country was at firft neglected by the Europeans for many reafons. It was feparated by inacceffible mountains from Malabar, where thefe bold adventurers endeavoured to fettle themfelves. Spices and aromatics, which were the principal objects of their attention, were not to be found there. In fhort, civil diffenfions had banifhed from it tranquillity, fecurity, and induftry. At that period the empire of Bifnagar, to which this vaft country was fubject, was falling to ruin. The governors of Vifapour, the Carnatic, Golconda, and Orixa, threw off their dependence, and affumed the title of kings. Thofe of Madura, Tanjore, Myfore, Gingi, and fome others, likewife ufurped the fovereign authority, though they retained their ancient title of *Naick*. This revolution had juft happened when the Europeans appeared on the coaft of Coromandel. The foreign trade was at that time inconfiderable; it confifted only of diamonds from Golconda, which were carried to Calicut and Surat, and from thence to Ormus or Suez, whence they were circulated through all Europe and Afia. Maffulipatan, the richeft and moft populous city of thefe countries, was the only market that was known for linens; they were purchafed at a great fair annually holden there by the Arabian and Malayan veffels that frequented that bay, and by caravans arrived from diftant parts. The linens were exported to the fame places with the diamonds. The fondnefs for the manufactures of Coromandel, which began to prevail here, infpired all the European nations trading to the Indian feas with the refolution of forming fettlements there. They were not difcouraged either by the difficulty of conveying goods from the inland parts of the country, where there was no navigable river; by the total want of harbours, where the fea at one feafon of the year is not navigable; by the barrennefs of the coafts, for the moft part uncultivated and uninhabited; nor by the tyranny and fluctuating ftate of the government. They thought that filver would be induftrioufly fought after; that Pegu would furnifh timber for building, and Bengal corn for fubfiftence; that a profperous voyage of nine months would be more than fufficient to complete their ladings; and that by fortifying themfelves they fhould be fecure againft the attacks of the weak tyrants that oppreffed thefe countries.

The firft European colonies were eftablifhed near the fhore. Some of them obtained a fettlement by force; moft of them were formed with the confent of the fovereigns; and all were confined to a very narrow tract of land. The boundaries of each were marked out by a hedge of thorny plants, which was their only defence. In procefs of time fortifications were raifed; and the fecurity derived from them, added to the lenity of the government, foon increafed the number of colonifts. The fplendor and independence of thefe fettlements feveral times raifed the jealoufy of the princes in whofe dominions they were formed; but their attempts to demolifh them proved abortive. Each colony increafed in profperity in proportion to the riches and the wifdom of the nation that founded it. None of the companies that exercifed an exclufive privilege beyond the Cape of Good Hope had any concern in the trade of diamonds. This was always left to private merchants, and by degrees fell entirely into the hands of the Englifh, or the Jews and Armenians that lived under their protection. At prefent this grand object of luxury and induftry is much reduced. The revolutions that have happened in Indoftan have prevented people from reforting to thefe rich mines; and the anarchy in which this unhappy country is plunged leaves no room to hope that they will be again attended to. The whole of the commercial operations on the coaft of Coromandel is confined to the purchafe of cottons. The manufacturing of the white cotton brought there differs fo little from ours, that it would be neither interefting nor inftructive to enter into a minute defcription of it. The procefs ufed in making their printed cottons, which was at firft fervilely followed in Europe, has fince been rendered more fimple, and brought to greater perfection by our manufacturers. The painted cottons which are brought thither we have not yet attempted to imitate. Thofe who imagine we have been prevented from undertaking this branch merely by the high price of labour among us, are miftaken. Nature has not given us the wild fruits and drugs neceffary for the compofition of thofe bright and indelible colours which conftitute the principal merit of the Indian manufactures; nor has fhe furnifhed us with the waters that ferve to fix them. The Indians do not univerfally obferve the fame method in painting their cottons; either becaufe there are fome niceties peculiar to certain provinces, or becaufe different foils produce different drugs for different ufes. We fhould tire the patience of our readers were we to trace the flow

Coromandel.

slow and painful progress of the Indians in the art of painting their cottons. It is natural to believe that they owe it to length of time, rather than to the fertility of their genius. What seems to authorise this conjecture is, that they have stopped in their improvements, and have not advanced a single step in the arts for many ages; whereas we have proceeded with amazing rapidity. Indeed, were we to consider only the want of invention in the Indians, we should be tempted to believe, that, from time immemorial, they have received the arts they cultivate from some more industrious nation; but when it is remembered that these arts have a peculiar dependence on the materials, gums, colours, and productions of India, we cannot but be convinced that they are natives of that country. It may appear somewhat surprising that cottons painted with all sorts of colours should be sold at so moderate a price, that they are almost as cheap as those that have only two or three. But it must be observed, that the merchants of the country sell to all the companies a large quantity of cottons at a time; and that the demand for cottons painted with various colours makes but a small article in their assortments, as they are not much esteemed in Europe.

Though cottons of all sorts are in some degree manufactured through the whole country of Indostan, which extends from Cape Comorin to the banks of the Ganges; it is observable, that the finest are made in the eastern part, the common ones in the centre, and the coarse ones in the most western parts. Manufactures are established in the European colonies, and upon the coast: they are more frequent at the distance of five or six leagues from the sea, where cotton is more cultivated, and provisions are cheaper. The purchases made there are carried 30 or 40 leagues farther into the country. The Indian merchants settled in the European factories have always the management of this business. The quantity and quality of the goods wanted are settled with these people: the price is fixed according to the patterns: and at the time a contract is made, a third or fourth part of the money agreed on is advanced. This arrangement is owing to the necessity these merchants themselves are under of advancing money to the workmen by the partners or agents who are dispersed through the whole country; of keeping a watchful eye upon them, for fear of losing what they have advanced; and of gradually lessening the sum, by calling for the cottons as fast as they are worked off. Without these precautions, nothing could be depended on in an oppressive government, where the weaver cannot work on his own account, either because his circumstances will not permit, or because he dares not venture to discover them for fear of exactions. The companies that have either success or good management, constantly keep the stock of one year in advance in their settlements. By this method they are sure of having the quantity of goods they have occasion for, and of the quality they choose, at the most convenient time: not to mention that their workmen, and their merchants, who are kept in constant employment, never leave them. Such nations as want money and credit cannot begin their mercantile operations till the arrival of their ships. They have only five or six months at most to execute the orders sent from Europe. The goods are manufactured and examined in haste; and they are even obliged to take such as are known to be bad, and would be rejected at any other time. The necessity they are under of completing their cargoes, and fitting out their vessels before hurricanes come on, leaves no room for nicety of inspection. It would be a mistake to imagine that the country agents could be prevailed upon to order goods to be made on their account in hopes of selling them with a reasonable advantage to the company with whom they are engaged. For, besides that the generality of them are not rich enough to embark in so large an undertaking, they would not be certain of finding their account in it. If the company that employ them should be hindered by unforeseen accidents from sending the usual number of ships, these merchants would have no vent for their commodities. The Indians, the form of whose dress requires different breadths and lengths from those of the cottons fabricated for our use, would not purchase them; and the other European companies would be provided, or certain of being provided, with whatever the extent of their trade required, and their money enabled them to purchase. The plan of procuring loans, which was contrived to remedy this inconvenience, never has nor can be useful. It has been a custom, time immemorial, in Indostan, for every citizen who borrows money to give a written instrument to his creditor. This deed is of no force in a court of judicature, unless it is signed by three witnesses, and bears the day of the month and the year when it was made, with the rate of interest agreed upon by the parties. If the borrower fails to fulfil his engagements, he may be arrested by the lender himself. He is never imprisoned, because there is no fear of his making his escape. He would not even eat, without obtaining leave of his creditor. The Indians make a three-fold division of interest: one kind they call *vice;* another neither *vice* nor *virtue;* and a third, they say, is *virtue.* The first is four per cent. a month; the second two; and the third one. The last is, in their opinion, an act of beneficence that only belongs to the most heroic minds. Yet, though the Europeans, who are forced to borrow, meet with this treatment, it is plain they cannot avail themselves of the indulgence without being involved in ruin.

The foreign trade of Coromandel is not in the hands of the natives. In the western part, indeed, there are Mohammedans known by the name of *Chalias*, who, at Naour and Porto-Nuovo, send out ships to Acheen, Merguy, Siam, and the eastern coast. Besides vessels of considerable burden employed in these voyages, they have smaller embarkations for the coasting trade for Ceylon and the pearl fishery. The Indians of Massulipatan turn their attention another way. They import from Bengal white calicoes, which they dye or print, and sell them again at the places from whence they had them, at 35 or 40 per cent. advantage. Excepting these transactions, which are of very little consequence, the whole trade is vested in the Europeans, who have no partners but a few Banians and Armenians settled in their colonies. The quantity of calicoes exported from Coromandel to the different ports of India may be computed at 3500 bales. Of these the French carry 800 to Malabar, Mocha, and

and the isle of France; the English, 1200 to Bombay, Malabar, Sumatra, and the Philippine islands; and the Dutch 1500 to their different settlements. Except 500 bales destined for Manila, each of the value of 100 guineas, the others are of such an ordinary kind that they do not exceed 30 guineas at prime cost; so that the whole number of bales does not amount to more than about 150,000l.

Coromandel furnishes Europe with 9500 bales; 800 of which are brought by the Danes, 2500 by the French, 3000 by the English, and 3200 by the Dutch. A considerable part of these callicoes are dyed blue, or striped blue and red for the African trade. The others are fine muslins, printed callicoes, and handkerchiefs from Massulipatan, or Paliacate. It is proved by experience that each of these bales costs only about 42l. sterling; consequently they ought to bring in to the manufactory where they are wrought near 360,000l. The payments are not entirely made in specie, either in Europe or Asia; we give in exchange, cloths, iron, lead, copper, coral, and some other articles of less value. On the other hand, Asia pays with spices, pepper, rice, sugar, corn, and dates. All these articles taken together may amount to about 210,000l.; and from this calculation it follows, that Coromandel receives annually from Europe about 300,000l. in money. The British, who have acquired the same superiority on this coast that they have elsewhere, have formed on it several settlements.

CORONA, among anatomists, denotes that edge of the glans penis where the preputium begins.

CORONA, or *Halo*, in *Optics*, a luminous circle, surrounding the sun, the moon, the planets, or fixed stars. Sometimes these circles are white, and sometimes coloured like the rainbow. Sometimes one only is visible, and sometimes several concentric coronas make their appearance at the same time. Those which have been seen about Sirius and Jupiter were never more than three, four, or five degrees in diameter; those which surround the moon are also sometimes no more than three or five degrees; but these, as well as those which surround the sun, are of very different magnitudes, viz. of 12° 0′, 22° 35′, 30° 0′, 38° 0′, 41° 2′, 45° 0′, 46° 24′, 47° 0′, and 90°, or even larger than this. Their diameters also sometimes vary during the time of observation, and the breadths both of the coloured and white circles are very different, viz. of 2, 4, or 7 degrees.

The colours of these coronas are more dilute than those of the rainbow; and they are in a different order, according to their size. In those which Newton observed in 1692, they were in the following order, reckoned from the inside. In the innermost were blue, white, and red; in the middle were purple, blue, green, yellow, and pale red; in the outermost, pale blue and pale red. Mr Huygens observed red next the sun, and a pale blue outwards. Sometimes they are red on the inside and white on the outside. M. Weidler observed one that was yellow on the inside and white on the outside. In France, one was observed in 1683, the middle of which was white; after which followed a border of red; next to it was blue, then green, and the outermost circle was a bright red. In 1728, one was seen of a pale red outwardly, then followed yellow, and then green, terminated by a white.

These coronas are very frequent. In Holland, M. Muschenbroeck says, 50 may be seen in the day-time, almost every year; but they are difficult to be observed, except the eye be so situated, that not the body of the sun, but only the neighbouring parts of the heavens can be seen. Mr Middleton says, that this phenomenon is very frequent in North America; for that there is generally one or two about the sun every week, and as many about the moon every month. Halos round the sun are very frequent in Russia. M. Æpinus says, that from the 23d of April 1758, to the 20th of September, he himself had observed no less than 26, and that he has sometimes seen twice as many in the same space of time.

Coronas may be produced by placing a lighted candle in the midst of steam in cold weather. Also, if glass windows be breathed upon, and the flame of a candle be placed some feet from it, while the spectator is also at the distance of some feet from another part of a window, the flame will be surrounded with a coloured halo. And if a candle be placed behind a glass receiver, when air is admitted into the vacuum within it, at a certain degree of density, the vapour with which it is loaded will make a coloured halo round the flame. This was observed by Otto Guericke. In December 1756, M. Muschenbroeck observed, that when the glass windows of his room were covered with a thin plate of ice on the inside, the moon appearing through it was surrounded with a large and variously coloured halo; and, opening the window, he found that it arose entirely from that thin plate of ice, for none was seen except through it.

Similar, in some respects, to the halo, was the remarkable appearance which M. Bouguer describes, as observed by himself and his companions on the top of Mount Pinchinca, in the Cordilleras. When the sun was just rising behind them, so as to appear white, each of them saw his own shadow projected upon it, and no other. The distance was such, that all the parts of the shadow were easily distinguishable, as the arms, the legs, and the head; but what surprised them most was, that the head was adorned with a kind of glory, consisting of three or four small concentric crowns, of a very lively colour, each exhibiting all the varieties of the primary rainbow, and having the circle of red on the outside. The intervals between these circles continued equal, though the diameters of them all were constantly changing. The last of them was very faint, and at a considerable distance was another great white circle, which surrounded the whole. As near as M. Bouguer could compute, the diameter of the first of these circles was about $5\frac{2}{7}$ degrees, that of the second 11, that of the third 17, and so on: but the diameter of the white circle was about 76 degrees. This phenomenon never appeared but in a cloud consisting of frozen particles, and never in drops of rain like the rainbow. When the sun was not in the horizon, only part of the white circle was visible, as M. Bouguer frequently observed afterwards.

Similar also to this curious appearance was one that was observed by Dr M'Feat in Scotland. This gentleman observed a rainbow round his shadow in the mist,

Corona.

miſt, when he was upon an eminence above it. In this ſituation the whole country round ſeemed, as it were, buried under a vaſt deluge, and nothing but the tops of diſtant hills appeared here and there above the flood : ſo that a man would think of diving down into it with a kind of horror. In thoſe upper regions the air, he ſays, is at that time very pure and agreeable to breathe in. At another time he obſerved a double range of colours round his ſhadow in theſe circumſtances. The colours of the outermoſt range were broad and very diſtinct, and everywhere about two feet diſtant from the ſhadow. Then there was a darkiſh interval, and after that another narrower range of colours, cloſely ſurrounding the ſhadow, which was very much contracted. This perſon ſeems to think that theſe ranges of colours are cauſed by the inflection of the rays of light, the ſame that occaſioned the ring of light which ſurrounds the ſhadows of all bodies, obſerved by M. Maraldi, and this author*. But the prodigious variety with which theſe appearances are exhibited ſeems to ſhow that many of them do not reſult from the general laws of reflection, refraction, or inflection, belonging to tranſparent ſubſtances of a large maſs; but upon the alternate reflection and tranſmiſſion of the different kinds of rays, peculiar to ſubſtances reduced to the form of thin plates, or conſiſting of ſeparate and very minute parts. But where the dimenſions of the coronas are pretty conſtant, as in the uſual and larger halo, which is about half the diameter of the rainbow, they may, perhaps, be explained on the general principles of refraction only.

* *Edin. Eſſays*, vol. i. p. 198.

Deſcartes obſerves, that the halo never appears when it rains : from which he concludes that this phenomenon is occaſioned by the refraction of light in the round particles of ice, which are then floating in the atmoſphere; and though theſe particles are flat when they fall to the ground, he thought they muſt be protuberant in the middle, before their deſcent; and according to this protuberancy he imagined that the diameter of the halo would vary.—In treating of meteors, Gaſſendi ſuppoſed that a halo is the ſame thing with the rainbow, the rays of light being in both caſes twice refracted and once reflected within each drop of rain or vapour, and that all the difference there is between them ariſes from their different ſituation with reſpect to the obſerver. For, whereas, when the ſun is behind the ſpectator, and conſequently the rainbow before him, his eye is in the centre of the circle; when he views the halo, with his face towards the ſun, his eye is in the circumference of the circle; ſo that according to the known principles of geometry, the angle under which the object appears in this caſe muſt be juſt half of what it is in the other. Though this writer ſays a great deal upon the ſubject, and endeavours to give reaſons why the colours of the halo are in a different order to thoſe of the rainbow, he does not deſcribe the progreſs of the rays of light from the ſun to the eye of the ſpectator when a halo is formed by them, and he gives no figures to explain his ideas.

Dechales, alſo, endeavours to ſhow that the generation of the halo is ſimilar to that of the rainbow. If, ſays he, a ſphere of glaſs or cryſtal, AB, (fig. 1.) full of water, be placed in the beams of the ſun ſhining from C, there will not only be two circles of coloured light on the ſide next the ſun, and which conſtitute the two rainbows; but there will alſo be another on the part oppoſite to the ſun, the rays belonging to which meeting at E, afterwards diverge, and form the coloured circle G, as will be viſible, if the light that is tranſmitted through the globe be received on a piece of white paper. The colours alſo will appear to an eye placed in any part of the ſurface of the cone FEG. Meaſuring the angle FEH, he found it to be 23 degrees. They were only the extreme rays of this cone that were coloured like thoſe of the rainbow.

Plate CLXIV. fig. 1.

This experiment he thought ſufficiently illuſtrated the generation of the halo; ſo that whenever the texture of the clouds is ſuch, as not entirely to intercept the rays of the ſun or moon, and yet have ſome degree of denſity, there will always be a halo round them, the colours of the rainbow appearing in thoſe drops which are 23 degrees diſtant from the ſun or moon. If the ſun be at A (fig. 2.), and the ſpectator in B, the halo will be the circle DFE, DBE, being 46 degrees, or twice 23.

Fig. 2.

The reaſon why the colours of the halo are more dilute than thoſe of the rainbow, he ſays, is owing principally to their being formed not in large drops of rain, but in very ſmall vapour; for if the drops of water were large, the cloud would be ſo thick, that the rays of the ſun could not be regularly tranſmitted through them; and, on the other hand, he had obſerved, that when the rainbow is formed by very thin vapours, the colours hardly appear. As for thoſe circles of colours which are ſometimes ſeen round candles, it was his opinion that they are owing to nothing but moiſture on the eye of the obſerver; for that he could never produce this appearance by means of vapour only, if he wiped his eyes carefully; and he had obſerved that ſuch circles are viſible to ſome perſons and not to others, and to the ſame perſons at one time and not at another.

The moſt conſiderable of all the theories reſpecting halos, and that which has met with the moſt favourable and longeſt reception, is that of Mr Huygens, Sir Iſaac Newton mentions it with reſpect, and Dr Smith, in his Complete Syſtem of Optics, does not ſo much as hint at any other. The occaſion of Mr Huygens publiſhing his thoughts on this ſubject, was the appearance of a halo at Paris, on the 12th of May 1667, of which he gave an account in a paper read at the Royal Academy in that city, which was afterwards tranſlated, and publiſhed in the Engliſh Philoſophical Tranſactions, and which may be ſeen in Lowthorp's Abridgment, vol. ii. p. 189. But this article contains nothing more than the heads of a diſcourſe, which he afterwards compoſed, but never quite finiſhed, on this ſubject; and which has been tranſlated, with ſome additions, by Dr Smith, from whom the following account is chiefly extracted.

Our philoſopher had been firſt engaged to think particularly upon this ſubject, by the appearance of five ſuns at Warſaw, in 1658; preſently after which, he ſays, he hit upon the true cauſe of halos, and not long after of that of mock ſuns alſo.

To prepare the way for the following obſervations, it muſt be remarked, that if we can conceive any kind of bodies in the atmoſphere, which, according to the known laws of optics, will, either by means of reflection-

Corona.

tion or refraction, produce the appearance, in question, when nothing else can be found that will do it, we must acquiesce in the hypothesis, and suppose such bodies to exist, even though we cannot give a satisfactory account of their generation. Now, two such bodies are assumed by Mr Huygens; one of them a round ball, opaque in the centre, but covered with a transparent shell; and the other is a cylinder, of a similar composition. By the help of the former he endeavours to account for halos, and by the latter for those appearances which are called mock suns. Those bodies which Mr Huygens requires, in order to explain these phenomena, are not, however, a mere assumption; for some such, though of a larger size than his purpose requires, have been actually found, consisting of snow within and ice without. They are particularly mentioned by Descartes.

The balls with the opaque kernel, which he supposed to have been the cause of them, he imagines not to exceed the size of a turnip-seed; but, in order to illustrate this hypothesis, he gives a figure of one, of a larger size, in ABCDEF, (fig. 3.) representing the kernel of snow in the middle of it. If the rays of light, coming from GH, fall upon the side AD, it is manifest they will be so refracted at A and D, as to bend inwards; and many of them will strike upon the kernel EF. Others, however, as GA and HD, will only touch the sides of the kernel; and being again refracted at B and C, will emerge in the lines BK, CK, crossing each other in the point K, whose nearest distance from the globule is somewhat less than its apparent diameter. If, therefore, BK and CK be produced towards M and L, (fig. 4.) it is evident that no light can reach the eye placed within the angle LKM, but may fall upon it when placed out of that angle, or rather the cone represented by it.

Fig. 3.

Fig. 4.

For the same reason, every other of these globules will have a shadow behind it, in which the light of the sun will not be perceived. If the eye be at N, and that be conceived to be the vertex of a cone, the sides of which NR, NQ, are parallel to the sides of the former cone KL, KM, it is evident that none of the globules within the cone QNR can send any rays of the sun to the eye at N. But any other globule out of this cone, as X, may send those rays, which are more refracted than XZ, to the eye; so that this will appear enlightened, while those within the cone will appear obscure. It is evident from this, that a certain area, or space, quite round the sun, must appear dark; and that the space next to this area will appear luminous, and more so in those parts that are nearest to the obscure area; because, he says, it may easily be demonstrated, that those globules which are nearest to the cone QNR exhibit the largest image of the sun. It is plain, also, that a corona ought to be produced in the same manner, whatever be the sun's altitude, because of the spherical figure of the globules.

To verify this hypothesis, our philosopher advises us to expose to the sun a thin glass bubble, filled with water, and having some opaque substance in the centre of it; and he says we shall find, that we shall not be able to see the sun through it, unless at a certain distance from a place opposite to the centre of it; but as soon as we do perceive the light, the image of the sun will immediately appear the brightest, and coloured red, for the same reason as in the rainbow.

Corona.

These coronas, he says, often appear about the moon; but the colours are so weak as to appear only white. Such white coronas he had also seen about the sun, when the space within them appeared scarce darker than that without. This he supposes to happen when there are but few of those globules in the atmosphere; for the more plentiful they are, the more lively the colours of the halo appear; at the same time also the area within the corona will be the darker. The apparent diameter of the corona, which is generally about 45 degrees, depends upon the size of the dark kernel; for the larger it is with respect to the whole globule, the larger will be the dark cone behind it.

The globules that form these halos, Mr Huygens supposes to have consisted of soft snow, and to have been rounded by continual agitation in the air, and thawed on their outsides by the heat of the sun.

To make the diameter of the halo 45 degrees, he demonstrates that the semidiameter of the globule must be to the semidiameter of the kernel of snow very nearly as 1000 to 480; and that to make a corona of 100 degrees, it must be as 1000 to 680.

Mr Weidler, in his Commentary on parhelia, published at Wirtemberg in 1733, observes that it is very improbable that such globules as Mr Huygens's hypothesis requires, with nuclei of such a precise proportion, should exist; and if there were such bodies, he thinks they would be too small to produce the effects ascribed to them. Besides, he observes that appearances exactly similar to halos are not uncommon, where fluid vapours alone are concerned; as when a candle is placed behind the steam of boiling water in frosty weather, or in the midst of the vapour issuing copiously from a bath, or behind a receiver when the air is so much rarefied as to be incapable of supporting the water it contains. The rays of the sun twice reflected and twice refracted within small drops of water are sufficient, he says, without any opaque kernel, to produce all the appearances of the halos that have the red light towards the sun, as may be proved by experiment. That the diameter of the halos is generally half of that of the rainbow, he accounts for as Gassendi did before him.

M. Mariotte accounts for the formation of the small coronas by the transmission of light through aqueous vapours, where it suffers two refractions, without any intermediate reflection. He shows that light which comes to the eye, after being refracted in this manner, will be chiefly that which falls upon the drop nearly perpendicular; because more rays fall upon any given quantity of surface in that situation, fewer of them are reflected with small degrees of obliquity, and they are not so much scattered after refraction. The red will always be outermost in these coronas, as consisting of rays which suffer the least refraction. And whereas he had seen, when the clouds were driven briskly by the wind, halos round the moon, varying frequently in their diameter, being sometimes of two, sometimes of three, and sometimes of four degrees; sometimes also being coloured, sometimes only white, and sometimes disappearing entirely; he concluded that all these variations arose from the different

 ent

Corona.

ent thicknefs of the clouds, through which fometimes more and fometimes lefs light was tranfmitted. He fuppofed, alfo, that the light which formed them might fometimes be reflected, and at other times refracted. As to thofe coronas which confift of two orders of colours, he imagined that they were produced by fmall pieces of fnow, which, when they begin to diffolve, form figures which are a little convex towards their extremities. Sometimes, alfo, the fnow will be melted in different fhapes; and in this cafe, the colours of feveral halos will be intermixed, and confufed; and fuch, he fays, he had fometimes obferved round the fun.

M. Mariotte then proceeds to explain the larger coronas, namely thofe that are about 45 degrees in diameter, and for this purpofe he has recourfe to equiangular prifms of ice, in a certain pofition with refpect to the fun; and he takes pains to trace the progrefs of the rays of light for this purpofe; but this hypothefis is very improbable. In fome cafes he thought that thefe large coronas were caufed by hailftones, of a pyramidal figure; becaufe after two or three of them had been feen about the fun, there fell the fame day feveral fuch pyramidal hailftones. M. Mariotte explains parhelia by the help of the fame fuppofitions. See PARHELIA.

Sir Ifaac Newton does not appear to have given any particular attention to the fubject of halos, but he has hinted at his fentiments concerning them occafionally; by which we perceive that he confidered the larger and lefs variable appearances of this kind as produced according to the common laws of refraction, but that the lefs and more variable appearances depend upon the fame caufe with the colours of thin plates.

He concludes his explication of the rainbow with the following obfervation on halos and parhelias. "The light which comes through drops of rain by two refractions, without any reflection, ought to appear the ftrongeft at the diftance of about 20 degrees from the fun, and to decay gradually both ways as the diftance from him increafes. And the fame is to be underftood of light tranfmitted through fpherical hailftones: and if hail be a little flatted, as it often is, the tranfmitted light may be fo ftrong, at a little lefs diftance than that of 26 degrees, as to form a halo about the fun or moon; which halo, as often as the hailftones are duly figured, may be coloured, and then it muft be red within by the leaft refrangible rays, and blue without by the moft refrangible ones: efpecially if the hailftones have opaque globules of fnow in their centres to intercept the light within the halo, as Mr Huygens has obferved, and make the infide of it more diftinctly defined than it would otherwife be. For fuch hailftones, though fpherical, by terminating the light by the fnow, may make a halo red within, and colourlefs without, and darker within the red than without, as halos ufe to be. For of thofe rays which pafs clofe by the fnow, the red-making ones will be the leaft refracted, and fo come to the eye in the ftraighteft lines."

Some farther thoughts of Sir Ifaac Newton on the fubject of halos we find fubjoined to the account of his experiments on the colours of thick plates of glafs, which he conceived to be fimilar to thofe which are exhibited by thin ones. "As light reflected by a lens quickfilvered on the back fide makes the rings of the colours above defcribed, fo (he fays) it ought to make the like rings in paffing through a drop of water. At the firft reflection of the rays within the drop, fome colours ought to be tranfmitted, as in the cafe of a lens, and others to be reflected back to the eye. For inftance, if the diameter of a fmall drop or globule of water be about the 500dth part of an inch, fo that a red-making ray, in paffing through the middle of this globule, has 250 fits of eafy tranfmiffion within the globule, and all the red-making rays which are at a certain diftance from this middle ray round about it have 249 fits within the globule, and all the like rays at a certain further diftance round about it have 248 fits, and all thofe at a certain farther diftance 247 fits, and fo on; thefe concentric circles of rays, after their tranfmiffion, falling on a white paper, will make concentric rings of red upon the paper, fuppofing the light which paffes through one fingle globule ftrong enough to be fenfible; and in like manner the rays of other colours will make rings of other colours. Suppofe now that in a fair day the fun fhould fhine through a thin cloud of fuch globules of water or hail, and that the globules are all of the fame fize, the fun feen through this cloud ought to appear furrounded with the like concentric rings of colours, and the diameter of the firft ring of red fhould be $7\frac{1}{4}^{\circ}$, that of the fecond $10\frac{1}{4}^{\circ}$, that of the third $12^{\circ}\ 33'$, and according as the globules of water are bigger or lefs, the ring fhould be lefs or bigger."

This curious theory our author informs us was confirmed by an obfervation which he made in 1692. He faw by reflection, in a veffel of ftagnating water, three halos, crowns, or rings of colours about the fun, like three little rainbows concentric to his body. The colours of the firft, or innermoft crown, were blue next the fun, red without, and white in the middle, between the blue and red. Thofe of the fecond crown were purple and blue within, and pale red without, and green in the middle. And thofe of the third were pale blue within, and pale red without. Thefe crowns inclofed one another immediately, fo that their colours proceeded in this continual order from the fun outward; blue, white, red; purple, blue, green, pale, yellow, and red; pale blue, pale red. The diameter of the fecond crown, meafured from the middle of the yellow and red on one fide of the fun, to the middle of the fame colour on the other fide was $9\frac{1}{3}$ degrees or thereabouts. The diameters of the firft and third he had not time to meafure; but that of the firft feemed to be about five or fix degrees, and that of the third about twelve. The like crowns appear fometimes about the moon; for in the beginning of the year 1664, on February 19th at night, he faw two fuch crowns about her. The diameter of the firft or innermoft was about three degrees, and that of the fecond about five degrees and a half. Next about the moon was a circle of white; and next about that the inner crown, which was of a bluifh green within, next the white, and of a yellow and red without; and next about thefe colours were blue and green on the infide of the outer crown, and red on the outfide, of it.

At the fame time there appeared a halo at the diftance

ſtance of about 22° 35′ from the centre of the moon. It was elliptical; and its long diameter was perpendicular to the horizon, verging below fartheſt from the moon. He was told, that the moon has ſometimes three or more concentric crowns of colours encompaſſing one another next about her body. The more equal the globules of water or ice are to one another, the more crowns of colours will appear, and the colours will be the more lively. The halo, at the diſtance of 22½ degrees from the moon, is of another ſort. By its being oval, and more remote from the moon below than above, he concludes that it was made by refraction in ſome kind of hail or ſnow floating in the air in an horizontal poſture, the refracting angle being about 50 or 60 degrees. Dr Smith, however, makes it ſufficiently evident, that the reaſon why this halo appeared oval, and more remote from the moon towards the horizon, is a deception of ſight, and the ſame with that which makes the moon appear larger in the horizon.

Dr Kotelnihow having, like Dr Halley, made very accurate obſervations to determine the number of poſſible rainbows, conſiders the coloured halo which appears about a candle as the ſame thing with one of theſe bows which is formed near the body of the ſun, but which is not viſible on account of his exceſſive ſplendor.

Laſtly, M. Muſchenbroeck concludes his account of coronas with obſerving, that ſome denſity of vapour, or ſome thickneſs of the plates of ice, divides the light in its tranſmiſſion through the ſmall globules of water, or their interſtices, into its ſeparate colours: but what that denſity was, or what was the ſize of the particles which compoſed the vapour, he could not pretend to determine.

Corona, among botaniſts, the name given by ſome to the circumference or margin of a radiated compound flower. It correſponds to the radius of Linnæus; and is exemplified in the flat, tongue-ſhaped petals which occupy the margin of the daiſy or ſunflower.

Corona Auſtralis or *Meridionalis*, Southern Crown, a conſtellation of the ſouthern hemiſphere, whoſe ſtars in Ptolemy's catalogue are 13, in the Britiſh catalogue 12.

Corona Borealis, the Northern Crown or Garland, in *Aſtronomy*, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolemy's catalogue are eight, in Tycho's as many, and in Mr Flamſtead's 21.

Corona Imperialis, in *Conchology*, a name given by ſome authors to a kind of voluta, differing from the other ſhells of that family, by having its head ornamented with a number of points, forming a ſort of crown. See Voluta, Conchology *Index*.

CORONALE, in *Anatomy*, the firſt ſuture of the ſkull. See Anatomy *Index*.

CORONALE os, the ſame with os frontis. See Anatomy *Index*.

CORONARY vessels, in *Anatomy*, certain veſſels which furniſh the ſubſtance of the heart with blood.

Coronary Arteries, are two arteries ſpringing out of the aorta, before it leaves the pericardium. See Anatomy *Index*.

Coronary Vein, a vein diffuſed over the exterior ſurface of the heart. See Anatomy *Index*.

Stomachic Coronary, a vein inſerted into the trunk of the ſplenic vein, which, by uniting with the meſenteric, forms the vena porta. See Anatomy *Index*.

CORONARIÆ, in *Botany*, the 10th order of plants, in Linnæus's Fragments of a Natural Method. Under this name, inſtead of the more obvious one *liliaceæ*, Linnæus collects a great number of genera, moſt of which furniſh very beautiful garden flowers, viz. albuca, cyanella, fritillaria, helonias, hyacinthus, hypoxis, lilium, melanthium, ornithogalum, ſcilla, tulipa, agave, aletris, aloe, anthericum, aſphodelus, bromelia, burmannia, hemerocallis, polyanthes, tillandſia, veratrum, yucca.

CORONATION, the ceremony of inveſting with a crown, particularly applied to the crowning of kings, upon their ſucceeding to the ſovereignty. See King.

CORONÆ, in *Ancient Geography*, a town of Bœotia, near Mount Helicon, and the lake Copais, ſituated on an eminence: famous for the defeat of the Athenians and Bœotians by Ageſilaus. Another Corona of Theſſaly; having Narthacium to the eaſt, and Lamia near the Sperchius to the north (Ptolemy).

CORONE, in *Ancient Geography*, a town of Meſſenia, ſituated on the ſea, giving name to the Sinus Coronæus, (Pliny); now *Golfo di Coron*. Pauſanias takes it to be the *Æpea* of Homer; but Strabo *Thuria*, and Pliny *Pedaſus*, now *Coron*, in the territory of Belvidere, in the Morea. E. Long. 22. N. Lat. 36. 30.

CORONELLI, Vincent, a famous geographer, was born at Venice. His ſkill in the mathematics having brought him to the knowledge of the count d'Eſtrees, his eminence employed him in making globes for Louis XIV. With this view Coronelli ſpent ſome time at Paris, and left a great number of globes there, which are eſteemed. In 1685, he was made coſmographer to the republic of Venice; and four years after public profeſſor of geography. He founded an academy of coſmography at Venice; and died in that city in 1718. He publiſhed about 400 geographical charts, an abridgment of coſmography, ſeveral books on geography, and other works.

CORONER (*coronator*), an ancient officer in England, ſo called becauſe he hath principally to do with pleas of the crown, or ſuch wherein the king is more immediately concerned. And in this light the lord chief juſtice of the king's bench is the principal coroner in the kingdom; and may, if he pleaſes, exerciſe the juriſdiction of a coroner in any part of the realm. But there are alſo particular coroners for every county in England; uſually four, but ſometimes ſix, and ſometimes fewer. This officer is of equally authority with the ſheriff; and was ordained, together with him, to keep the peace, when the earls gave up the wardſhip of the county.

He is choſen by all the freeholders of the county court; and by the ſtatute of Weſtminſter 1. it was enacted, that none but lawful and diſcreet knights ſhould be choſen; but it ſeems now ſufficient if a man have lands enough to be made a knight, whether he be really knighted or not; for the coroner ought to have an eſtate ſufficient to maintain the dignity of his office, and anſwer any fines that may be made upon him for

his

his misbehaviour; and, if he hath not enough to answer, his fine shall be levied on the county, as a punishment for electing an insufficient officer. Now, indeed, through the culpable neglect of gentleman of property, this office has been suffered to fall into disrepute, and get into low and indigent hands; so that although formerly no coroners would be paid for serving their country, and they were by the aforesaid statute of Westminster 1. expressly forbidden to take a reward under pain of great forfeiture to the king, yet for many years past they have only desired to be chosen for the sake of their perquisites; being allowed fees for their attendance by the statute 3 Hen. VII. c. 1. which Sir Edward Coke complains of heavily, though since his time those fees have been much enlarged.

The coroner is chosen for life; but may be removed, either by being made sheriff or chosen verderor, which are offices incompatible with the other; and by the statute 25 Geo. II. c. 29. extortion, neglect, or misbehaviour, are also made causes of removal.

The office and power of a coroner are also, like those of the sheriff, either judicial or ministerial; but principally judicial. This is in a great measure ascertained by statute 4 Edw. I. *De officio coronatoris;* and consists, first, in inquiring, when any person is slain, or dies suddenly, or in prison, concerning the manner of his death. And this must be *super visum corporis;* for if the body is not found, the coroner cannot sit. He must also sit at the very place where the death happened. And his inquiry is made by a jury from four, five, or six, of the neighbouring towns, over whom he is to preside. If any be found guilty by this inquest of murder, he is to commit to prison for farther trial, and is also to inquire concerning their lands, goods, and chattels, which are forfeited thereby; but whether it be murder or not, he must inquire whether any deodand has accrued to the king, or the lord of the franchise, by this death; and must certify the whole of this inquisition to the court of king's bench, or the next assizes. Another branch of his office is to inquire concerning shipwrecks; and certify whether wreck or not, and who is in possession of the goods. Concerning treasure-trove, he is also to inquire concerning the finders, and where it is, and whether any one be suspected of having found and concealed a treasure; "and that may well be perceived (saith the old statute of Edw. I.), where one liveth riotously, haunting taverns, and hath done so of long time;" whereupon he might be attached and held to bail upon this suspicion only.

The ministerial office of the coroner is only as the sheriff's substitute. For when just exception can be taken to the sheriff, for suspicion of partiality (as that he is interested in the suit, or of kindred to either plaintiff or defendant), the process must then be awarded to the coroner, instead of the sheriff, for execution of the king's writs.

CORONET. See Crown.

Coronet, or *Cornet*, of a horse, the lowest part of the pastern, which runs round the coffin, and is distinguished by the hair joining and covering the upper part of the hoof.

CORONILLA, *jointed-podded* Colutea; a genus of plants belonging to the diadelphia class, and in the natural method ranking under the 32d order, *Papilionaceæ*. See Botany *Index*.

CORONOID, and Condyloid, processes. See Anatomy *Index*.

CORPORA cavernosa, in *Anatomy*, two spongious bodies, called also *corpora nervosa* and *corpus spongiosum*. See Anatomy *Index*.

Corpora *Pyramidalia*, are two protuberances of the under part of the *cerebellum*, about an inch long; so called from their resemblance to a pyramid. See Anatomy *Index*.

Corpora *Striata*. See Anatomy *Index*.

CORPORAL, an inferior officer under a sergeant, in a company of foot, who has charge over one of the divisions, places and relieves sentinels, and keeps good order in the corps de garde; he also receives the word from the inferior rounds which passes by his corps de garde. This officer carries a fusee, and is commonly an old soldier; there are generally three corporals in each company.

Corporal *of a Ship of War*, an officer under the master at arms, employed to teach the officers the exercise of small arms, or of musketry; to attend at the gangway, on entering ports, and observe that no spirituous liquors are brought into the ship, unless by express leave from the officers. He is also to extinguish the fire and candles at eight o'clock in winter, and nine in summer, when the evening gun is fired; and to walk frequently down in the lower decks in his watch, to see that there are no lights but such as are under the charge of proper sentinels.

Corporal (*Corporale*), is also an ancient church-term, signifying the sacred linen spread under the chalice in the eucharist and mass, to receive the fragments of the bread, if any chance to fall. Some say it was Pope Eusebius who first enjoined the use of the corporal; others ascribe it to St Sylvester. It was the custom to carry corporals, with some solemnity, to fires, and to heave them against the flames, in order to extinguish them. Philip de Comines says, the pope made Louis XI. a present of the corporale whereon my lord St Peter sung mass.

CORPORATION, a body politic or incorporate, so called, because the persons or members are joined into one body, and are qualified to take, grant, &c.

Of corporations there is a great variety subsisting, for the advancement of religion, of learning, and of commerce; in order to preserve entire and for ever those rights and immunities, which, if they were granted only to those individuals of which the body corporate is composed, would upon their death be utterly lost and extinct. To show the advantages of these incorporations, let us consider the case of a college in either of our universities, founded *ad studendum et orandum*, for the encouragement and support of religion and learning. If this was a mere voluntary assembly, the individuals which compose it might indeed read, pray, study, and perform scholastic exercises together, so long as they could agree to do so; but they could neither frame nor receive any laws or rules of their conduct; none at least which would have any binding force, for want of a coercive power to create a sufficient obligation. Neither could they be capable of retaining any privileges or immunities: for

Corporation.

for, if ſuch privileges be attacked, which of all this unconnected aſſembly has the right or ability to defend them? And, when they are diſperſed by death or otherwiſe, how ſhall they transfer theſe advantages to another ſet of ſtudents, equally unconnected as themſelves? So alſo, with regard to holding eſtates or other property, if land be granted for the purpoſes of religion or learning to 20 individuals not incorporated, there is no legal way of continuing the property to any other perſons for the ſame purpoſes, but by endleſs conveyances from one to the other, as often as the hands are changed. But when they are conſolidated and united into a corporation, they and their ſucceſſors are then conſidered as one perſon in law: as one perſon, they have one will, which is collected from the ſenſe of the majority of the individuals: this one will may eſtabliſh rules and orders for the regulation of the whole, which are a ſort of municipal laws of this little republic; or rules and ſtatutes may be preſcribed to it at its creation, which are then in the place of natural laws: the privileges and immunities, the eſtates and poſſeſſions, of the corporation, when once veſted in them, will be for ever veſted, without any new conveyance to new ſucceſſions; for all the individual members that have exiſted from the foundation to the preſent time, or that ſhall ever hereafter exiſt, are but one perſon in law, a perſon that never dies: in like manner as the river Thames is ſtill the ſame river, though the parts which compoſe it are changing every inſtant.

The original invention of theſe political conſtitutions ſeems entirely to belong to the Romans. They were introduced, as Plutarch ſays, by Numa; who finding, upon his acceſſion, the city torn to pieces by the two rival factions of Sabines and Romans, thought it a prudent and politic meaſure to ſubdivide theſe two into many ſmaller ones, by inſtituting ſeparate ſocieties of every manual trade and profeſſion. They were afterwards much conſidered by the civil law, in which they were called *univerſitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together: they were adopted alſo by the canon law, for the maintenance of eccleſiaſtical diſcipline; and from them our ſpiritual corporations are derived. But our laws have conſiderably refined and improved upon the invention, according to the uſual genius of the Engliſh nation, particularly with regard to ſole corporations, conſiſting of one perſon only, of which the Roman lawyers had no notion; their maxim being that *Tres faciunt collegium;* though they held, that if a corporation, originally conſiſting of three perſons, be reduced to one, *Si univerſitas ad unum redit;* it may ſtill ſubſiſt as a corporation, *Et ſtet nomen univerſitatis.*

As to the ſeveral ſorts of corporations, the firſt diviſion of them is into *aggregate* and *ſole*. Corporations aggregate conſiſt of many perſons united together into one ſociety, and are kept up by a perpetual ſucceſſion of members, ſo as to continue for ever: of which kind are the mayor and commonalty of a city, the head and fellows of a college, the dean and chapter of a cathedral church. Corporations ſole conſiſt of one perſon only and his ſucceſſors, in ſome particular ſtation, who are incorporated by law, in order to give them ſome legal capacities and advantages, particularly that of perpetuity, which in their natural perſons they could not have had. In this ſenſe the king is a ſole corporation; ſo is a biſhop; ſo are ſome deacons and prebendaries, diſtinct from their ſeveral chapters; and ſo is every parſon and vicar. And the neceſſity, or at leaſt uſe, of this inſtitution will be very apparent, if we conſider the caſe of a parſon of a church. At the original endowment of pariſh-churches, the freehold of the church, the church-yard, the parſonage-houſe, the glebe, and the tithes of the pariſh, were veſted in the then parſon by the bounty of the donor, as a temporal recompenſe to him for his ſpiritual care of the inhabitants, and with intent that the ſame emoluments ſhould ever afterwards continue as a recompenſe for the ſame care. But how was this to be effected? The freehold was veſted in the parſon; and if we ſuppoſe it veſted in his natural capacity, on his death it might deſcend to his heir, and would be liable to his debts and incumbrances: or at beſt, the heir might be compellable, at ſome trouble and expence, to convey theſe rights to the ſucceeding incumbent. The law therefore has wiſely ordained, that the parſon, *quatenus* parſon, ſhall never die, any more than the king; by making him and his ſucceſſors a corporation. By which means all the original rights of the parſonage are preſerved entire to the ſucceſſor; for the preſent incumbent, and his predeceſſor who lived ſeven centuries ago, are in law one and the ſame perſon; and what was given to the one was given to the other alſo.

Another diviſion of corporations, either ſole or aggregate, is into *eccleſiaſtical* and *lay*. Eccleſiaſtical corporations are, where the members that compoſe it are entirely ſpiritual perſons, ſuch as biſhops, certain deans and prebendaries, all archdeacons, parſons, and vicars, which are ſole corporations; deans and chapters at preſent, and formerly prior and convent, abbot and monks, and the like, bodies aggregate. Theſe are erected for the furtherance of religion, and perpetuating the rights of the church.—Lay corporations are of two ſorts, *civil* and *eleemoſynary*. The civil are ſuch as are erected for a variety of temporal purpoſes. The king, for inſtance, is made a corporation, to prevent in general the poſſibility of an *interregnum* or vacany of the throne, and to preſerve the poſſeſſions of the crown entire; for immediately upon the demiſe of one king, his ſucceſſor is in full poſſeſſion of the regal rights and dignity. Other lay corporations are erected for the good government of a town or particular diſtrict, as a mayor and commonalty, bailiff and burgeſſes, or the like: ſome for the advancement and regulation of manufactures and commerce; as the trading companies of London and other towns: and ſome for the better carrying on of divers ſpecial purpoſes; as church wardens, for converſation of the goods of the pariſh; the college of phyſicians and company of ſurgeons in London, for the improvement of the medical ſcience; the royal ſociety for the advancement of natural knowledge; and the ſociety of antiquarians for promoting the ſtudy of antiquities. The eleemoſynary ſort are ſuch as are conſtituted for the perpetual diſtribution of the free alms or bounty of the founder of them to ſuch perſons as he has directed. Of this kind are all hoſpitals for the maintenance of the poor, ſick, and impotent; and all colleges, both *in* our univerſities and *out* of them: which colleges are founded for two purpoſes:

Corporation.

poſes; 1. For the promotion of piety and learning by proper regulations and ordinances. 2. For imparting aſſiſtance to the members of thoſe bodies, in order to enable them to proſecute their devotion and ſtudies with greater eaſe and aſſiduity. And all theſe eleemoſynary corporations are, ſtrictly ſpeaking, lay, and not eccleſiaſtical, even though compoſed of eccleſiaſtical perſons, and although they in ſome things partake of the nature, privileges, and reſtrictions of eccleſiaſtical bodies.

Having thus marſhalled the ſeveral ſpecies of corporations, let us next proceed to conſider, 1. How corporations in general may be created. 2. What are their powers, capacities, and incapacities. And, 3. How they may be diſſolved.

I. Corporations, by the civil law, ſeem to have been created by the mere act and voluntary aſſociation of their members; provided ſuch convention was not contrary to law, for then it was *illicitum collegium*. It does not appear that the prince's conſent was neceſſary to be actually given to the foundation of them; but merely that the original founders of theſe voluntary and friendly ſocieties (for they were little more than ſuch) ſhould not eſtabliſh any meetings in oppoſition to the laws of the ſtate.

But in England the king's conſent is abſolutely neceſſary to the erection of any corporation, either impliedly or expreſsly given. The king's implied conſent is to be found in corporations which exiſt by force of the common law, to which our former kings are ſuppoſed to have given their concurrence; common law being nothing elſe but cuſtom, ariſing from the univerſal agreement of the whole community. Of this ſort are the king himſelf, all biſhops, parſons, vicars, church-wardens, and ſome others; who by common law have ever been held (as far as our books can ſhow us) to have been corporations, *virtute officii;* and this incorporation is ſo inſeparably annexed to their offices, that we cannot frame a complete legal idea of any of theſe perſons, but we muſt alſo have an idea of a corporation, capable to tranſmit his rights to his ſucceſſors, at the ſame time. Another method of implication, whereby the king's conſent is preſumed, is as to all corporations by preſcription, ſuch as the city of London, and many others, which have exiſted as corporations, time whereof the memory of man runneth out to the contrary; and therefore are looked upon in law to be well created. For though the members thereof can ſhow no legal charter of incorporation, yet in caſes of ſuch high antiquity the law preſumes there once was one; and that by the variety of accidents, which a length of time may produce, the charter is loſt or deſtroyed. The methods by which the king's conſent is expreſsly given, are either by act of parliament or charter. By act of parliament, of which the royal aſſent is a neceſſary ingredient, corporations may undoubtedly be created: but it is obſervable, that moſt of thoſe ſtatutes which are uſually cited as having created corporations, do either confirm ſuch as have been before created by the king; as in the caſe of the college of phyſicians, erected by charter 10 Hen. VIII. which charter was afterwards confirmed in parliament: or, they permit the king to erect a corporation *in futuro* with ſuch and ſuch powers; as is the caſe of the bank of England, and the ſociety of the Britiſh fiſhery. So that the immediate creative act is uſually performed by the king alone, in virtue of his royal prerogative.

All the other methods therefore whereby corporations exiſt, by common law, by preſcription, and by act of parliament, are for the moſt part reducible to this of the king's letters patent, or charter of incorporation. The king's creation may be performed by the words *creamus*, *erigimus*, *fundamus*, *incorporamus*, or the like. Nay it is held, that if the king grants to a ſet of men to have *gildam mercatorium*, "a mercantile meeting or aſſembly," this is alone ſufficient to incorporate and eſtabliſh them for ever.

The king (it is ſaid) may grant to a ſubject the power of erecting corporations, though the contrary was formerly held; that is, he may permit the ſubject to name the perſons and powers of the corporation at his pleaſure; but it is really the king that erects, and the ſubject is but the inſtrument; for though none but the king can make a corporation, yet *qui facit per alium, facit per ſe*. In this manner the chancellor to the univerſity of Oxford has power by charter to erect corporations; and has actually often exerted it in the erection of ſeveral matriculated companies, now ſubſiſting, of tradeſmen ſubſervient to the ſtudents.

When a corporation is erected, a name muſt be given to it; and by that name alone it muſt ſue and be ſued, and do all legal acts.

II. After a corporation is ſo formed and named, it acquires many powers and rights, which we are next to conſider. Some of theſe are neceſſarily and inſeparably incident to every corporation; which incidents as ſoon as a corporation is duly erected, are tacitly annexed of courſe. As, 1. To have perpetual ſucceſſion. This is the very end of its incorporation; for there cannot be a ſucceſſion for ever without an incorporation; and therefore all aggregate corporations have a power neceſſarily implied of electing members in the room of ſuch as go off. 2. To ſue or be ſued, implead or be impleaded, grant or receive, by its corporate name, and do all other acts as natural perſons may. 3. To purchaſe lands and hold them, for the benefit of themſelves and their ſucceſſors: which two are conſequential to the former. 4. To have a common ſeal. For a corporation being an inviſible body, cannot manifeſt its intention by any perſonal act or oral diſcourſe: it otherwiſe acts and ſpeaks only by its common ſeal. For though the particular members may expreſs their private conſents to any act by words or ſigning their names, yet this does not bind the corporation; it is the fixing of the ſeal, and that only, which unites the ſeveral aſſents of the individuals who compoſe the community, and makes one joint aſſent of the whole. 5. To make by-laws or private ſtatutes for the better government of the corporation; which are binding upon themſelves, unleſs contrary to the laws of the land, and then they are void. But no trading company is with us allowed to make bye-laws which may affect the king's prerogative or the common profit of the people, under penalty of 40l. unleſs they be approved by the chancellor, treaſurer, and chief juſtices, or the judges of aſſize in their circuits; and even though they be ſo approved, ſtill, if contrary to law, they are void. Theſe five powers are inſeparably incident to every corporation, at leaſt to every corporation

Corporation.

ration aggregate: for two of them, though they may be practiſed, yet are very unneceſſary to a corporation ſole; viz. to have a corporate ſeal to teſtify his ſole aſſent, and to make ſtatutes for the regulation of his own conduct.

Corporations have a capacity to purchaſe lands for themſelves and ſucceſſors; but they are excepted out of the ſtatute of wills; ſo that no deviſe of lands to a corporation by will is good; except for charitable uſes, by ſtat. 43 Eliz. c. 4. which exception is again greatly narrowed by the ſtat. 9 Geo. II. c. 36. And alſo, by a great variety of ſtatutes, their privilege even of purchaſing from any living granter is much abridged; ſo that now a corporation, either eccleſiaſtical or lay, muſt have a licenſe from the king to purchaſe, before they can exert that capacity which is veſted in them by the common law: nor is even this in all caſes ſufficient. Theſe ſtatutes are generally called the ſtatutes of *mortmain*. See MORTMAIN.

Blackſt. Comment.

The general duties of all bodies politic, conſidered in their corporate capacity, may, like thoſe of natural perſons, be reduced to this ſingle one; that of acting up to the end or deſign, whatever it be, for which they were created by their founder.

III. How corporations may be diſſolved. Any particular member may be disfranchiſed, or loſe his place in the corporation, by acting contrary to the laws of the ſociety, or the laws of the land: or he may reſign it by his own voluntary act. But the body politic may alſo itſelf be diſſolved in ſeveral ways; which diſſolution is the civil death of the corporation; and in this caſe their lands and tenements ſhall revert to the perſon, or his heirs, who granted them to the corporation; for the law doth annex a condition to every ſuch grant, that if the corporation be diſſolved, the granter ſhall have the lands again, becauſe the cauſe of the grant faileth. The grant is indeed only during the life of the corporation; which may endure for ever: but when that life is determined to be the diſſolution of the body politic, the granter takes it back by reverſion, as in the caſe of every other grant for life. The debts of a corporation, either to or from it, are totally extinguiſhed by its diſſolution; ſo that the members thereof cannot recover, or be charged with them, in their natural capacities: agreeable to that maxim of the civil law, *Si quid univerſitati debetur, ſingulis non debetur; nec, quod debet univerſitas, ſinguli debent.*

A corporation may be diſſolved, 1. By act of parliament, which is boundleſs in its operations. 2. By the natural death of all its members, in caſes of an aggregate corporation. 3. By ſurrender of its franchiſes into the hands of the king, which is a kind of ſuicide. 4. By forfeiture of its charter, through negligence or abuſe of its franchiſes, in which caſe the law judges that the body politic has broken the conditions upon which it was incorporated, and therefore the incorporation is void. And the regular courſe is to bring an information in nature of a writ of *quo warranto*, to inquire by what warrant the members now exerciſe their corporate power, having forfeited it by ſuch and ſuch proceedings. The exertion of this act of law, for the purpoſes of the ſtate, in the reigns of King Charles and King James II. particularly by ſeizing the charter of the city of London, gave great and juſt offence; though perhaps, in ſtrictneſs of law, the proceedings in moſt of them were ſufficiently regular; but the judgment againſt that of London was reverſed by act of parliament after the revolution; and by the ſame ſtatute it is enacted, that the franchiſes of the city of London ſhall never more be forfeited for any cauſe whatſoever. And becauſe by the common law corporations were diſſolved, in caſe the mayor or head officer was not duly elected on the day appointed in the charter or eſtabliſhed by preſcription, it is now provided, that for the future no corporation ſhall be diſſolved upon that account, and ample directions are given for appointing a new officer, in caſe there be no election, or a void one, made upon the charter or preſcriptive day.

Corporation ‖ Corpulency.

CORPORATION Act, is that which prevents any perſon from being legally elected into any office relating to the government of any city or corporation, unleſs within a twelvemonth before he has received the ſacrament of the Lord's Supper according to the rites of the church of England; and which enjoins him to take the oaths of allegiance and ſupremacy when he takes the oath of office; otherwiſe his election is void.

CORPOREAL, thoſe qualities which denominate a body. See INCORPOREAL.

CORPOREITY, the quality of that which is corporeal, or has body; or that which conſtitutes or denominates it ſuch. The corporeity of God was the capital error of the Anthropomorphites. Some authors reproach Tertullian with admitting a corporeity in the Deity; but it is manifeſt, by *body* he means no more than *ſubſtance*. The Mahometans reproach the Samaritans at this day, with a belief of the corporeity of God. Many of the ancients believed the corporeity of angels.

CORPSE, a dead body.

If any one, in taking up a dead body, ſteals the ſhroud, or other apparel, it will be felony. Stealing only the corpſe itſelf is not felony; but it is puniſhable as a miſdemeanor by indictment at common law.

CORPS, in *Architecture*, is a term borrowed from the French, ſignifying any part that projects or advances beyond the naked of a wall; and which ſerves as a ground for ſome decoration or the like.

Corps de Battaille, is the main body of an army drawn up for battle.

Corps de Garde, a poſt in an army, ſometimes under covert, ſometimes in the open air, to receive a body of ſoldiers, who are relieved from time to time, and are to watch in their turns, for the ſecurity of a quarter, a camp, ſtation, &c. The word is alſo uſed for the men who watch therein. It is uſual to have, beſide the great, a little corps de garde, at a good diſtance before the lines; to be the more readily advertiſed of the approach of the enemy.

CORPULENCY, the ſtate of a perſon too much loaded with fleſh or fat.

Corpulency is the occaſion of various diſeaſes, and particularly the apoplexy. It was held infamous among the ancient Lacedæmonians.

Sennertus mentions a man that weighed 600 pounds, and a maid 36 years of age who weighed 450. Bright of Malden, who died at the age of 29 years in 1750, weighed 616 pounds. Chiapin Vitelli, marquis of Cerona, a noted Spaniſh general in his time, from an exceſſive

excessive corpulency, is said to have reduced himself by drinking of vinegar, to such a degree of leanness, that he could fold his skin several times round him.

Castile soap, in the form of a bolus, an electuary, pills, or dissolved in a gill or more of soft water, from one to four drachms taken at bed-time, is strongly recommended with a view of reducing corpulency, in a discourse on its nature, causes, and cure, by Malcolm Flemyng, M. D. Lond. 1760. See MEDICINE *Index*.

CORPUS, in *Anatomy*, is applied to several parts of the animal structure; as *corpus callosum*, *corpus cavernosum*, &c. See ANATOMY *Index*.

CORPUS is also used in matters of learning, for several works of the same nature collected and bound together.

Gratian made a collection of the canons of the church, called *corpus canonum*. The *corpus* of the civil law is composed of the digest, code, and institutes. We have also a *corpus* of the Greek poets; and another of the Latin poets.

Corpus Christi, a festival of the church of England, kept on the next Thursday after Trinity Sunday, instituted in honour of the eucharist; to which also one of the colleges of Oxford is dedicated.

CORPUSCLE, in *Physics*, a minute particle, or physical atom, being such as a natural body is made up of. By this word is not meant the elementary particles, nor hypostatical principles of chemists; but such particles, whether of a simple or compound nature, whose parts will not be dissolved nor dissipated by ordinary degrees of heat.

CORPUSCULAR PHILOSOPHY, is that way of philosophising which endeavours to explain things, and to account for the phenomena of nature, by the motion, figure, rest, position, &c. of the corpuscles, or the minute particles of matter.

Mr Boyle sums up the chief principles of the corpuscular hypothesis, which now flourishes under the mechanical philosophy in these particulars:

1. They suppose that there is but one catholic or universal matter, which is an extended, impenetrable, and divisible substance, common to all bodies, and capable of all forms. 2. That this matter, in order to form the vast variety of natural bodies, must have motion in some or all its assignable parts; and that this motion was given to matter by God the Creator of all things, and has all manner of directions and tendencies. 3. Matter must also be actually divided into parts, and each of these primitive particles, fragments, or atoms of matter must have its proper magnitude or size, as also its peculiar figure or shape. 4. They suppose also, that these differently sized and shaped particles may have as different orders and positions, whereof great variety may arise in the composition of bodies.

CORRADINI DE SEZZA, *Peter Marcellinus*, a learned civilian and cardinal, born at Sezza, in 1658, acquired the esteem and confidence of Clement XI. and died at Rome in 1743. He was the author of a learned and curious work, entitled, "Verus Latium profanum et sacrum," 2 vols folio; and a history of Sezza, in 4to.

CORRADO, SEBASTIAN, an Italian grammarian of the 16th century, taught the Greek and Latin tongues at Reggio, where he formed an academy of polite literature; and at length removed to Bologna, in order to be professor of those languages. He wrote several works, the most esteemed of which are, "*Questura in qua Ciceronis vita refertur*," an excellent performance; and, "*de Lingua Latina*." He died in 1556.

CORRECTION, in *Printing*, the act of retrenching the faults in a work; or the reading which the corrector gives the first proofs, to point out and amend the faults to be rectified by the compositor.

The corrections are placed on the margin of each page, right against the line where the faults are found. There are different characters used to express different corrections, as D or ₰, *dele*, for any thing to be effaced or left out. When any thing is to be inserted, the place is marked in the line with a caret ʌ, and the insertion added in the margin. When a word, syllable, &c. is to be altered, it is erased out of the proof, and that to be put in its room written in the margin; always observing, if there be several mistakes in the same line, that the corrections in the margin be separated by little bars, or strokes, |. If a space be omitted, its place is marked with a caret, and the margin with #. If a space be wrong placed, as in the middle of a word, the two parts are connected with a cu rve, and the same character put in the margin. If a letter be inverted, it is expressed on the margin with 9. If any thing be transposed, it is marked thus: *The shortest* |*are the*|*follies*| *best*; for *the shortest follies are the best*; and in the margin is added *tr.* in a circle. If Roman characters are to be changed for Italic, or *vice versa*, a line is drawn under them thus, and *Roman* or *Italic* added in the margin: if to capitals, a double line. If a word or sentence is entirely omitted, the place is marked with a caret, and in the margin is inserted the word *out*. If the letters of a word stand too far asunder, a line is drawn under them, and in the margin is put a crooked line or hook, thus ‿.

Correction House, a place of confinement, where vagrants and persons guilty of crimes of an inferior degree, suffer punishment by being obliged to labour for a certain period of time, as for months or years, according to the nature of the crime. The benefits arising to society, and the reformation of offenders, from this mode of punishment, have been variously estimated by different writers, according to the views which they have taken of the effects and consequences which are supposed to follow the confinement and restraint to which the criminal is subjected. It has been regarded as one of the greatest defects of the laws of this country, that, excepting the punishment of death, there is no other which is accompanied with that degree of severity and terror to awe or restrain offenders from the commission of crimes. To this purpose are the following observations of Dr Paley. The laws of England, he says, "are not provided with any other punishment than that of death, sufficiently terrible to keep offenders in awe. Transportation which is the punishment second in the order of severity, answers the purpose of example very imperfectly; not only because exile is in reality a slight punishment to those who have neither property, nor friends, nor regular means of

of fubfiftence at home, but becaufe the punifhment, whatever it be, is unobferved and unknown. A tranfported convict *may* fuffer under his fentence, but his fufferings are removed from the view of his countrymen; his mifery is unfeen; his condition ftrikes no terror into the minds of thofe for whofe warning and admonition it was intended. This chafm in the fcale of punifhment produces alfo two farther imperfections in the adminiftration of penal juftice; of which the firft is, that the fame punifhment is extended to crimes of very different characters and malignancy; and the fecond, that punifhments, feparated by a great interval, are affigned to crimes hardly diftinguifhable in their guilt and mifchief."

This defect, it has been fuppofed, might be made up by the proper management of houfes of correction. For as the object of punifhment is not only the amendment of the offender, but is alfo intended to operate as an example to others, both thefe objects feem to be more certainly attained by the confinement and labour to which criminals are fubjected in houfes of this defcription than by any fpecies of punifhment provided by the laws of Britain. It is greatly to be regretted that the punifhments inflicted by the laws of this country, whether imprifonment or exile, pain or infamy, have rarely the effect of producing any reformation of the criminal. On the contrary, he often returns to the world more hardened in crime, and more determined in his wicked courfes. Houfes of correction might probably in this refpect be attended with more beneficial confequences. This feems to be the cafe with the Amfterdam houfe of correction, an account of which in this view will not, it is hoped, be unacceptable to our readers. It is extracted from the Journal of the Travels of M. Thouin.

The Amfterdam correction houfe, from the employment of the prifoners confined in it, is called the *rafping-houfe*, and is deftined to the reception of thofe malefactors whofe crimes do not amount to a capital offence. Their punifhment cannot fo properly be denominated folitary confinement as a fequeftration from fociety during a limited term of years. The building is fituated in a part of the fuburbs to the north-eaft of the city. The exterior has nothing remarkable, either with refpect to form or extent. It is detached from the ftreet by a fpacious court, which contains the keeper's lodge, together with apartments for the different fervants belonging to the eftablifhment. Over the gate, which opens from this court into the prifon, are placed two ftatues, as large as life, reprefenting two men in the act of fawing a piece of logwood.

The inner court is in the form of a fquare, round which are arranged the apartments of the prifoners, together with the neceffary warehoufes. One part of the ground ftory is divided into different chambers; the other ferves as a depot for the logwood, and the implements employed in its preparation.

The keeper, whofe countenance, contrary to the general cuftom of perfons of his profeffion, was ftrongly indicative of urbanity and gentlenefs, introduced M. Thouin into an apartment where two prifoners were at work in fawing a large log of Campeachy wood. The faw is compofed of four blades joined together, with very ftrong, large, and fharp teeth, which make a fciffure in the wood of nearly two inches in breadth. The operation is repeated, till the pieces become too fmall to undergo the faw, when they are ground in mills peculiarly conftructed for this purpofe.

This employment requires an extraordinary exertion of ftrength, and is at firft a fevere penance even to robuft perfons; but habit, addrefs, and practice, foon render it eafy; and the prifoners in a fhort time become competent to furnifh, without painful exertion, their weekly contingent of 200 lb. weight of fawed pieces. After completing this tafk, they even find time to fabricate a variety of little articles in wood and ftraw, which they fell to thofe who vifit the prifon, or difpofe of, by means of agents, in the town.

M. Thouin next infpected three apartments of different dimenfions, which opened into the inner court. The one was inhabited by four, the fecond by fix, and the third by ten prifoners. The furniture of the rooms confifted in hammocks, with a mattrefs, a blanket, and a coverlid to each, tables, chairs, and ftools, glafs and earthen veffels, and various other articles of convenience. Every thing in thefe apartments was diftinguifhed by neatnefs and propriety; and notwithftanding the number of inhabitants allotted to each was fully adequate to the dimenfions of the rooms, the fenfes were not offended with any difagreeable fcent, and the air was in every refpect as pure and wholefome as the furrounding atmofphere.

In an obfcure part of the building are a number of cells, in which formerly thofe prifoners who revolted againft the proper fubordination of the place, or ill-treated their comrades, were confined for a few days. But the keeper affured M. Thouin that thefe cells had not been made ufe of for upwards of 10 years. They are dark gloomy dungeons, with only a fmall aperture for the admiffion of light and air. The fuppreffion of this barbarous and coercive punifhment does honour to the humanity of government.

The ftore-rooms are filled with various kinds of wood for the purpofes of dyeing; as the *hæmatoxylum campechianum*, the *morus tinctoria*, the *cæfalpinia fappan*, &c. They are all exotics, with the exception of the *evonymus Europæus*. The warehoufes were not of fufficient extent to contain the quantity of wood, which was depofited in piles in different parts of the court.

The prifoners, amounting to 76 in number, were uniformly habited in coarfe woollens; wear very good ftockings, large leather fhoes, white fhirts, and caps or hats. They are, by the rules of the houfe, obliged to frequent ablutions, which greatly contribute to the prefervation of their health. There was only one fick perfon amongft them; and, what is not a little remarkable, almoft all the prifoners had formerly lived in large commercial towns; very few villagers were amongft them. They had all been fentenced to imprifonment for theft; but it depends upon themfelves, by reformation and good behaviour, to fhorten the term of their confinement, which many of them frequently do.

The keeper, whofe humanity to the unfortunate perfons committed to his care entitles him rather to the title of their protector than their gaoler (and M. Thouin informs us, that the prifoners generally called him by no other name than *father*), affifts them with his counfels and friendly admonitions. He regifters every week, in a book appropriated to this purpofe, both the inftances of good and bad behaviour, which is annually

submitted

submitted to the examination of the magistracy, who, from this report, abridge or prolong the term of confinement, according to the degree of indulgence which each prisoner appears to merit. Cases frequently happen where a malefactor, condemned to an imprisonment of eight years, by his good behaviour procures his enlargement at the expiration of four; and so on in proportion for a shorter term. But great attention is paid to discriminate between actual reform and hypocritical artifice.

The reward of good behaviour is not, however, confined to, or withheld till, the period of actual liberation. Their restoration to society is preceded by a progressive amelioration of their lot. Their work is gradually rendered less laborious, they are accommodated with separate apartments, and employed in the services of domestic economy. The keeper even entrusts them with commissions beyond the precincts of the prison; and scarce a single instance has occurred of their abusing this indulgence. By this prudent management, a considerable saving is effected in the expence of the establishment, at the same time that it tends to wear away prejudice, and to initiate the prisoners by gradual advances into the reciprocal duties of social life.

M. Thouin made particular inquiries whether it was customary for persons after their discharge to be confined a second and third time, as is but too often the case in many countries, for a repetition of their offence. He was informed, that such instances very rarely occur; but the case is not without precedent, as he observed in the person of a young Jew, who was then in the rasping-house for the third time. The case of this man is somewhat extraordinary. During the period of his detention, he always conforms, with the most scrupulous observance, to the rules of the place, and gives general satisfaction by his exemplary conduct. But such, as he himself avowed to our traveller, is his constitutional propensity to thieving, that no sooner is the term of his imprisonment elapsed, than he returns with redoubled ardour to his lawless courses. It is not so much for the sake of plunder, as to gratify his irresistible impulse, that he follows this vicious life; and M. Thouin adds, that he recounted his different exploits with as much exultation and triumph as a veteran displays when rehearsing his warlike atchievements.

Another salutary regulation in this institution, from which the best consequences result, is the indulgence granted to the prisoners of receiving the visits of their wives and mistresses twice every week. Proper care, however, is taken to guard against the introduction of disease; and the ladies, in one sense, purchase their admission by giving a trifling sum of money at the gate, which becomes the perquisite of the aged prisoners, whose wants are of a different nature from their youthful comrades. Thus the pleasures of one class contribute to the comforts of the other; and the entrance money, trifling as it is, keeps away a crowd of idle vagabonds, who have no acquaintance with the prisoners. The ladies at their visits are permitted to eat and drink with their lovers; and when the conversation becomes too animated for a third person to be present, the rest of the company obligingly take the hint, and leave them to enjoy a *tete a-tete*.—By this prudent regulation, many hurtful consequences attendant on a total seclusion from female society are guarded against.

M. Thouin concludes his account with observing, that the rasping-house at Amsterdam bears a greater resemblance to a well-ordered manufactory than to a prison. It were to be wished, that all similar institutions were conducted upon a similar plan.

But it is probable that solitary confinement and less intercourse with their friends would have a better effect in reforming the habits of offenders than the indulgences which M. Thouin considers as so beneficial. The philosopher whom we formerly quoted observes, that "of reforming punishments none promises so much success as that of solitary imprisonment, or the confinement of criminals in separate apartments. This improvement of the Amsterdam house of correction would augment the terror of the punishment, would seclude the criminal from the society of his fellow-prisoners, in which society the worse are sure to corrupt the better; would wean him from the knowledge of his companions, and from the love of that turbulent pernicious life in which his vices had engaged him; would raise up in him reflections on the folly of his choice, and dispose his mind to such bitter and continued penitence, as might produce a lasting alteration in the principles of his conduct."

In addition to the confinement and labour which offenders undergo in houses of correction, some are subject to whipping at certain stated intervals. The benefit arising from this mode of punishment, with regard to the reformation of the criminal, has been justly questioned. If any good effect is to be expected from this discipline, it must be inflicted in private. It has been observed by one * who knew nature well, that punishment which deprives a man of all sense of honour will never contribute to make him virtuous; and it is generally found that the soldier who has once been whipped, becomes quite indifferent to propriety of conduct. Fasting, which is not attended with shame, promises to be a more effectual punishment of profligacy.

* *Fielding.*

CORRECTOR, in general, denotes something that mends the faults or bad qualities of others.

Corrector *of the Staple*, a clerk belonging to the staple, whose business is to write down and record the bargains that merchants make there.

Corrector, in *Medicine* or *Pharmacy*, an ingredient in a composition, which guards against or abates the force of another.

CORREGIDOR, the name of an officer of justice in Spain, and countries subject to the Spanish government. He is the chief judge of a town or province.

CORREGIO. See Allegri.

CORRELATIVE, something opposed to another in a certain relation. Thus father and son are correlatives. Light and darkness, motion and rest, are correlative and opposite terms.

CORRIGIOLA, in *Botany*, a genus of plants belonging to the pentandria class, and in the natural method ranking under the 45th order, *Miscellaneæ*. See Botany *Index*.

CORROBORANTS, or Corroborative *Medicines*. See Strengtheners.

CORROSION, in a general sense, the action of gnawing away, by degrees, the continuity of the parts of bodies.

Corrosion, in *Chemistry*, an action of bodies, by means of proper menstruums, that produces new combinations,

binations, and a change of their form, without converting them to fluidity.

CORROSIVE SUBLIMATE MERCURY. See CHEMISTRY *Index*.

CORRUGATOR MUSCLE. See ANATOMY, *Table of the Muscles*.

CORROSIVES, in *Surgery*, are medicines which corrode whatever part of the body they are applied to. Such are burnt alum, white precipitate of mercury, white vitriol, red precipitate of mercury, butter of antimony, lapis infernalis, &c.

CORRUPTICOLÆ, a sect who rose out of the Monophysites in Egypt about the year 519, under their chief Severus, the pretended patriarch of Alexandria.

Their distinguishing doctrine, whence they derived their name, was, that the body of Jesus Christ was *corruptible;* that the fathers had owned it; and that to deny it was to deny the truth of our Saviour's passion.

On the other hand, Julian of Halicarnassus, another Eutychian, a refugee, as well as Severus, in Alexandria, maintained that the body of Jesus Christ had been always incorruptible; that to say it was corruptible, was to make a distinction between Jesus Christ and the Word, and by consequence to make two natures in Jesus Christ.

The people of Alexandria were divided between the two opinions; and the partisans of Severus were called *corrupticolæ*, q. d. worshippers of something *corruptible:* sometimes they were denominated *corruptibiles;* and the adherents of Julian *incorruptibiles* or *phantasiastæ*. The clergy and secular powers favoured the first; the monks and the people the latter.

CORRUPTION, the destruction, extinction, or at least cessation for a time, of the proper mode of existence of any natural body. See PUTREFACTION.

Corruption of Blood, in *Law*, one of the consequences of an attainder; and is both upwards and downwards; so that an attainted person can neither inherit lands or other hereditaments from his ancestors, nor retain those he is already in possession of, nor transmit them by descent to any heir; but the same shall escheat to the lord of the fee, subject to the king's superior right of forfeiture; and the person attainted shall also obstruct all descents to his posterity, wherever they are obliged to derive a title through him to a remoter ancestor. See ATTAINDER.

Blackst. Comment.

This is one of those notions which our laws have adopted from the feudal constitutions, at the time of the Norman conquest; as appears from its being unknown in those tenures which are indisputably Saxon, or gavel kind: wherein though by treason, according to the ancient Saxon laws, the land is forfeited to the king, yet no corruption of blood, no impediment of descents, ensues; and on judgment of mere felony, no escheat accrues to the lord. But by the law of England, derived as above, a man's blood is so universally corrupted by attainder, that his sons can neither inherit to him nor to any other ancestor, at least on the part of their attainted father.

This corruption of blood cannot be absolutely removed but by authority of parliament. The king may excuse the public punishment of an offender; but cannot abolish the private right which has accrued, or may accrue, to individuals as a consequence of the criminal's attainder. He may remit a forfeiture in which the interest of the crown is alone concerned; but he cannot wipe away the corruption of blood; for therein a third person hath an interest, the lord who claims by escheat. If therefore a man hath a son, and is attainted, and afterwards pardoned by the king: this son can never inherit to his father, or father's ancestors; because his paternal blood, being once thoroughly corrupted by his father's attainder, must continue so: but if the son had been born after the pardon, he might inherit; because, by the pardon, the father is made a new man, and may convey new inheritable blood to his after-born children.

This corruption of blood, thus arising from feudal principles, but perhaps extended farther than even these principles will warrant, has been long looked upon as a peculiar hardship: because the oppressive parts of the feudal tenures being now in general abolished, it seems unreasonable to reserve one of their most inequitable consequences; namely, that the children should not only be reduced to present poverty (which, however severe, is sufficiently justified upon reasons of public policy), but also be laid under future difficulties of inheritance, on account of the guilt of their ancestors. And therefore in most (if not all) of the new felonies treated by parliament since the reign of Henry VIII. it is declared that they shall not extend to any corruption of blood: and by the statute 7 Anne, c. 21. (the operation of which is postponed by the statute 17 Geo. II. c. 39.) it is enacted, that after the death of the late pretender and his sons, no attainder for treason shall extend to the disinheriting any heir, nor the prejudice of any person, other than the offender himself; which provisions have indeed carried the remedy farther than was required by the hardship above complained of; which is only the future obstruction of descents, where the pedigree happens to be deduced through the blood of an attainted ancestor.

CORSAIR, a pirate or person who scours the seas, especially the Mediterranean, with a vessel armed for war, without commission from any prince or power, to plunder merchant vessels. The word comes from the Italian *corsare*, of *corso*, or *à cursibus*, by reason of their courses, or excursions.—The name is commonly given to the piratical cruisers of Barbary, who had their rise about the beginning of the 16th century.

A *corsair* is distinguished from a *privateer* in this, that the latter does it under a commission, and only attacks the vessels of those at war with the state whence his commission is derived. The punishment of a corsair is to be hanged, without remission; whereas privateers are to be treated as prisoners of war. All corsair vessels are good prizes.

CORSELET, a little cuirass: or, according to others, an armour or coat made to cover the whole body, anciently worn by the pikemen, usually placed in the front and flanks of the battle, for the better resisting the enemy's assaults, and guarding the soldiers placed behind them.

CORSICA, an island in the Mediterranean, between 8° and 10° E. Long. and 41° and 43° N. Lat. On the south it is separated from Sardinia, by the strait of Bonifacio; to the east it has the Tuscan sea; to the north the gulf of Genoa; and to the west it is opposite the coasts of France and Spain. It is 150 miles

miles from north to fouth, and from 40 to 50 in breadth. It was known to the ancient Greeks by the names of Callifta and Cyrnus, and to the Romans by its prefent appellation. On the coaft are many excellent harbours. It is mountainous, but fruitful valleys are interfperfed; and it has fome fine lakes and rivers. With refpect to products, Corfica has nothing peculiar to itfelf; but from the earlieft times it has been famous for its fwarms of bees, and produces vaft quantities of honey, which, however, is reckoned bitter, on account of the box and yew with which the country abounds. The mountains are rich in lead, iron, copper, and filver; a mine of the latter was opened in the year 1767, from which a quintal of mineral produced 18 ounces of filver. There are alfo mines of alum and faltpetre. The granite of Corfica is nearly equal to the oriental. Porphyries, jafper, talc, amianthus, emeralds, and other precious ftones, are found fcattered in the mountains; and the fouth coaft abounds with beautiful coral. After many revolutions, this ifland was, for fome centuries, under the dominion of the Genoefe, whofe tyranny was fuch, that the Corficans were almoft in a perpetual ftate of infurrection. In 1736, a German adventurer, Theodore baron Newhoff, brought fome affiftance to them, and, on his affurances of more powerful aid, they elected him king; but, as he could not fubftantiate his promifes, he was obliged to leave the ifland. He came to England, was thrown into the Fleet prifon, releafed by an act of infolvency (after having regiftered his kingdom of Corfica for the benefit of his creditors), and fuffered to die in extreme indigence. The Genoefe tired of the conteft, fold the fovereignty to France, in 1767, and the celebrated Paoli, who had been elected to the chief command, in 1755, was obliged to abandon the ifland in 1769. After the French revolution, in 1789, Corfica was admitted as an eighty-third department of France, at the particular requeft of a deputation, of which Paoli was at the head. In confequence, however, of fome events which followed the revolution of 1792, Paoli revolted; the French, by the affiftance of the Englifh, were expelled from the ifland; and Corfica, on the 19th of June 1794, was declared annexed to the crown of Great Britain, according to a new conftitution which had been previoufly formed. In October 1796, however, the Englifh found it expedient to evacuate the ifland, of which the French immediately took poffeffion, and again united it to their republic, dividing it into two departments, Golo and Liamone; of the former of which Baftia is the chief town, and of the latter Ajaccio.

CORSNED, or Morsel of Execration, a fpecies of trial or purgation * anciently in ufe among us, and which probably arofe from an abufe of revelation in the dark ages of fuperftition. It confifted of a piece of cheefe or bread, about an ounce in weight, which was confecrated with a form of exorcifm; defiring of the Almighty that it might caufe convulfions and palenefs, and find no paffage if the man was really guilty; but might turn to health and nourifhment if he was innocent; as the water of jealoufy among the Jews was, by God's efpecial appointment, to caufe the belly to fwell, and the thigh to rot, if the woman was guilty of adultery. This corfned was then given to the fufpected perfon, who at the fame time alfo received the holy facrament: if indeed the corfned was not, as fome have fufpected, the facramental bread itfelf: till the fubfequent invention of tranfubftantiation preferved it from profane ufes with a more profound refpect than formerly. Our hiftorians affure us, that Godwin, earl of Kent, in the reign of King Edward the Confeffor, abjuring the death of the king's brother, at laft appealed to his corfned, "per *buccellam deglutiendam abjuravit*," which ftuck in his throat and killed him. This cuftom has been long fince gradually abolifhed, though the remembrance of it ftill fubfifts in certain phrafes of abjuration retained among the common people: as, "I will take the facrament upon it; May this morfel be my laft;" and the like.

* See *Trial*.

CORT, Cornelius, a celebrated engraver, was born at Hoorn in Holland in 1536. After having learned the firft principles of drawing and engraving, he went to Italy to complete his ftudies, and vifited all the places famous for the works of the great mafters. At Venice he was courteoufly received by Titian; and engraved feveral plates from the pictures of that admirable painter. He at laft fettled at Rome, where he died in 1578, aged 42. According to Bafan, he was "the beft engraver with the burin or graver only that Holland ever produced. We find in his prints," adds he, "correctnefs of drawing, and an exquifite tafte." He praifes alfo the tafte and lightnefs of touch with which he engraved landfcapes, and that without the affiftance of the point. It is no fmall honour to this artift, that Agoftino Carracci was his fcholar, and imitated his ftyle of engraving rather than that of any other mafter. His engravings are very numerous (151 according to Abbé Marolles), and by no means uncommon.

CORTES *of* Spain, a term purely Spanifh, fignifying the *courts*, i. e. the ftates or affembly of the ftates, at Madrid.

Cortes, or Cortez, *Ferdinand*, a Spanifh general, famous for the conqueft of Mexico, and other victories over the natives of South America; but infamous for the cruelties he committed upon the vanquifhed, without regard to rank, age, or fex. It probably was on this account he was but coolly received on his return to Europe by his royal mafter Charles V.: It is even afferted that the emperor afked him who he was? to which Cortez replied; "I am the man who gave you more provinces than your anceftors have left you towns." He died in 1554, aged 63. See Mexico.

CORTEX, in *Botany*, the rind or coarfe outer bark of plants. The organization of the outer and inner barks, which differ principally in the finenefs of their texture, is particularly explained under the article Plants.

Wounds of the bark, and its feparations from the wood, whether naturally or artificially made, are eafily cured, and made to unite again by proper care. If fections be made in the rinds of the afh and fycamore of a fquare figure, three fides cut, and the fourth uncut, and the whole be afterwards bound round with a pack-thread, it will all unite again, only leaving a fcar in each of the three fides where it was cut. If feveral parts of the bark of either of thefe trees be cut off, and entirely feparated from the tree; fome fhallower, leaving

ving a part of the bark on, and others deeper, to the wood itself; these pieces being again put into their places, and bound on with a pack-thread, will not indeed unite, but a fresh bark will grow in their places, and thrust them away; but if they be first carefully laid on in the exact direction in which they originally grew, and then the whole part beyond the wound on every side covered with a large plaster of diachylon, or the like, and this bound over with pack-thread to keep all firmly in their places, the pieces of bark, whether cut off shallow or deep down to the very wood of the tree, will firmly unite themselves to the places where they originally grew. This cure will be performed in about three weeks; but the outer rind of the separated pieces will not be plump, but somewhat shrivelled; the edges also will recede somewhat from their original place; so that there remains a sort of scar all round. These experiments are best made in the spring season; for in the autumn and winter, the sap arising but weakly, the parts that should unite wither before that is brought about. The success of these experiments has made some think that the whole branch of a tree separated and bound on again might unite with the rest. But the experiments that have been made in the most favourable manner for such a trial have all proved vain, the branch cut off withering always in a few days, however well united and carefully kept on.

Cortex *Peruvianus*. See Cinchona, Botany and Materia Medica *Index*.

Cortex *Winteranus*. See Wintera, Botany and Materia Medica *Index*.

CORTONA, Pietro da. See Berretini.

Cortona, a very ancient town of Italy, mentioned by many of the Roman historians. It was originally called *Corton*, and lay to the northward of the lake Thrasymenus. It still retains the name of Cortona. E. Long. 13. 0. N. Lat. 43. 15.

CORTONESE, Pietro Palo. See Gobbo.

CORTUSA, Bear's-ear Sanicle; a genus of plants, belonging to the pentandria class; and in the natural method ranking under the 21st order, *Preciæ*. See Botany *Index*.

CORUNNA, or Groyne, a port-town of Gallicia in Spain, situated on a fine bay of the Atlantic ocean, about 32 miles north of Compostella, and 20 south-west of Ferrol. W. Long. 9. 0. N. Lat. 43. 0.

CORUS, Omer, Homer, or Chomer, in the Jewish antiquities, a measure containing 10 baths or 75 gallons and five pints, as a measure of things liquid, and 32 pecks and 1 pint as a measure for things dry. The *corus* or *omer* was most commonly a measure for things dry; and the greatest that was used among the Jews. It contained, according to the rabbins, 10 ephahs or 30 sata or seahs. *Corus* is the most usual term in the historical writers, and *omer* or *chomer* among the prophets.

Corus is also used in some of our old writers for eight bushels or a quarter; *decem* coros *tritici*, *sive decem quarteria*.

CORUSCATION, a glittering or gleam of light issuing from any thing. It is chiefly used for a flash of lightning darting from the clouds in time of thunder.

There is a method of producing artificial coruscations, or sparkling fiery meteors, which will be visible not only in the dark but at noon-day, and that from two liquors actually cold. The method is this. Fifteen grains of solid phosphorus are to be melted in about a drachm of water; when this is cold, pour upon it about two ounces of oil of vitriol; let these be shaken together, and they will at first heat, and afterwards they will throw up fiery balls in great number, which will adhere like so many stars to the sides of the glass, and continue burning a considerable time; after this, if a small quantity of oil of turpentine is poured in, without shaking the phial, the mixture will of itself take fire, and burn very furiously. The vessel should be large, and open at the top.

Artificial coruscations may also be produced by means of oil of vitriol and iron, in the following manner: Take a glass body capable of holding three quarts; put into this three ounces of oil of vitriol and twelve ounces of water; then warming the mixture a little, throw in, at several times, two ounces or more of clean iron filings; upon this an ebullition and white vapours will arise: then present a lighted candle to the mouth of the vessel, and the vapour will take fire, and afford a bright fulmination or flash like lightning. Applying the candle in this manner several times, the effect will always be the same; and sometimes, the fire will fill the whole body of the glass, and even circulate to the bottom of the liquor; at others, it will only reach a little way down its neck. The great caution to be used in making this experiment is the making the vapour of a proper heat: for, if too cold, few vapours will arise; and, if made too hot, they will arise too fast and will only take fire in the neck of the glass, without any remarkable coruscation.

CORVORANT, formerly written Cormorant. See Pelicanus, Ornithology *Index*.

CORVUS, the Raven or Crow kind, a genus of birds of the order of picæ. See Ornithology *Index*.

Corvus (*Raven*), in *Astronomy*, a constellation of the southern hemisphere; whose stars in Ptolemy's catalogue are 7; in Tycho's as many; in the Britannic catalogue 9.

Corvus, in Roman antiquity, a military engine, or rather gallery, moveable at pleasure by means of pulleys; chiefly used in boarding the enemy's ships to cover the men. The construction of the corvus was as follows: They erected on the prow of their vessels a round piece of timber of about a foot and a half diameter, and about 12 feet long; on the top of which they had a block or pulley. Round this piece of timber they laid a stage or platform of boards, four feet broad, and about 18 feet long, which was well framed and fastened with iron. The entrance was long-ways, and it moved about on the above-mentioned upright piece of timber as on a spindle, and could be hoisted up within six feet of the top: about this was a sort of parapet knee-high, which was defended with upright bars of iron sharpened at the end, and towards the top there was a ring, by the help of which and a pulley or tackle, they raised or lowered the engine at pleasure. With this moveable gallery they boarded the enemy's vessels (when they did not oppose side to side),

side), sometimes on their bow and sometimes on their stern, as occasion best served. When they had grappled the enemy with these iron spikes, if they happened to swing broadside to broadside, then they entered from all parts; but in case they attacked them on the bow, they entered two and two by the help of this machine, the foremost defending the foreparts, and those that followed the flanks, keeping the boss of their bucklers level with the top of the parapet.

CORYATE, THOMAS, a very extraordinary personage, who seems to have made himself famous by his whimsical extravagancies, was the son of a clergyman, and born at Oldcombe in Somersetshire in 1577. He acquired Greek and Latin at Oxford; and coming to London, was received into the household of Henry prince of Wales. If Coryate was not over witty himself, he got acquainted with the wits of that time, and served to exercise their abilities, having more learning than judgment. He was a great peripatetic: for, in 1608, he took a long journey on foot; and after he returned, published his travels under the following strange title: *Crudities hastily gobbled up in five months Travels in France, Savoy, Italy, Rhetia, Helvetia, some parts of High Germany, and the Netherlands*, Lond. 1611, 4to. In 1612 he set out again with a resolution to spend ten years in travelling: he went first to Constantinople; and after travelling over a great part of the East, died of a flux at Surat in the East Indies. Some of the accounts of his peregrinations are to be found in Purchas's Pilgrimages.

CORYBANTES, in antiquity, priests of Cybele, who danced and capered to the sound of flutes and drums. See CROTALUM.

Catullus, in his poem called *Atys*, gives a beautiful description of them, representing them as madmen. Accordingly Maximus Tyrius says, that those possessed with the spirit of Corybantes, as soon as they heard the sound of a flute, were seized with an enthusiasm, and lost the use of their reason. And hence the Greeks use the word κορυβαντειν, *to corybantize*, to signify a person's being transported or possessed with a devil. See ENTHUSIASM.

Some say that the Corybantes were all eunuchs; and that it is on this account Catullus, in his Atys, always uses feminine epithets and relatives in speaking of them.

Diodorus Siculus remarks, that Corybas, son of Jason and Cybele, passing in Phrygia with his uncle Dardanus, there instituted the worship of the mother of the gods, and gave his own name to the priests. Strabo relates it as the opinion of some, that the Corybantes were children of Jupiter and Calliope, and the same with the *Cabiri*. Others say the word had its origin from this, that the Corybantes always walked dancing (if the expression may be allowed) or tossing the head, κορυπτοντες βαινοειν.

CORYBANTICA, a festival held in Crete, in memory of the Corybantes, who educated Jupiter when he was concealed in that island from his father Saturn, who would have devoured him.

CORYCEUM, in antiquity, that part of the gymnasium where people undressed. It was otherwise called *apodyterion*.

CORYCOMACHIA, among the ancients, was a sort of exercise in which they pushed forwards a ball, suspended from the ceiling, and at its return either caught it with their hands, or suffered it to meet their body. Oribasius informs us it was recommended for extenuating too gross bodies.

CORYDALES, in *Botany*, an order of plants in the *Fragmenta Methodi Naturalis* of Linnæus, containing the following genera, viz. epimedium, hypecoum, leontice, melianthus, pinguicula, and utricularia.

CORYDALIS, in *Botany*. See FUMARIA, BOTANY *Index*.

CORYLUS, the HAZEL; a genus of plants belonging to the monœcia class; and in the natural method ranking under the 50th order, *Amentaceæ*. See BOTANY *Index*.

CORYMBIFERÆ, in *Botany*, the name of an order or division of the compound flowers adopted by Linnæus after Ray and Vaillant, in the former editions of his Fragments of a Natural Method. This title in the later editions is changed for *Discoideæ*, another name borrowed from Ray's Method, but used in a somewhat different sense.

CORYMBIUM, in antiquity, an ornament of hair worn by the women. Its form was that of a corymbus.

CORYMBIUM; a genus of plants belonging to the syngenesia class; and in the natural method ranking under the 49th order, *Compositæ*. See BOTANY *Index*. —The calyx is diphyllous, uniflorous, and prismatical; the corolla monopetalous and regular; there is one woolly seed below each floret.

CORYMBUS, properly signifies a cluster of ivy berries. Among botanists, it is a mode of flowering in which the lesser or partial flowerstalks are produced along the common stalk on both sides; and though of unequal lengths, rise to the same height, so as to form a flat and even surface at the top. See BOTANY *Index*.

CORYNOCARPUS, in *Botany*, a genus of plants belonging to the pentandria class. See BOTANY *Index*.

CORYPHA, MOUNTAIN PALM, or *Umbrella Tree*; a genus of plants of the order of *Palmæ*, belonging to the monœcia class. See BOTANY *Index*.

CORYPHÆNA, a genus of fishes belonging to the order of thoracici. See ICHTHYOLOGY *Index*.

CORYPHÆUS, in the ancient tragedy, was the chief or leader of the company that composed the chorus: (See CHORUS).—The word is formed from the Greek κορυφη, "tip of the head." The coryphæus spoke for all the rest, whenever the chorus took part in the action, in quality of a person of the drama, during the course of the acts. Hence coryphæus had passed into a general name for the chief or principal of any company, corporation, sect, opinion, &c. Thus Eustatius of Antioch is called the *coryphæus* of the council of Nice; and Cicero calls Zeno the *coryphæus* of the Stoics.

CORYVREKAN, a dangerous whirlpool on the west coast of Scotland, between the isle of Scarba and the north point of Jura. It is so named from a young Danish prince, who perished in this place: its dreadful vortex extends above a mile in circuit. Many smaller whirlpools and rapid currents are found in this neighbourhood; dangerous to those who are strangers to the coast.

CORYZA, in *Medicine*, a catarrh of the nose. See MEDICINE *Index*.

CORZOLA, or CURSCOLA, an island in the gulf of Venice, divided from Ragusa in Dalmatia by a narrow strait. E. Long. 18. 0. N. Lat. 42. 35.

COS, or COOS, in *Ancient Geography*, a noble island on the coast of Caria, in the Hither Asia, 15 miles to the west of Halicarnassus, 100 in compass, called *Meropis;* and hence Thucydides joins both names together, *Cos Meropis;* it had a cognominal town *Cos*, but originally called *Astypalæa*, mentioned by Homer; with a port locked or walled round, (Scylax, Mela). The island was fruitful, and yielded a generous wine, (Strabo). It boasted of Hippocrates and Apelles; each at the head of his several profession. It was the country of Philetas, an excellent elegiac poet, who flourished in the time of Philip and Alexander: the preceptor of Ptolemy Philadelphus: so thin and light that he was obliged to wear lead to prevent the being blown away by a puff of wind (Ælian, Athenæus); much commended by Propertius. The *vestes Coæ*, made of silk, were famous for their fineness and colour, (Horace, Propertius, Tibullus). In the suburbs of Cos stood the temple of Æsculapius, a noble structure, and extremely rich.

Cos, the *Whetstone*, in *Natural History*, a genus of vitrescent stones, consisting of fragments of an indeterminate figure, sub-opaque, and granulated.

Of this genus there are several species, some consisting of rougher, and others of smoother, or even of altogether impalpable particles; and used not only for whetstones, but also for mill-stones, and other the like purposes.

Cos TURCICA, *Turkey-stone*, a species of stones which is arranged in the siliceous class. It is of a dull white, and often of an unequal colour; some parts appearing more compact than others. Its specific gravity is 2.598: it strikes fire with steel, and effervesces with acids. Mr Kirwan found that 100 parts of it contain 25 of carbonate of lime, and no iron. Cronstedt is of opinion that there are probably two sorts of stones known by this name, as that described by Wallerius neither gives fire with steel nor effervesces with acids. It is used as a whetstone; and those of the finest grain are the best hones for the most delicate cutting tools, and even for razors, lancets, &c.

COSCINOMANCY, the art of divination by means of a sieve. The word comes from κοσκινον, *cribrum*, "a sieve," and μαντεια, *divination*. The sieve being suspended, after rehearsing a formula of words, it is taken between two fingers only; and the names of the parties suspected repeated: he at whose name the sieve turns, trembles, or shakes, is reputed guilty of the evil in question.

This must be a very ancient practice: Theocritus, in his third Idyllion, mentions a woman very skilful in it. It was sometimes also practised by suspending the sieve by a thread, or fixing it to the points of a pair of sheers, giving it room to turn, and naming, as before, the parties suspected; in which last manner *coscinomancy* is still practised in some parts of England. It appears from Theocritus, that it was not only used to find out persons unknown, but also to discover the secrets of those that were known.

CO-SECANT, in *Geometry*, the secant of an arch which is the complement of another to 90°. See GEOMETRY.

COSENAGE, in *Law*, a writ that lies where the tresail, that is, the tritavus, the father of the besail, or great grandfather, being seized in fee at his death of certain lands or tenements, dies; a stranger enters, and abates; then shall his heir have this writ of cosenage; the form of which see in Fitz. Nat. Br. fol. 221.

COSENING, in *Law*, an offence whereby any thing is done deceitfully, in or out of contracts, which cannot be fitly termed by any especial name. In the civil law it is called *stellionatus*. See STELLIONATE.

COSENZA, the capital of the Hither Calabria, in the kingdom of Naples. E. Long. 16. 35. N. Lat. 39. 15. It is an archbishop's see.

COSHERING, in the feudal customs, a kind of right of the lords to lie and feast themselves and their followers at their tenants houses. The word *coshering* may perhaps be derived from the old English word *coshe*, a cot or cottage.

CO-SINE, in *Trigonometry*, the sine of an arch which is the complement of another to 90°. See GEOMETRY.

COSMETIC, in *Physic*, any medicine or preparation which renders the skin soft and white, or helps to beautify and improve the complexion; as lip salves, cold creams, ceruse, &c.

COSMICAL, a term in *Astronomy*, expressing one of the poetical risings of a star: thus a star is said to rise cosmically when it rises with the sun, or with that point of the ecliptic in which the sun is at that time; and the cosmical setting is when a star sets in the west at the same time that the sun rises in the east.

COSMOGONY, in *Physics*, signifies the science of the formation of the universe. It is formed of κοσμος, *the world*, and γινομαι, *I am born*.

In our conjectures about the formation of the world there are two principles which we ought never to lose sight of: 1. That of *creation;* for certainly matter could not give itself existence, it must have received it. 2. That of a *Supreme Intelligence* directing this creation, and the arrangement of the parts of matter, in consequence of which this world was formed. See CREATION and GEOLOGY.

COSMOGRAPHY, the description of the world; or the art which teaches the construction, figure, disposition, and relation of all the parts of the world, with the manner of representing them on a plane. The word comes from κοσμος, *world*, and γραφω, *I describe*.

Cosmography consists chiefly of two parts: *Astronomy*, which shows the structure of the heavens, and the disposition of the stars; and *Geography*, which shows those of the earth.

COSMOLABE (from κοσμος, *world*, and λαμβανω, *I take*), an ancient mathematical instrument, serving to measure distances both in the heavens and on earth. The *Cosmolabe* is in a great measure the same with the astrolabe. It is also called *pantacosm*, or the *universal instrument*, by L. Morgard, in a treatise written expressly upon it, printed in 1612.

COSMOLOGY (from κοσμος, *world*, and λογος, *discourse*), the science of the world in general. This Wolfius calls *general*, or *transcendental cosmology*, and has

has written a treatife on the fubject, wherein he endeavours to explain how the world arifes from fimple fubftances; and treats of the general principles, of the modifications of material things, of the elements of bodies, of the laws of motion, of the perfection of the world, and of the order and courfe of nature.

COSMOPOLITE, or COSMOPOLITAN, a term fometimes ufed to fignify a perfon who has no fixed living or place of abode, or a man who is a ftranger nowhere. The word comes from the Greek κοσμος, *world*, and πολις, *city*.—One of the ancient philofophers being interrogated what countryman he was? anfwered, he was a *cofmopolite*, i. e. an inhabitant or citizen of the world.

COSSACKS, a name given to the people inhabiting the banks of the rivers Dnieper and Don, near the Black fea and borders of Turkey. The word implies irregular troops of horfe. Thefe people are divided into European and Afiatic Coffacks. The firft confift of the Zaporog, who dwell below the cataract of the Dnieper, fome on the fide next to Ruffia, and others on the oppofite fide of the river; the Lower and Upper Coffacks; the Bielgorod Coffacks; and a part of the Don Coffacks. The Afiatic Coffacks are compofed of the reft of the Don Coffacks, the Grebin Coffacks, the Yaik Coffacks, and the Weftern Calmucks, who retiring from thofe that inhabited the fouth borders of Siberia under Yaiuki Can, fettled upon the Wolga, and are dependent upon Ruffia.

The Coffacks were known by that name ever fince the 948th year of Chrift. They dwelt upon Mount Caucafus, in the place now called *Cabardy;* and were reduced under the Ruffian dominion by Prince Mftiflaw in the year 1021. Many Ruffians, Poles, and others, who could not live at home, have, at different times, been admitted among the Coffacks: but the latter, abftracted from thefe fugitives, muft have been an ancient and well governed nation.

Toward the beginning of the 16th century, the Zaporog Coffacks fixed their habitations on the fpacious plains that extend along the banks of the Dnieper. They had undergone confiderable hardfhips from the incurfions of the Tartars, for which they afterwards found means to avenge themfelves in an ample manner. The Poles being fenfible how ferviceable the Coffacks might be in defending them from the ravages of the Tartars, and even the Ruffians, propofed to them terms of alliance. In 1562, they folemnly took them under their protection, and engaged to pay them an annual fubfidy; in return for which the Coffacks were to keep on foot a fufficient body of troops for the defence of the Polifh dominions. With a view to bind them ftill more ftrongly by ties of intereft, the Poles gave them the whole country between the rivers Dnieper and Neifter, and the borders of Tartary. The Coffacks applied themfelves with great induftry to the cultivation of this fertile fpot; fo that in a fhort time it was interfperfed with large towns and handfome villages. Befides, they continually haraffed the Turks, and did them great damage by their incurfions; and, in order to prevent the latter from purfuing them, or making reprifals, they poffeffed themfelves of feveral fmall iflands in the Dnieper, where they kept their magazines, &c. The hettman or general of the Coffacks was not in the leaft fubordinate to the field marfhal of Poland; but acted in concert with him as an ally, and not as a fubject of that republic. But this alliance, though of fuch manifeft advantage to both parties, was not of long duration. The Poles, feeing the vaft improvements made by the Coffacks, in the country they had given up to them, became envious of them, and actually made an attempt to bring them into fubjection, as we have feen in the hiftory of Poland. In 1648 the Coffacks gained great advantages over them, and next year came to an accommodation, in which they not only preferved their old immunities, but obtained additional privileges. The refult of all was, that thefe Coffacks remained under the protection of Ruffia; and as their former country was entirely laid wafte in the late wars, they fettled in the Ruffian Ukraine, upon receiving formal affurances from the court of Ruffia, that no alteration fhould be made in their political conftitution, and that no taxes whatever fhould be laid upon them. The Coffacks, on the other hand were always to keep in readinefs a good body of troops for the fervice of Ruffia: but in the year 1708 Mazeppa, their hettman or chief, went over from the Ruffians to the Swedes; upon which Peter I. refolved to prevent fuch revolts for the future. To this end, after the battle of Pultowa, he fent a ftrong detachment into the above-mentioned little iflands in the Dnieper, whither the Coffacks had fled with their wives and children, and all their effects; and ordered them all to be put to the fword without diftinction, and the plunder to be divided among his foldiers. He likewife fent a great number of men into their country, and caufed feveral thoufands of the Coffacks to be carried to the coafts of the Baltic, where they were put to all forts of hard labour; by which means he in a manner extirpated the whole nation.

What diftinguifhes the Zaporog Coffacks from all other people is, that they never fuffer any women in their fettlements, as the Amazons are faid not to have fuffered any men among them. The women of thefe Coffacks live in other iflands of the Dnieper. They never marry, nor have any family: all their male children are enrolled as foldiers, and the females are left with their mothers. The brother often has children by his fifter, and the father by his daughter. They know no laws but thofe which cuftom has introduced, founded on their natural wants; though they have among them fome priefts of the Greek perfuafion. They ferve in the armies as irregulars; and woe to thofe who fall into their hands.

The country of thefe Coffacks, who are an affemblage of ancient Roxelans, Sarmatians, and Tartars, is called the *Ocraine* or *Ukraine*. It lies upon the borders of Ruffia and Poland, Little Tartary, and Turkey, and was anciently a part of Scythia. By virtue of the laft treaty fettled between Ruffia and Poland, in 1693, the latter remains in poffeffion of all that part of the Ukraine which is fituated on the weft of the Dnieper, and is now but poorly cultivated. That on the eaft fide, inhabited by the Coffacks, is in a much better condition, and extends about two hundred and fixty miles in length, and as many in breadth. It is one continued fertile plain, watered by a great number of fine rivers, diverfified with pleafant woods, and yields fuch plenty of all forts of grain, pulfe, tobacco, honey

honey and wax, as to supply a great part of the Russian empire with those commodities. Its pastures are exceeding rich, and its cattle very large; but the inhabitants are greatly plagued by locusts, which infest this fine country. The houses in the Ukraine are, like those of the Russians, mostly built with timber.

The Cossacks are tall and well made, generally hawk-nosed, and of a good mien. They are hardy, vigorous, brave, and extremely jealous of what is most valuable in life, their liberty; fickle and wavering, but sociable, cheerful, and sprightly. They are a very powerful people, and their forces consist wholly of cavalry.—Their dialect is a compound of the Polish and Russian languages; but the latter is the most predominant. They were formerly Pagans or Mahometans; but upon their entering into the Polish service, they were baptized Christians of the Romish communion; and now that they belong to Russia, they profess themselves members of the Greek church.

Each of their towns, with the district belonging to it, is governed by an officer called *ottomann* or *attamann*.

The Don Cossacks, so called from their residence upon the banks of the river Don, greatly resemble those already described. In the year 1559, when the Czar Iwan Basilowitz was emperor of Russia, they voluntarily put themselves under his protection, and are at this time on a pretty equal footing with the other Russian subjects. They have several towns and villages upon the banks of the Don; but are prevented from extending themselves farther up the country, by the scarcity of fresh water and wood in many places. Their chief support is grazing and agriculture, and occasionally robbing and plundering, for which they want neither capacity nor inclination. Every town is governed by a magistrate called *tamann;* and the tamanns, with their towns, are under the jurisdiction of two ottomanns, who reside at Tsherkasky. The troops of these Cossacks likewise consist entirely of cavalry. In this country all the towns and villages are fortified and encompassed with pallisades, to defend them against the incursions of the Calmucks and Kuban Tartars, with whom they are continually at war. The Cossacks, in general, are of great service to garrison towns by way of defence, or to pursue an enemy; but are not so good at regular attacks.

The Sietsh Cossacks, who are also called *Haidamacks*, have their particular hettman. They inhabit the Russian, Polish, and Turkish dominions, along the banks of the Dnieper.

The Yaik Cossacks dwell on the south side of the river Yaik; and upon the success of the Russian arms in the kingdom of Astracan, voluntarily submitted to them. In stature they greatly resemble the other Cossacks; though by their boorish manner of living, and intermarriages with the Tartars, they have not the shape and air peculiar to the rest of their countrymen. Their natural dispositions and customs are, however, nearly the same. Husbandry, fishing, and feeding of cattle, are their principal employments; and, like the other tribes, they let slip no opportunity of making depredations on their neighbours. Their continual wars with the Kara Kalpacs and the Kasatshaia-Horda oblige them to keep their towns and villages in a state of defence. They are indeed subject to Russian waiwodes, to whom they pay an annual tribute in corn, wax, honey, and cattle; but they have also their particular chiefs, who govern them according to their ancient customs. Though the generality of the Yaik Cossacks profess the Greek religion, yet a great many relics of Mahometanism and Paganism are still found among them. Being naturally bold and hardy, they make excellent soldiers; and they are not so turbulent as the other Cossacks. They live entirely at peace with the Calmucks and their other neighbours, and even maintain a commercial intercourse with them.

COSSE DE GENISTE, an order of knighthood instituted in 1234, by Louis IX. at his marriage with Margaret of Provence. The motto on the collar of this order was *Exaltat humiles*.

COSSET, among farmers, a colt, calf, or lamb, brought up by hand without the dam.

COSTA, CHRISTOPHER, a celebrated botanist of the 16th century, was born in Africa, of a Portuguese father, and went into Asia, to perfect himself in the knowledge of simples, where he was taken prisoner, but found means to make his escape, and after several voyages, practised physic at Burgos. He wrote, 1. A Treatise on Indian drugs and medicines. 2. His Voyages to the Indies. 3. A book in praise of Women; and other works.

COSTAL, an appellation given by anatomists to several parts belonging to the sides; thus we meet with costal muscles, vertebræ, &c.

COSTANZO, ANGELO DI, an Italian historian and poet, lord of Catulopa, was born in 1507, of a noble and ancient family of Naples, and died about 1591. He wrote, 1. A History of Naples, from 1250 to 1489; the best edition of which is that of Aquila, in 1582, in folio, very scarce. 2. Italian poems, which are esteemed, and have had several editions.

COSTA-RICCA, a province of North America in New Spain, and in the audience of Guatimala, bounded on the north-east by the Northern ocean, on the south-west by the South sea, on the north-west by Nicaragua, and on the south-east by Veragua. The soil is not very fertile, though there is plenty of cattle. Carthagena is the capital town.

COSTARD, GEORGE, a clergyman of the church of England, and author of several learned works, was born about the year 1710. He was educated at Wadham college, Oxford; and took the degree of M. A. in 1733. The first ecclesiastical situation in which he was placed was that of curate of Islip in Oxfordshire. In 1747 he published, in 8vo, Some Observations tending to illustrate the Book of Job. In 1750 he published Two Dissertations: I. On the meaning of the word *Kesita*, mentioned in Job, chap. xlii. ver. 11. II. On the Signification of the word *Hermes*. In 1752 he published in 8vo, at Oxford, *Dissertationes II. Critico-sacræ, quarum prima explicatur Ezek.* xiii. 18. *altera vero*, 2 *Reg*. x. 22. In 1755 he wrote a letter to Dr Birch, which is preserved in the British Museum, respecting the meaning of the phrase *sphæra barbarica*. Some time after this he undertook to publish a second edition of Dr Hyde's *Historia Religionis veterum Persarum, eorumque Magorum;* and which was accordingly printed under his inspection and with his corrections, at the Clarendon

rendon Press at Oxford, in 4to. In 1760, Mr Costard's extensive learning having now recommended him to the notice of Lord Chancellor Northington, he obtained, by the favour of that nobleman, in June 1764, the vicarage of Twickenham in Middlesex, in which situation he continued till his death. In 1767, he published, in one volume quarto, The History of Astronomy, with its application to Geography, History, and Chronology; occasionally exemplified by the Globes. This work was chiefly intended for the use of students, and contains a full and distinct view of the several improvements made in geography and astronomy. Mr Costard has shown, by a gradual deduction, at what time, and by whom, the principal discoveries have been made in geography and astronomy; how each discovery has paved the way to what followed; and by what easy steps, through the revolution of so many ages, these very useful sciences have advanced towards their present state of perfection. In 1778, he published, in 8vo, A Letter to Nathaniel Brassey Halhed, Esq. containing some Remarks on his Preface to the Code of Gentoo Laws. This appears to have been the last of his publications. It contains some criticisms which were intended to invalidate the opinion which Mr Halhed had conceived concerning the great antiquity of the Gentoo laws; and some arguments against a notion which had been adopted by several writers, drawn from the observation of natural phenomena, that the world is far more ancient than it is represented to be by the Hebrew chronology. Mr Costard died on the 10th of January 1782. He was a man of uncommon learning, and eminently skilled in Grecian and oriental literature. His private character was amiable, and he was much respected in the neighbourhood in which he lived for his humanity and benevolence. Besides the works already mentioned, he wrote some others; and was also the author of learned papers, inserted in the Philosophical Transactions, on astronomical and chronological subjects.

COSTIVENESS, a preternatural detention of the feces, with an unusual dryness and hardness thereof, and thence a suppression of their evacuation. See MEDICINE *Index*.

COSTMARY, the English name of a species of tansy. See TANACETUM, BOTANY *Index*.

COSTS, in *Law*, imply the expences of a suit recovered by the plaintiff, together with damages. Costs were not allowed by the common law, the amercement of the vanquished party being his only punishment; but they are given by statute*. Costs are allowed in chancery for failing to make answer to a bill exhibited, or making an insufficient answer; and if a first answer be certified by a master to be insufficient, the defendant is to pay 40s.; 3l. for a second insufficient answer; 4l. for a third, &c. But if the answer be reported good, the plaintiff shall pay the defendant 40s. costs.

* *Blackst. Comment.*

COSTUME, a rule or precept in painting, by which the artist is enjoined to make every person and thing sustain its proper character, and not only observe the story, but the circumstances, the scene of action, the country or place, and take care that the habits, arms, manners, proportion, and the like, exactly correspond.

COSTUS, a genus of plants belonging to the monandria class, and in the natural method ranking under the eighth order, *Scitamineæ*. See BOTANY *Index*.

COTA, RODRIGUEZ, a Spanish poet in the 16th century, was the author of the *Tragi comedia de Calisto y Melibea*, which has been translated into Latin by Gasper Barthius, and into French by James de Lavardin. The Spaniards set a great value on this performance.

CO-TANGENT, the tangent of an arch which is the complement of another to 90. See GEOMETRY.

COTBUS, a town of Germany in Lower Lusatia. It is a strong important place, and has been subject to the king of Prussia ever since the year 1645. It is seated on the river Spree, 60 miles south-by-east of Berlin, and 55 south-east of Wirtemburg. Here are a great number of French Protestants, who have introduced manufactures; and this place is noted for excellent beer, pitch, and the cultivation of flax. E. Long. 15. 29. N. Lat. 51. 40.

COTE, a term used in coursing, to express the advantage one greyhound has over another when he runs by the side of it, and putting before it, gives the hare a turn. See COURSING.

COTE *Gare*, a kind of refuse wool, so clung or clotted together that it cannot be pulled asunder. By 13 Rich. II. stat. 1. c. 9. it is provided, that neither denizen or foreigner make any other refuse of wool, but cot-gare and villein. So the printed statute has it; but in the parliament roll of that year it is *cod-land*, and *villein*. *Cot*, or *cote*, signifies as much as cottage in many places, and was so used by the Saxons according to Verstegan.

COTELERIUS, JOHN BAPTIST, fellow of the Sorbonne, and king's Greek professor, was born at Nismes in Languedoc in 1627. He made a collection of the fathers who lived in the apostolic age, which he published at Paris in two volumes folio in 1672; all reviewed and corrected from several MSS. with a Latin translation and notes. He also published *Monumenta Ecclesiæ Græcæ*, in 3 vols; being a collection of Greek tracts out of the king's and M. Colbert's libraries, and which had never been published before; to these he added a Latin translation and notes. He intended a farther prosecution of this work; but his intense studies broke his constitution, and deprived him of life in 1686. Besides his great skill in languages and ecclesiastical antiquities, Cotelerius was remarkable for his probity and candour.

COTERELLUS. *Cotarius* and *Coterellus*, according to Spelman and Du Fresne, are servile tenants; but in Doomsday and other ancient MSS. there appears a distinction, as well in their tenure and quality as in their name; for the cotarius hath a free soccage tenure, and paid a stated firm or rent in provisions or money, with some occasional customary services; whereas the coterellus seems to have held in mere villenage, and his person, issue, and goods, were disposable at the pleasure of the lord.

COTERIE, a term adopted from the French trading associations or partnerships, where each person advances his quota of stock, and receives his proportion of gain; and which retains its original meaning when applied to little assemblies or companies associated for mirth and good humour, where each one furnishes his

quota of pleafantry. Here they coin new words not underftood elfewhere, but which it becomes fafhionable for others to ufe; and they are thought ridiculous who are ignorant of them. It has been fometimes ufed to fignify a club of ladies.

COTES, Roger, an excellent mathematician of the 18th century. He early difcovered an inclination to the mathematics; and at 17 years of age, was admitted a penfioner of Trinity college, Cambridge. In 1706, he was appointed profeffor of aftronomy in the profefforfhip founded by Dr Plume archdeacon of Rochefter, being chofen the firft in that chair for his great merit and learning. In the year 1713, at the requeft of Dr Richard Bentley, he publifhed at Cambridge, in 4to, a fecond edition of Sir Ifaac Newton's *Principia*, with all the improvements which the author had annexed thereto: to which he prefixed an excellent preface. He prepared feveral ufeful books for the public; and wrote A Defcription of the great Meteor which appeared on the 6th of March 1716, publifhed in the Philofophical Tranfactions. He lived but a little while to carry on the difcourfes for which he was eminently qualified; dying in the prime of his age in 1716, to the great regret of all the lovers of the fciences.

COTESWOLD, feveral fheep-cotes, and fheep feeding on hills. It comes from the Saxon *cote*, i. e. *cafa*, "a cottage," and *wold*, "a place where there is no wood."

COTHURNUS, Buskin, a very high fhoe or patten raifed on foles of cork, worn by the ancient actors in tragedy, to make them appear taller and more like the heroes they reprefented, moft of whom were fuppofed to be giants. It covered the greateft part of the leg, and was tied beneath the knee. Æfchylus is faid to have invented the cothurnus. See Buskin.

COTICE, or Cotise', in *Heraldry*, is the fourth part of the bend; which with us is feldom or ever borne but in couples, with a bend between them; whence probably the name; from the French *cote*, "fide;" they being borne, as it were, afide of the bend. A bend thus bordered is faid to be *cotifed*, *cotice*. He bears fable on a bend cotifed argent three cinquefoils.

COTILLON, the name of a well-known brifk dance, in which eight perfons are employed. The term is French, and fignifies an under-petticoat.

COTRONE, a town in the Hither Calabria ftanding on the fite of the ancient Croton, though not occupying the fame extent of ground: (See Croton). It is fortified with fingle walls, and a caftle erected by Charles V. Its private buildings are poor and fordid, the ftreets difmal and narrow. Cheefe and corn are the principal commodities. For the ftowage of corn, there are ranges of granaries in the fuburbs; and the annual export is about 20,000 tomoti. The cheefe is tolerably good; but has a great deal of that hot acrid tafte fo common to all cheefe made with goats milk. The wine is not unpleafant, and appears fufceptible of improvement by better management in the making and keeping.

COTT, a particular fort of bed-frame, fufpended from the beam of a fhip for the officers to fleep in between the decks. This contrivance is much more convenient at fea than either the hammocks or fixed cabins: being a large piece of canvas fewed into the form of a cheft, about fix feet long, and one foot deep, and from two to three feet wide. It is extended by a fquare wooden frame with a canvas bottom, equal to its length and breadth, to retain it in an horizontal pofition.

COTTAGE, Cottagium, is properly a little houfe for habitation without lands belonging to it: ftat. 4. Edw. I. But by a later ftatute 31 Eliz. c. 7. no man may build a cottage unlefs he lay four acres of land thereto; except it be in market-towns or cities, or within a mile of the fea, or for the habitation of labourers in mines, failors, forefters, fhepherds, &c. and cottages erected by order of juftices of the peace for poor impotent people are excepted out of the ftatute. The four acres of land to make it a cottage within the law are to be freehold, and land of inheritance; and four acres holden by copy, or for life or lives, or for any number of years, will not be fufficient to make a lawful cottage.

COTTON, in *Commerce*, a foft downy fubftance found on the goffypium, or cotton-tree. See Gossypium, Botany *Index*.

Cotton is feparated from the feeds of the plant by a mill, and then fpun and prepared for all forts of fine work, as ftockings, waiftcoats, quilts, tapeftry, curtains, &c. With it they likewife make muflin; and fometimes it is mixed with wool, fometimes with filk, and even with gold itfelf.

The fineft fort comes from Bengal and the coaft of Coromandel.

Cotton makes a very confiderable article in commerce, and is diftinguifhed into cotton-wool and cotton-thread. The firft is brought moftly from Cyprus, St John d'Acre, Smyrna, and the Eaft and Weft Indies; the moft efteemed is white. Thofe who buy it in bales fhould fee that it has not been wet: moifture being very prejudicial to it.

Of cotton-thread, that of Damas, called *cotton d'ounce*, and that of Jerufalem, called *bazas*, are the moft efteemed; as alfo that of the Weft India iflands. It is to be chofen white, fine, very dry, and evenly fpun. The other cotton threads are the half bazas, the rames, the beledin, and gondezel; the payas and mountafiri, the geneguins, the baquins, the joffelaffars, of which there are two forts. Thofe of India, known by the name of Tutucorin, Java, Bengal, and Surat, are of four or five forts, diftinguifhed by the letters A, B, C, &c. They are fold in bags, with a deduction of one pound and a half on each of thofe of Tutucorin, which are the deareft, and two pounds on each bag of the other forts. For thofe of Fielebas, Smyrna, Aleppo, and Jerufalem, the deduction at Amfterdam is eight in the hundred for the tare, and two in the hundred for weight, and on the value one per cent. for prompt payment.

Cotton of Siam, is a kind of filky cotton in the Antilles, fo called becaufe the grain was brought from Siam. It is of an extraordinary finenefs, even furpaffing filk in foftnefs. They make hofe of it there preferable to filk ones for their luftre and beauty. They fell from 10 to 12 and 15 crowns a pair, but there are very few made unlefs for curiofity.

The manner of packing Cotton *as practifed in the Antilles.* The bags are made of coarfe cloth, of which they

they take three ells and a half each; the breadth is one ell three inches. When the bag has been well ſoaked in water, they hang it up, extending the mouth of it to croſs pieces of timber nailed to poſts fixed in the ground ſeven or eight feet high. He who packs it goes into the bag, which is ſix feet nine inches deep, or thereabouts, and preſſes down the cotton, which another hands him, with hands and feet; obſerving to tread it equally everywhere, and putting in but little at a time. The beſt time of packing is in rainy moiſt weather, provided the cotton be under cover. The bag ſhould contain from 300 to 320 pounds. The tare abated in the Antilles is three in the hundred. Cotton being a production applicable to a great variety of manufactures, it cannot be too much cultivated in our own plantations that will admit of it.

Cotton-Spinning, the art or proceſs of reducing cotton-wool into yarn or thread.

The moſt ſimple method for this purpoſe, and the only one in uſe for a long time in this country, was by the hand upon the well-known domeſtic machine called a *one-thread wheel*. But as the demand for cotton-goods began to increaſe, other inventions were thought of for expediting this part of the manufacture. About 50 years ago, one Paul and others of London contrived an engine for a more eaſy and expeditious method of ſpinning cotton, and for which they obtained a patent; but the undertaking did not prove ſucceſsful. Some years thereafter, various machines were conſtructed by different perſons for facilitating the ſpinning of cotton; but without producing any very material or laſting advantage. At length, about the year 1767, Mr James Hargrave, a weaver in the neighbourhood of Blackburn in Lancaſhire, conſtructed a machine by which a great number of threads (from 20 to 80) might be ſpun at once, and for which he obtained his majeſty's letters-patent. This machine is called a *jenny*, and is the beſt contrivance for ſpinning *woof* or *ſhute* that has hitherto appeared. It is now commonly conſtructed for 84 threads; and with it one perſon can ſpin 100 Engliſh hanks in the day, each hank containing 840 yards.

Carding of cotton, as a preparation for ſpinning, uſed formerly to be performed by the hand, with a ſingle pair of cards upon the knee: but this being a tedious method, ill ſuited to the rapid operations of the new ſpinning machines, other methods were contrived for affording a quicker and more adequate ſupply. The firſt improvement for this purpoſe was likewiſe made by Mr Hargrave; and conſiſted in applying two or three cards to the ſame board, and fixing them to a ſtool or ſtock; whence they obtained the name of *ſtock-cards*. With theſe, one woman could perform two or three times as much work as ſhe could do before in the common way. A ſtill more expeditious method of carding, however, by what are commonly called *cylinder cards*, was ſoon afterwards invented, and is that which is now moſt commonly practiſed: but as ſeveral perſons lay claim to this invention, it is not eaſy to determine to whom in particular the merit of it is due.

The next and moſt capital improvements which this branch of manufacture received were from Mr Arkwright, a native of Lancaſhire, afterward Sir Richard Arkwright of Cromford in Derbyſhire. He firſt brought forward his new method of ſpinning cotton in 1768, for which he obtained a patent in 1769. In 1775, he obtained another patent for engines which he had conſtructed to prepare the materials for ſpinning; though one of theſe patents, being challenged at law, was ſet aſide ſome years before it expired. The reſult of Mr Arkwright's different inventions and improvements is a combination of machinery, by which cotton is *carded*, *roved*, and *ſpun*, with the utmoſt exactneſs and equality; and ſuch a degree of perfection attained in ſpinning *warp*, as is not to be equalled in any other part of the world. To theſe improvements this country is entirely indebted for the great extent of its cotton manufactures; large buildings having been erected for that branch both in England and Scotland, many of which contain ſeveral thouſands of ſpindles, each driven by one or more large water wheels; and ſome of ſuch extent as to ſpin at the rate of one thouſand yards of twiſt or warp yarn in the minute.

Other machines have been invented at different times, and a variety of improvements made by different mechanics and manufacturers; one of which in particular we muſt not omit to mention. It is called a *mule*, being a kind of mixture of machinery between the *warp*-machine of Mr Arkwright and the *woof*-machine or hand jenny of Mr Hargrave; and was alſo invented in Lancaſhire. This machine bids fair to be of great uſe in ſpinning cotton-yarn for muſlins to a degree of fineneſs never before known in this country, being nearly equal in quality to thoſe uſually brought from India.

Cotton-Mills, are large buildings with peculiar machinery for carding, roving, and ſpinning cotton: (ſee the preceding article). Theſe were entirely unknown in this country before the different inventions and improvements of Meſſrs Arkwright and Hargrave; ſince which time great numbers have been erected in England, many in Scotland, and ſome in Ireland.

The firſt erections of the kind were by Meſſrs Arkwright and Hargrave, both in the town of Nottingham, and both nearly at the ſame time. The engines were then driven by horſes; but ſince that time they have been chiefly erected upon water-falls in different parts of the country; particularly the warp-machines, which are better adapted for being driven by water than any other. The moſt extenſive of theſe is in the village and neighbourhood of Cromford in Derbyſhire, and under the immediate inſpection of Sir Richard Arkwright. The firſt that was erected in Scotland was for Mr Peter Brotherſton, under the inſpection and direction of Mr John Hacket from Nottingham; and is in the neighbourhood of Pennycuick near Edinburgh. Since which time many have been erected in the neighbourhood of Glaſgow, Paiſley, Lanark, Perth, &c. Many are driven by ſteam-engines.

General State of the Cotton Manufactory. The facilities which the manufacturers of Great Britain had ſuddenly acquired, and the immenſe capitals which they have ſo recently laid out in expenſive machinery and other heavy eſtabliſhments for carrying on the cotton trade, are unparalleled in the annals of the world. Above 140 cotton mills are now (1787) built in Great Britain, of which nearly two-thirds have been erected within theſe ſeven years. Beſides theſe, there are above 20,500 hand-mills or jennies for ſpinning

ning the ſhute for the twiſted yarn ſpun by the water-mills.

Above a million of money was within this time ſunk in mills, hand engines, and other machines, including the grounds and neceſſary buildings.

Expence of water-mills, -	L. 715,000
Ditto of hand jennies, houſes, buildings, and auxiliary machinery, ſuppoſed at leaſt,	285,000
Total,	L. 1,000,000

A power had been alſo created of working nearly two millions of ſpindles; and men, women, and children were trained to this buſineſs, capable of carrying the cotton manufacture almoſt to any extent. In 1787, the power of ſpindles capable of being worked was eſtimated as follows:

In the water-mills, - - -	286,000
In the jennies, - - -	1,665,100
Total ſpindles,	1,951,100

In the branches applicable to muſlin and callico, it was calculated that employment was given to 100,000 men and women, and at leaſt 60,000 children; many of the latter having been taken from different pariſhes and hoſpitals in Great Britain.

The quantity of the raw material of cotton wool conſumed in this manufacture, which did not amount to 6,000,000 pounds in 1781, and was only about 11,000,000 pounds ſix years ago, had amounted in the year 1787 to the enormous height of 22,000,000 lb. and upwards; and the aſtoniſhing rapidity of this increaſe is in ſome meaſure to be attributed to the extenſion of theſe branches to the goods of India, particularly the callicoes and muſlins.

Britiſh callicoes were firſt made in Lancaſhire about the year 1772, but the progreſs was ſlow till within theſe laſt 12 years. The quantity manufactured has ſince extended from about 50,000 to 1,000,000 of pieces made in the courſe of a ſingle year.

Britiſh muſlins were not ſucceſsfully introduced until the year 1781, and were carried to no great extent until 1785, after which period the progreſs during two years became rapid beyond all example. The acquiſition of cotton wool of a ſuperior quality from Demerara and the Brazils, and the improvements made in the ſpinning fine yarns upon the mule jennies, had given a ſpring to this branch of the cotton manufactory, which extended it beyond what it was poſſible to have conceived. Above half a million pieces of muſlin of different kinds, including ſhawls and handkerchiefs, were computed to be annually made in Great Britain; while the quantity not only increaſed daily with the new acceſſion of powers that were burſting forth upon the country, but the quality was exceedingly improved; and ſince a yearly ſupply of about 300 bales of Eaſt Indian cotton has been obtained by the way of Oſtend, yarns have been ſpun, and muſlins have been wove, equal to any from India. Nothing, therefore, but a fine raw material appeared wanting to enable the Britiſh manufacturer to carry this branch to the greateſt extent: and, of all others, it is that ſpecies of cotton goods which deſerves moſt to be encouraged, becauſe of the immenſe return it makes for labour more than any other branch of the cotton manufactory. Eaſt India cotton wool has been ſpun into one pound of yarn worth five guineas; and when wove into muſlin, and afterwards ornamented by children in the tambour, has extended to the value of 15l.; yielding a return of 5900 per cent. on the raw material.

But the ſtate of the raw materials, and the progreſſive and aſtoniſhing increaſe of this manufacture, will be beſt explained by what follows:

	Cotton Wool uſed in the Manufacture.	Suppoſed Value when Manufactured.
1781,	lb. 5,101,920	L. 2,000,000
1782,	11,206,810	3,900,000
1783,	9,546,179	3,200,000
1784,	11,280,238	3,950,000
1785,	17,992,888	6,000,000
1786,	19,151,867	6,500,000
1787,	22,600,000	7,500,000

Such was the progreſs of the Britiſh cotton manufactory till 1787; when, with eſtabliſhments and mechanical powers capable of bringing forward immenſe quantities of goods into the conſumption, this manufacture was checked by a great and ſudden reduction of the prices of Eaſt India goods of the ſame ſpecies, which were ſold above 20 per cent. on an average under the loweſt prices at which the Britiſh manufacturer can afford to ſell without loſs.

This conduct in the Eaſt India Company quickly operated to the great prejudice of the Britiſh manufactures; and there is no ſaying how far theſe might be reduced, ſhould that company be allowed to preſs goods upon the market at prices which have no relation to the original coſt, and under circumſtances where every idea of protecting duties is annihilated in the effect of the general ſyſtem.

The home-manufacture of this article, however, in all its different branches, has been greatly extended, and is likely to be carried on with greater advantage to the manufacturer than ever it was before.

Lavender Cotton. See Santolina, Botany *Index*.

Philoſophic Cotton, a name given to the flowers of zinc, on account of their white colour, extreme lightneſs, and reſemblance to cotton.

Flax made to reſemble Cotton. See Flax.

Silk-Cotton. See Bombax, Botany *Index*.

Cotton *Weed*. See Gnaphalium, Botany *Index*.

Cotton, *Sir Robert*, a moſt eminent Engliſh antiquarian, deſcended from an ancient family, was born in 1570. In his 18th year he began to collect ancient records, charters, and other MSS. Camden, Selden, and Speed, acknowledged their obligations to him in their reſpective works. He was highly diſtinguiſhed by Queen Elizabeth, and by James I. who created him a baronet. He wrote many things himſelf; but our principal obligations to him are for his valuable library, conſiſting of curious manuſcripts, &c. which he was 40 years in collecting. At his death in 1631, he left the property of it to his family, though deſigned for public uſe. A large acceſſion was made to this library by private benefactions before the death of the founder, and afterwards by the purchaſes of his heirs,

and

and donations of others, who added to it a great number of books, chiefly relating to the history and antiquities of our own nation. An act of parliament was obtained, at the request of Sir John Cotton, in 1790, for preserving it after his decease, under the above denomination, for public use. It is now fixed in the British Museum. For statutes relating to it, see 12 and 13 W. III. c. 3. and 5 Anne cap. 30.

COTTON, *Charles*, a burlesque poet, was descended of a good family, and lived in the reign of Charles II. and James II. His most celebrated piece is *Scarronides*, or *Travestie* of the first and fourth books of the Æneid. But though, from the title, one would be apt to imagine it an imitation of Scarron's famous Travestie of the same author, yet upon examination, it will be found greatly to excel not only that, but every other attempt of the same kind that has been hitherto made in any language. He has also translated several of Lucian's dialogues, in the same manner, under the title of *The Scoffer Scoff'd*;—and written another poem of a more serious kind, entitled *The Wonders of the Peak*. The exact period of either Mr Cotton's birth or his death, is nowhere recorded; but it is probable the latter happened about the time of the revolution. Neither is it better known what his circumstances were with respect to fortune: they appear, however, to have been easy, if one may judge from the turn of his writings, which is such as seems scarcely possible for any one to indulge whose mind was not perfectly at ease. Yet there is one anecdote told of him, which seems to show that his vein of humour could not restrain itself on any consideration. viz. that in consequence of a single couplet in his *Virgil Travestie*, wherein he has made mention of a peculiar kind of ruff worn by a grandmother of his who lived in the Peak, he lost an estate of 400l. per annum; the old lady, whose humour and testy disposition he could by no means have been a stranger to, being never able to forgive the liberty he had taken with her; and having her fortune wholly at her disposal, although she had before made him her sole heir, altered her will, and gave it away to an absolute stranger.

COTTUS, or BULL-HEAD, a genus of fishes belonging to the order of thoracici. See ICHTHYOLOGY *Index*.

COTULA, MAY-WEED, a genus of plants belonging to the syngenesia class. See BOTANY *Index*.

COTULA, or *Cotyla*, a liquid measure in use among the ancients.

Fannius says the cotyla was the same thing with the hemina, which was half a sextary.

> *At* cotylas, *quas si placeat, dixisse licebit*
> *Heminas recepit geminas sextarias unus.*

Chorier observes, that the cotyla was used as a dry measure as well as a liquid one; from the authority of Thucydides, who in one place mentions two cotylæ of wine, and in another two cotylæ of bread.

COTURNIX. See TETRAO, ORNITHOLOGY *Index*.

COTYLEDON, NAVEL WORT, a genus of plants belonging to the decandria class; and ranking under the natural order *Succulentæ*. See BOTANY *Index*.

COTYLEDONES, in *Anatomy*, are certain glandular bodies, adhering to the chorion of some animals.

COTYLEDONES, in *Botany*, the perishable porous side lobes of the seed, which involve, and for some time furnish nourishment to, the embryo plant. See BOTANY *Index*.

COTYTTO, the goddess of all debauchery. Her festivals, called *Cotyttia*, were celebrated by the Athenians, Corinthians, Thracians, &c. during the night. Her priests were called *baptæ*, and nothing but debauchery and wantonness prevailed at the celebration. A festival of the same name was observed in Sicily, where the votaries of the goddess carried about boughs hung with cakes and fruit, which it was lawful for any person to pluck off. It was a capital punishment to reveal whatever was seen or done at these sacred festivals. It cost Eupolis his life for an unseasonable reflection upon them. The goddess Cotytto is supposed to be the same as Proserpine.

COUCH, in *Painting*, denotes a lay, or impression of colour, whether in oil or water, wherewith the painter covers his canvas, wall, wainscot, or other matter to be painted.

The word is also used for a lay or impression on any thing, to make it firm and consistent, or to screen it from the weather.

Paintings are covered with a couch of varnish; a canvas to be painted must first have two couches of size, before the colours be laid; two or three couches of white lead are laid on wood, before the couch of gold be applied: the leather-gilders lay a couch of water and whites of eggs on the leather, before they apply the gold or silver-leaf.

The gold-wire-drawers also use the word *couch* for the gold or silver leaf wherewith they cover the mass to be gilded or silvered, before they draw it through the iron that is to give it its proper thickness.

The gilders use couch for the quantity of gold or silver leaves applied on the metals in gilding or silvering. Each couch of gold is about one leaf, or two at most, and each of silver three to gild: if the gilding be hatched, there are required from eight to twelve couches; and only three or four if it be without hatching. To silver there are required from four to ten couches, according to the beauty of the work.

Couch-Grass. See TRITICUM, BOTANY *Index*.

COUCHANT, in *Heraldry*, is understood of a lion, or other beast, when lying down, but with his head raised; which distinguishes the posture of couchant from dormant, wherein he is supposed quite stretched out and asleep.

COUCHE, in *Heraldry*, denotes any thing lying along: thus chevron-couche, is a chevron lying sidewise, with the two ends on each side of the shield, which should properly rest on the base.

COUCHER, or COURCHER, in our statutes, is used for a factor, or one that continues in some place or country for traffic; as formerly in Gascoign, for the buying of wines. Anno 37 Edw. III. c. 16.

COUCHER, is also used for the general book in which any religious house or corporation register their particular acts. Anno 3 and 4 Edw. VI. c. 10.

COUCHING *of a* CATARACT, in *Surgery*. See SURGERY *Index*.

COVE,

Cove, Covenant.

COVE, a ſmall creek or bay, where boats and ſmall veſſels may ride at anchor, ſheltered from the wind and ſea.

COVENANT, in *Law*, is the conſent and agreement of two or more perſons to do, or not to do, ſome act, or thing, contracted between them. Alſo it is the declaration the parties make, that they will ſtand to ſuch agreement, relating to lands or other things; and is created by deed in writing, ſealed and executed by the parties, or otherwiſe it may be implied in the contract as incident thereto. And if the perſons do not perform their covenants, a writ or action of covenant is the remedy to recover damages for the breach of them.

COVENANT, in eccleſiaſtical hiſtory, denotes a contract or convention agreed to by the Scotch in the year 1638, for maintaining their religion free from innovation. In 1581, the general aſſembly of Scotland drew up a confeſſion of faith, or national covenant, condemning epiſcopal government, under the name of *hierarchy*, which was ſigned by James I. and which he enjoined on all his ſubjects. It was again ſubſcribed in 1590 and 1596. The ſubſcription was renewed in 1638, and the ſubſcribers engaged by oath to maintain religion in the ſame ſtate as it was in 1580, and to reject all innovations introduced ſince that time. This oath annexed to the confeſſion of faith received the name of the *covenant:* as thoſe who ſubſcribed it were called *covenanters*.

COVENANT, in *Theology*, is much uſed in connection with other terms; as, 1. *The Covenant of Grace* is that which is made between God and thoſe who believe the goſpel, whereby they declare their ſubjection to him, and he declares his acceptance of them and favour to them. The goſpel is ſometimes denominated a *covenant of grace*, in oppoſition to the Moſaic law. 2. *Covenant of Redemption* denotes a mutual ſtipulation, tacit or expreſs, between Chriſt and the Father, relating to the redemption of ſinners by him, previous to any act on Chriſt's part under the character of Mediator. 3. *Covenant of Works* ſignifies in the language of ſome divines, any covenant whereby God requires perfect obedience from his creatures, in ſuch a manner as to make no expreſs proviſion for the pardon of offences to be committed againſt the precepts of it, on the repentance of ſuch ſuppoſed offenders, but pronounces a ſentence of death upon them: ſuch, they ſay, was the covenant made with Adam in a ſtate of innocence, and that made with Iſrael at Mount Sinai.

Solemn League and COVENANT, was eſtabliſhed in the year 1643, and formed a bond of union between Scotland and England. It was ſworn and ſubſcribed by many in both nations; who hereby ſolemnly abjured popery and prelacy, and combined together for their mutual defence. It was approved by the parliament and aſſembly at Weſtminſter, and ratified by the general aſſembly of Scotland in 1645. King Charles I. diſapproved of it when he ſurrendered himſelf to the Scots army in 1646: but in 1650 Charles II. declared his approbation both of this and the national covenant by a ſolemn oath; and in Auguſt of the ſame year, made a farther declaration at Dunfermline to the ſame purpoſe, which was alſo renewed on occaſion of his coronation at Scone in 1651. The covenant was ratified by parliament in this year; and the ſubſcription of it required by every member, without which the conſtitution of the parliament was declared null and void. It produced a ſeries of diſtractions in the ſubſequent hiſtory of that country, and was voted illegal by parliament, and proviſion made againſt it. Stat. 14 Car. II. c. 4.

Covenant, Coventry.

Ark of the COVENANT, in Jewiſh antiquity. See ARK.

COVENTRY, a town of Warwickſhire, in England, ſituated in W. Long. 1. 26. N. Lat. 52. 25. It is an ancient place, and is ſuppoſed to derive its name from a convent formerly ſituated here. Leofric, earl of Mercia, who rebuilt the religious houſe after it had been deſtroyed by the Danes, and was lord of the place about the year 1040, is ſaid, upon ſome provocation, to have loaded them with heavy taxes. Being importuned by his lady, Godina, to remit them, he conſented, upon condition that ſhe ſhould ride naked through the town, which he little imagined ſhe would ever comply with. But he found himſelf miſtaken: for ſhe accepted the offer, and rode through the town with her long hair ſcattered all over her body; having firſt enjoined the citizens not to venture, on pain of death, to look out as ſhe paſſed. It is ſaid, however, that a certain taylor could not help peeping: and to this day there is an effigy of him at the window whence he looked. To commemorate this extraordinary tranſaction, and out of reſpect to the memory of their patroneſs, the citizens make a proceſſion every year, with the figure of a naked woman on horſeback. After Leofric's death, the earls of Cheſter became lords of the city, and granted it many privileges. At length it was annexed to the earldom of Cornwall; and growing conſiderable, had divers immunities and privileges conferred upon it by ſeveral kings; particularly that of a mayor and two bailiffs by Edward III.; and Henry VI. made it, in conjunction with ſome other towns and villages, a diſtinct county, independent of the county of Warwick. But afterwards Edward VI. for their diſloyalty, deprived them of their liberties, which were not reſtored till they had paid a fine of 500 merks. By a charter from James I. an alderman is allotted to each ward, with the powers of the juſtices of the peace within the city and its liberties. The walls were ordered to be demoliſhed at the Reſtoration; and now nothing remains of them but the gates, which are very lofty. Coventry is noted for the two parliaments which were held in it; the one called the parliament of *Dunces*, and the other of *Devils*. The former was ſo called on account of the excluſion of the lawyers; and the attainders of the duke of York, the earls of Saliſbury, Warwick, and March, procured the other the epithet of *Devils*. The townhouſe of Coventry is much admired for its painted windows, repreſenting ſeveral kings and others that have been benefactors to the city. The chief manufactures carried on here are temmies and ribbands.

Coventry ſends two members to parliament, and gives title of earl to an ancient family of the ſame name.—Coventry is a biſhop's ſee. The biſhoprick is ſaid to have been founded by Oſwy king of Mercia, in the year 656 or 657; and although it hath a double name, yet, like Bath and Wells, it is a ſingle dioceſe. It was ſo extremely wealthy, that King Offa, by the favour of Pope Adrian, conſtituted it an archiepiſcopal ſee; but this

this title was laid aside on the death of that king. In 1075, Peter, the 34th bishop, removed the see to Chester. In 1102, Robert de Limsey, his immediate successor, removed it to Coventry; and Hugo Novant, the 41st bishop, removed it back to Litchfield, but with great opposition from the monks of Coventry. The dispute was finally settled in a manner nearly similar to that which is mentioned between Bath and Wells. Here it was agreed that the bishop should be styled from both places, and that Coventry should have the precedence; that they should choose the bishop alternately; and that they should both make one chapter to the bishop, in which the prior of Coventry should be the chief man. Matters continued thus till the Reformation, when the priory of Coventry being dissolved by King Henry VIII. the style of the bishop continued as before. But an act of parliament passed 33d of King Henry VIII. to make the dean and chapter of Litchfield one sole chapter to the bishop. This see hath given three saints to the church; and to the nation one lord chancellor, three lord treasurers, three presidents of Wales, one chancellor to the university of Cambridge, and one master of the wardrobe. The old church built by King Oswy being taken down by Roger de Clinton, the 37th bishop, he built the beautiful fabric that now stands in 1148, and dedicated it to the Virgin Mary and St Chad. During the grand rebellion, the church suffered much; but soon after the Restoration, it was repaired and beautified. This diocese contains the whole counties of Stafford and Derby (except two parishes of the former), the largest part of Warwickshire, and nearly one half of Shropshire, in which are 555 parishes, of which 250 are impropriate. It hath four archdeaconries, viz. Stafford, Derby, Coventry, and Shrewsbury. It is valued in the king's books at 559l. 18s. 2¼d. and is computed to be worth annually 2800l. The clergy's tenth is 590l. 16s. 11¼d. To this cathedral belong a bishop, a dean, a precentor, a chancellor, a treasurer, four archdeacons, twenty-seven prebendaries, five priest-vicars, seven lay clerks or singing men, eight choristers, and other under officers and servants.

CO-VERSED SINE, in *Geometry*, the remaining part of the diameter of a circle, after the versed sine is taken from it. See GEOMETRY.

COVERT, in *Law*.—*Femme Covert* denotes a woman married, and so covered by, or under the protection of, her husband.

Covert Way, or CORRIDOR, in *Fortification*, a space of ground, level with the field on the edge of the ditch, three or four fathoms broad, ranging quite round the half moons and other works towards the country. It has a parapet raised on a level, together with its banquets and glacis. See FORTIFICATION.

COVERTURE, in *Law*, is applied to the state and condition of a married woman, who is under the power of her husband, and therefore called *femme couvert*.

COUGH, in *Medicine*. See MEDICINE *Index*.

COUGH, in *Farriery*. See FARRIERY *Index*.

COUGH, called the husk, is a disease to which young bullocks are subject. In this disorder the wind-pipe and its branches are loaded with small taper worms. Farmers count the disease incurable; but fumigations with mercurials, as cinnabar, or with fœtids, as tobacco, might prove serviceable.

COUHAGE, or STINKING BEANS; a kind of kidney-beans imported from the East Indies, where they are used as a cure for the dropsy. The down growing on the outside of the pod is so pointed as, like a nettle, to sting the flesh, though not with so painful a sensation. This, by a corruption of the word, is called *cowitch*. See DOLICHOS, BOTANY *Index*.

COVIN, a deceitful compact or agreement between two or more to deceive or prejudice a third person: As, if a tenant for life conspire with another, that this other shall recover the land which the tenant holds in prejudice of him in reversion. Dr Skinner takes the word to be a corruption of the Latin *conventum*, and therefore writes it *coven*. See CONSPIRACY.

COVING, in building, is when houses are built projecting over the ground-plot, and the turned projecture arched with timber, lathed and plastered.

COVINUS, among the ancients, a kind of chariot, in which the Gauls and Britons used to fight in battles.

COUL, or COWL. See COWL.

COULTER, in *Husbandry*, an iron instrument, fixed in the beam of a plough, and serving to cut the edge of each furrow. See AGRICULTURE.

COUNCIL, or COUNSEL, in a general sense, an assembly of divers considerable persons to concert measures relative to the state.

In Britain, the law, in order to assist the king in the discharge of his duties, the maintenance of his dignity, and the exertion of his prerogative, hath assigned him a diversity of councils to advise with.

1. The first of these is the high court of parliament. See PARLIAMENT.

2. The peers of the realm are by their birth hereditary counsellors of the crown; and may be called together by the king, to impart their advice in all matters of importance to the realm, either in time of parliament, or, which hath been their principal use, when there is no parliament in being. Accordingly, Bracton, speaking of the nobility of his time, says, they might properly be called "consules à consulendo; reges enim tales sibi associant ad consulendum." And in the law-books it is laid down, that the peers are created for two reasons: 1. *Ad consulendum*, 2. *Ad defendendum, regem*: for which reasons the law gives them certain great and high privileges; such as freedom from arrests, &c. even when no parliament is sitting; because the law intends, that they are always assisting the king with their counsel for the common-wealth, or keeping the realm in safety by their prowess and valour.

Instances of conventions of the peers, to advise the king, have been in former times very frequent; though now fallen into disuse, by reason of the more regular meetings of parliament. Sir Edward Coke gives us an extract of a record, 5 Henry IV. concerning an exchange of lands between the king and the earl of Northumberland, wherein the value of each was agreed to be settled by advice of parliament (if any should be called before the feast of St Lucia), or otherwise by advice of the grand council of peers, which the king promises to assemble before the said feast, in case no parliament shall be called. Many other instances of this

this kind of meeting are to be found under our ancient kings: though the formal method of convoking them had been so long left off, that when King Charles I. in 1640, issued out writs under the great seal to call a council of all the peers of England, to meet and attend his majesty at York, previous to the meeting of the long parliament, the earl of Clarendon mentions it as a new invention, not before heard of: that is, as he explains himself, so old, that it had not been practised in some hundreds of years. But though there had not for long time before been an instance, nor has there been any since, of assembling them in so solemn a manner, yet in cases of emergency, our princes have at several times thought proper to call for, and consult as many of the nobility as could easily be brought together; as was particularly the case with King James II. after the landing of the prince of Orange; and with the prince of Orange himself before he called the convention parliament which afterwards called him to the throne.

Besides this general meeting, it is usually looked upon to be the right of each particular peer of the realm, to demand an audience of the king, and to lay before him with decency and respect such matters as he shall judge of importance to the public weal. And therefore, in the reign of Edward II. it was made an article of impeachment in parliament against the two Hugh Spencers, father and son, for which they were banished the kingdom, "that they by their evil covin would not suffer the great men of the realm, the king's good counsellors, to speak with the king, or to come near him; but only in presence and hearing of said Hugh the father and Hugh the son, or one of them, and at their will, and according to such things as pleased them."

3. A third council belonging to the king, are, according to Sir Edward Coke, his judges of the courts of law, for law-matters. And this appears frequently in the English statutes, particularly 14 Edward III. c. 5. and in other books of law. So that when the king's council is mentioned generally, it must be defined, particularized, and understood, *secundum subjectam materiem;* "according to the subject matter;" and if the subject be of a legal nature, then by the king's council is understood his council for matters of law; namely, his judges. Therefore, when by statute 16 Richard II. c. 5. it was made a high offence to import into England any papal bulls, or other processes from Rome; and it was enacted, that the offenders should be attached by their bodies and brought before the king and his council to answer for such offence; here, by the expression of king's *council*, were understood the king's judges of his courts of justice, the subject matter being legal: this being the general way of interpreting the word *council.*

4. But the principal council belonging to the king is his *privy council*, which is generally by way of eminence, called *the council.* For an account of its constitution and powers, see the article *Privy-Council.*

Aulic Council. See Aulic.

Common Council, in the city of London, is a court wherein are made all the bye-laws which bind the citizens. It consists, like the parliament, of two houses; an upper, composed of the lord-mayor and aldermen; and a lower, of a number of common-council men, chosen by the several wards, as representatives of the body of the citizens.

Council of War, an assembly of the principal officers of an army or fleet, occasionally called by the general or admiral to concert measures for their conduct with regard to sieges, retreats, engagements, &c.

Council, in church history, an assembly of prelates and doctors, met for regulating matters relative to the doctrine or discipline of the church.

National Council, is an assembly of the prelates of a nation under their primate or patriarch.

Oecumenical or *General Council*, is an assembly which represents the whole body of the universal church. The Romanists reckon eighteen of them; Bullinger, in his Treatise de Conciliis, six; Dr Prideaux, seven; and Bishop Beveridge has increased the number to eight, which, he says, are all the general councils which have ever been held since the time of the first Christian emperor. They are as follows: 1. The council of Nice, held in the reign of Constantine the Great, on account of the heresy of Arius. 2. The council of Constantinople, called under the reign and by the command of Theodosius the Great, for much the same end that the former council was summoned. 3. The council of Ephesus, convened by Theodosius the younger at the suit of Nestorius. 4. The council of Chalcedon, held in the reign of Martinus, which approved of the Eutychian heresy. 5. The second council of Constantinople, assembled by the emperor Justinian, condemned the three chapters taken out of the book of Theodorus of Mopsuestia, having first decided that it was lawful to anathematise the dead. Some authors tell us, that they likewise condemned the several errors of Origen about the Trinity, the plurality of worlds, and pre-existence of souls. 6. The third council of Constantinople, held by the command of Constantius Pogonatus the emperor, in which they received the definitions of the five first general councils, and particularly that against Origen and Theodorus of Mopsuestia. 7. The second Nicene council. 8. The fourth council of Constantinople, assembled when Louis II. was emperor of the West. The regulations which they made are contained in twenty-seven canons, the heads of which are set down by M. du Pin, to whom the reader is referred.

COUNSEL, in a general sense, signifies advice or instruction how to behave in any difficult matter.

Counsel, or *Advocates*, in English courts of law, are of two species or degrees; Barristers, and Serjeants. See these articles; also Advocate.

From both these degrees some are usually selected to be his majesty's counsel, learned in the law; the two principal of whom are called his *attorney-general*, and *solicitor-general.* The first king's council, under the degree of serjeant, was Sir Francis Bacon, who was made so *honoris causa*, without either patent or fee; so that the first of the modern order (who are now the sworn servants of the crown, with a standing salary) seems to have been Sir Francis North; afterwards lord keeper of the great seal to King Charles II. These king's counsel answer, in some degree, to the advocates of the revenue, *advocati fisci*, among the Romans. For they must not be employed in any case against the crown without special license; in which restriction they agree with

Counsel || Count.

with the advocates of the fisc; but, in the imperial law, the prohibition was carried still farther, and perhaps was more for the dignity of the sovereign; for, excepting some peculiar causes, the fiscal advocates were not permitted to be at all concerned in private suits between subject and subject. A custom has of late years prevailed of granting letters patent of precedence to such barristers as the crown thinks proper to honour with that mark of distinction; whereby they are entitled to such rank and preaudience as are assigned in their respective patents; sometimes next after the king's attorney-general, but usually next after his majesty's counsel next being. These, as well as the queen's attorney and solicitor-general, rank promiscuously with the king's counsel; and, together with them, sit within the bar of their respective courts: but receive no salaries, and are not sworn; and therefore are at liberty to be retained in causes against the crown. And all other serjeants and barristers indiscriminately, (except in the court of common-pleas, where only serjeants are admitted), may take upon them the protection and defence of any suitors, whether plaintiff or defendant; who are therefore called their *clients;* like the dependants on the ancient Roman orators. These indeed practised *gratis*, for honour merely, or at most for the sake of gaining influence; and so likewise it is established with us, that a counsel can maintain no action for his fees; which are given, not as *locatio vel conductio*, but as *quiddam honorarium;* not as a salary or hire, but as a mere gratuity, which a counsellor cannot demand without doing wrong to his reputation; as is also laid down with regard to advocates in the civil law, whose *honorarium* was directed, by a decree of the senate, not to exceed in any case 10,000 sesterces, or about 80l. of English money. And in order to encourage due freedom of speech in the lawful defence of their clients, and at the same time to check the unseemly licentiousness of prostitute and illiberal men (a few of whom may sometimes insinuate themselves even into the most honourable professions), it hath been holden that a counsel is not answerable for any matter by him spoken, relative to the cause in hand, and suggested in the client's instructions; although it should reflect upon the reputation of another, and even prove absolutely groundless; but if he mentions an untruth of his own invention, or even upon instructions, if it be impertinent to the cause in hand, he is then liable to an action from the party injured. And counsel guilty of deceit and collusion are punishable by the statute Westm. I. 3 Edw. I. c. 28. with imprisonment for a year and a day, and perpetual silence in the courts: a punishment still sometimes inflicted for gross misdemeanors in practice.

Blackstone's Comment.

COUNSELLOR, in general, a person who advises another: thus we say, a counsellor at law, a privy counsellor, &c.

Counsellor at Law, a person retained by a client, to plead his cause in a public court of judicature. See Advocate, Barrister, Counsel, and Serjeant.

Privy Counsellor. See *Privy-Council.*

COUNT, (Comes), a nobleman who possesses a domain erected into a county. See Viscount.

English and Scottish counts we distinguish by the title of *earls;* foreign ones still retain their proper name. The dignity of a count is a medium between that of a duke and a baron. According to the modern use, most plenipotentiaries and ambassadors assume the title of counts, though they have no county; as the count d'Avaux, &c.

Count.

Anciently, all generals, counsellors, judges, and secretaries of cities under Charlemagne, were called *counts;* the distinguishing character of a duke and count being this, that the latter had but one town under him, but the former had several.

A count has a right to bear on his arms a coronet, adorned with three precious stones, and surmounted with three large pearls, whereof those in the middle and extremities of the coronet advance above the rest.

Counts were originally lords of the court, or of the emperor's retinue, and had their name *comites, à comitando*, or *à commeando:* hence those who were always in the palace, or at the emperor's side, were called *counts palatine*, or *comites à latere.* See Palatine.

In the times of the commonwealth, *comites* among the Romans was a general name for all those who accompanied the proconsuls and proprætors into the provinces, there to serve the commonwealth; as the tribunes, præfects, scribes, &c.

Under the emperors, *comites* were the officers of the palace. The origin of what we now call *counts* seems owing to Augustus, who took several senators to be his *comites*, as Dion observes, i. e. to accompany him in his voyages and travels, and to assist him in the hearing of causes; which were thus judged with the same authority as in full senate. Gallienus seems to have abolished this council, by forbidding the senators being found in the armies; and none of his successors re-established it.

These counsellors of the emperor were really counts, *comites*, i. e. companions of the prince; and they sometimes took the title thereof, but always with the addition of the emperor's name whom they accompanied: so that it was rather a mark of their office than a title of dignity. Constantine was the first who converted it into a dignity; and under him it was that the name was first given absolutely. The name once established, was in a little time indifferently conferred, not only on those who followed the court, and accompanied the emperor, but also on most kinds of officers; a long list whereof is given us by Du Cange.

Eusebius tells us, that Constantine divided the counts into three classes; the first bore the title of *illustres;* the second that of *clarissimi*, and afterwards *spectabiles;* the third were called *perfectissimi.* Of the two first classes was the senate composed: those of the third had no place in the senate, but enjoyed several other of the privileges of senators.

There were counts who served on land, others at sea; some in a civil, some in a religious, and some in a legal capacity; as *comes ærarii, comes sacrarum largitionum, comes sacri consistorii, comes curiæ, comes capellæ, comes archiatrorum, comes commerciorum, comes vestiarius, comes horreorum, comes opsoniorum* or *annonæ, comes domesticorum, comes equorum regiorum* or *comes stabuli, comes domorum, comes excubitorum, comes notariorum, comes legum* or *professor in jure, comes limitum* or *marcarum, comes portus Romæ, comes patrimonii*, &c.

The

The Franks, Germans, &c. paſſing into Gaul and Germany, did not aboliſh the form of the Roman government: and as the governors of cities and provinces were called *counts*, *comites*, and *dukes*, *duces*, they continued to be called ſo. They commanded in time of war; and in time of peace they adminiſtered juſtice. Thus, in the time of Charlemagne, counts were the ordinary judges and governors of the cities.

Theſe counts of cities were beneath the dukes and counts who preſided over provinces; the firſt being conſtituted in the particular cities, under the juriſdiction of the latter. The counts of provinces were in nothing inferior to dukes, who themſelves were only governors of provinces. Under the laſt of the ſecond race of French kings, they got their dignity rendered hereditary, and even uſurped the ſovereignty when Hugh Capet came to the crown; his authority was not ſufficient to oppoſe their encroachments; and hence it is they date the privilege of wearing coronets in their arms; they aſſumed it then, as enjoying the rights of ſovereigns in their particular diſtricts or counties. But, by degrees, moſt of the counties became reunited to the crown.

The quality of count is now become very different from what it was anciently; being now no more than a title, which a king grants upon erecting a territory into a county, with a reſerve of juriſdiction and ſovereignty to himſelf. At firſt there was no clauſe in the patent of erection intimating the reverſion of the county to the crown in default of heirs male; but Charles IX. to prevent their being too numerous, ordained that duchies and counties, in default of heirs male, ſhould return to the crown.

The point of precedence between counts and marquiſes was formerly much controverted: the reaſon was, that there were counts who were peers of France, but no marquiſes: but the point was given up, and marquiſes took place; though anciently, when counts were governors of provinces, they were on a level even with dukes.

William the Conqueror, as is obſerved by Camden, gave the dignity of counts in fee to his nobles; annexing it to this or that county or province, and allotting for their maintenance a certain proportion of money, ariſing from the prince's profits in the pleadings and forfeitures of the provinces. To this purpoſe he quotes an ancient record, thus: Hen. II. *Rex Angliæ his verbis comitem creavit; ſciatis nos feciſſe Hugonem Bigot comitem de Norf, &c. de tertio denarii de Norwich et Norfolk, ſicut aliquis comes Angliæ, &c.*

The Germans call a count, *graaf*, or *graff;* which, according to a modern critic, properly ſignifies *judge;* and is derived from *gravio* or *graffio*, of γϱαφω *I write.* They have ſeveral kinds of theſe counts or graffs; as landgraves, marchgraves, burg-graves, and palſ-graves, or counts palatine. Theſe laſt are of two kinds: the former are of the number of princes, and have the inveſtiture of a palatinate; the others have only the title of *count palatine* without the inveſtiture of any palatinate. Some aſſert, that by publicly profeſſing the imperial laws for twenty years, the perſon acquires the dignity of a count palatine; and there are inſtances of profeſſors in law who have aſſumed the title accordingly; but there are others who queſtion this right.

COUNT, in *Law*, denotes the original declaration in a real action; as the declaration is in a perſonal one: the libellus of the civilians anſwers to both. Yet, count and declaration are ſometimes confounded, and uſed for each other; as, count in debt, count in appeal, &c.

Count-Wheel, in the ſtriking part of a clock, a wheel which moves round once in 12 or 24 hours. It is ſometimes called the *locking-wheel.* See CLOCK-*Making*.

COUNTER, a term which enters into the compoſition of divers words of our language, and generally implies oppoſition; but when applied to deeds, means an exact copy kept of the contrary party, and ſometimes ſigned by both parties.

Counter-Changed, in *Heraldry*, the intermixture or oppoſition of any metal with a colour.

Counter-Flory, in *Heraldry*, is ſaid of a treſſure whoſe flowers-de-luce are oppoſite to others. See HERALDRY.

Counter-Drawing, in *Painting*, is the copying a deſign, or painting, by means of a fine linen-cloth, an oiled paper, or other tranſparent matter, where the ſtrokes appearing through are followed with a pencil, with or without colour. Sometimes it is done on glaſs, and with frames or nets divided into ſquares with ſilk or with thread, and alſo by means of inſtruments invented for the purpoſe, as the parallelogram.

Counter-Ermine, in *Heraldry*, is the contrary of ermine, being a black field with white ſpots.

COUNTERFEITS, in *Law*, are perſons that obtain any money or goods by counterfeit letters or falſe tokens, who being convicted before juſtices of aſſize or of peace, &c. are to ſuffer ſuch puniſhment as ſhall be thought fit to be inflicted under death, as impriſonment, pillory, &c.

COUNTER-FOIL, or COUNTER-*ſtock*, in the exchequer, that part of a tally which is kept by an officer of the court.

Counter-Guard, in *Fortification*, is a work raiſed before the point of a baſtion, conſiſting of two long faces parallel to the faces of the baſtion, making a ſalient angle; they are ſometimes of other ſhapes, or otherwiſe ſituated.

Counter-Light, or *Counter-jour*, a light oppoſite to any thing, which makes it appear to diſadvantage. A ſingle counter-light is ſufficient to take away all the beauty of a fine painting.

Counter-March, in military affairs, a change of the face or wings of a battalion, by which means thoſe that were in the front come to be in the rear. It alſo ſignifies returning, or marching back again.

Counter-Mine, in *War*, a well and gallery drove and ſunk till it meet the enemy's mine, to prevent its effect.

Counter-Paled, in *Heraldry*, is when the eſcutcheon is divided into twelve pales parted per feſſe, the two colours being counter-changed; ſo that the upper are of one colour and the lower of another.

Counter-Part, in *Muſic*, denotes one part to be applied to another. Thus the baſs is ſaid to be a counterpart to the treble.

Counter-Paſſant, in *Heraldry*, is when two lions are in a coat of arms, and the one ſeems to go quite the contrary way from the other.

Counter-

Counter-Point, in *Music*, a term derived from the Latin prepofition *contra* and the verb *pungere;* becaufe the mufical characters by which the notes in each part are fignified are placed in fuch a manner, each with refpect to each, as to fhow how the parts anfwer one another. See COMPOSITION.

Counter-Pointed (*Contre-pointé*), in *Heraldry*, is when two cheverons in one efcutcheon meet in the points, the one rifing as ufual from the bafe, and the other inverted falling from the chief; fo that they are counter to one another in the points. They may alfo be counter-pointed when they are founded upon the fides of the fhield, and the points meet that way, called *counter-pointed* in *feffe*.

COUNTERPOISE, in the manege, is the liberty of the action and feat of a horfeman; fo that in all the motions made by the horfe, he does not incline his body more to one fide than to the other, but continues in the middle of the faddle, being equally on his ftirrups, in order to give the horfe the proper and reafonable aids.

COUNTER-POTENT (*contre-potencé*), in *Heraldry*, is reckoned a fur as well as vaire ermine; but compofed of fuch pieces as reprefent the tops of crutches, called in French *potences*, and in old Englifh *potents*.

Counter-Proof, in rolling-prefs printing, a print taken off from another frefh printed; which by being paffed through the prefs, gives the figure of the former, but inverted. To counter-prove, is alfo to pafs a defign in black lead, or red chalk, through the prefs, after having moiftened with a fponge both that and the paper on which the counter-proof is to be taken.

Counter-Quartered (*contre-ecartelé*), in *Heraldry*, denotes the efcutcheon, after being quartered, to have each quarter again divided into two.

Counter-Saliant, is when two beafts are borne in a coat leaping from each other directly the contrary way.

Counter-Scarp, in *Fortification*, is properly the exterior talus or flope of the ditch; but it is often taken for the covered way and the glacis. In this fenfe we fay, the enemy have lodged themfelves in the counterfcarp. Angle of the counter-fcarp, is that made by two fides of the counter-fcarp, meeting before the middle of the curtain.

Counter-Signing, the figning the writing of a fuperior in quality of fecretary. Thus charters are figned by the king, and counter-figned by a fecretary of ftate, or lord chancellor.

Counter-Time, in the manege, is the defence or refiftance of a horfe that interrupts his cadence, and the meafure of his manege, occafioned either by a bad horfeman or by the malice of a horfe.

COUNTER, is alfo the name of a counting-board in a fhop, and of a piece of metal with a ftamp on it, ufed in playing at cards.

Counter of a Horfe, that part of a horfe's forehand which lies between the fhoulders and under the neck.

Counters in a fhip are two. 1. The hollow arching from the gallery to the lower part of the ftraight piece of the ftern, is called the *upper-counter*. 2. The lower counter is between the tranfom and the lower part of the gallery.

COUNTER, is alfo the name of two prifons in the city of London, viz. the Poultry and Woodftreet.

COUNTORS, COUNTOURS, or COUNTERS, has been ufed for ferjeants at law, retained to defend a caufe, or to fpeak for their client in any courfe of law.

It is of thefe Chaucer fpeaks:

—— A fheriff had he been, and a contour,
Was nowhere fuch a worthy vavafour.

They were anciently called *ferjeant contours*.

COUNTRIES, among the miners, a term or appellation they give to their works under ground.

COUNTRY, among geographers, is ufed indifferently to denote either a kingdom, province, or leffer diftrict. But its moft frequent ufe is in contradiftinction to town.

Country-Dance is of Englifh origin, though now tranfplanted into almoft all the countries and courts of Europe. There is no eftablifhed rule for the compofition of tunes to this dance, becaufe there is in mufic no kind of time whatever which may not be meafured by the motions common in dancing; and there are few fong tunes of any note within the laft century, that have not been applied to country-dances.

COUNTY, in *Geography*, originally fignified the territory of a count or earl, but now it is ufed in the fame fenfe with fhire; the one word coming from the French, the other from the Saxon.—In this view, a county is a circuit or portion of the realm; into fifty-two of which the whole land, England and Wales, is divided for its better government and the more eafy adminiftration of juftice.

For the execution of the laws in the feveral counties, excepting Cumberland, Weftmoreland, and Durham, every Michaelmas term officers are appointed, under the denomination of *fheriffs*. Other officers of the feveral counties are, a lord lieutenant, who has the command of the militia of the county; cuftodes rotulorum, juftices of peace, bailiffs, high-conftable, and coroner.

Of the fifty-two counties, there are three of fpecial note, which are therefore termed *counties palatine*, as Lancafter, Chefter, and Durham. See PALATINE.

County-Corporate, is a title given to feveral cities, or ancient boroughs, on which our monarchs have thought fit to beftow extraordinary privileges; annexing to them a particular territory, land, or jurifdiction; and making them counties of themfelves, to be governed by their own fheriffs and magiftrates.

County Court, in *Englifh Law*, a court incident to the jurifdiction of the fheriff. It is not a court of record, but may hold pleas of debt or damages under the value of 40s. Over fome of which caufes thefe inferior courts have, by the exprefs words of the ftatute of Gloucefter, a jurifdiction totally exclufive of the king's fuperior courts. For in order to be entitled to fue an action of trefpafs for goods before the king's jufticiars, the plaintiff is directed to make affidavit that the caufe of action does really and *bona fide* amount to 40s. which affidavit is now unaccountably difufed, except in the court of exchequer. The ftatute

tute also 43 Eliz. c. 6. which gives the judges in many personal actions, where the jury assess less damages than 40s. a power to certify the same and abridge the plaintiff of his full costs, was also meant to prevent vexation by litigious plaintiffs; who, for purposes of mere oppression, might be inclinable to institute such suits in the superior courts for injuries of a trifling value. The county court may also hold plea of many real actions, and of all personal actions to any amount, by virtue of a special writ called *justicies*; which is a writ empowering the sheriff for the sake of dispatch to do the same justice in this county-court, as might otherwise be had at Westminster. The freeholders of the county are the real judges in this court, and the sheriff is the ministerial officer. The great conflux of freeholders, which are supposed always to attend at the county court (which Spelman calls *forum plebeiæ justitiæ et theatrum comitivæ potestatis*), is the reason why all acts of parliament at the end of every session were wont to be there published by the sheriff; why all outlawries of absconding offenders are there proclaimed; and why all popular elections which the freeholders are to make, as formerly of sheriffs and conservators of the peace, and still of coroners, verderors, and knights of the shire, must ever be made *in pleno comitatu*, or in full county-court. By the statute 2 Edw. VI. c. 25. no county-court shall be adjourned longer than for one month, consisting of 28 days. And this was also the ancient usage, as appears from the laws of King Edward the elder; *prepositus* (that is the sheriff) *ad quartam circiter septimanam frequentem populi concionem celebrato; cuique jus dicito; litesque singulas dirimito*. In those times the county-court was a court of great dignity and splendour, the bishop and the ealdorman (or earl), with the principal men of the shire, sitting therein to administer justice both in lay and ecclesiastical causes. But its dignity was much impaired, when the bishop was prohibited, and the earl neglected to attend it. And, in modern times, as proceedings are removeable from hence into the king's superior courts, by writ of *pone* or *recordare*, in the same manner as from hundred-courts and courts-barons; and as the same writ of false judgment may be had, in nature of a writ of error, this has occasioned the same disuse of bringing actions therein.

COUPAR, or CUPAR, *of* ANGUS, a town of Scotland, in the valley of Strathmore, and though designated in Angus, by far the greater part is situated in the county of Perth. The town is placed on the Isla, and is divided by a rivulet into two parts; that part which lies south of this rivulet being all that belongs to the county of Angus. The streets are well paved and lighted, and the town has much improved of late years; there is a town-house and steeple on the spot where the prison of the court of regality stood. The linen manufacture is carried on to a considerable extent, nearly 200,000 yards of different kinds of cloth being annually stamped here. The number of inhabitants in 1793, amounted to 1604. Cupar is distant about 12 miles from Perth, and nearly the same distance from Dundee. The parish of Cupar extends about 5 miles in length from south-west to north-east, and is from 1 to 2 miles in breadth; it is divided lengthways by an elevated ridge: a considerable extent of haugh ground lies on the banks of the Isla, which is frequently swelled by the rains, and lays nearly 600 acres under water. There are still visible at Cupar, the vestiges of a Roman camp, said to have been formed by the army of *Agricola* in his 7th expedition. On the centre of this camp, Malcolm IV. in 1104, founded and richly endowed an abbey for Cistertian monks; from what remains, it must have been a house of considerable magnitude.

COUPAR, or *Cupar*, *of Fife*, a town in Scotland, capital of the county of Fife, about 10 miles west of St Andrews; W. Long. 2. 40. N. Lat. 56. 20. It is situated on the north bank of the Eden, nearly in the centre of the county; it boasts of great antiquity; the thanes of Fife, from the earliest times of which any account has been transmitted to us, held here their courts of justice; and in the rolls of parliament, assembled in the beginning of the reign of King David II. may be seen the names of commissioners from the royal borough of Cupar. It is governed by a provost, 3 bailies, a dean of guild, and 21 counsellors. The revenue of the town amounts to 430l. sterling per annum. Cupar has the appearance of a neat, clean, well built, thriving town. The streets are well paved, and upwards of one third of the town is newly built. The church is a neat new building, and the spire is much admired for its light and elegant appearance. Adjoining to the town-house, the gentlemen of the county lately built a room for county meetings, and other apartments. The prisons are on the opposite side of the town-house. In Cupar, and the neighbouring country, a considerable quantity of coarse linens are manufactured; about 500,000 yards are annually stamped, the aggregate value of which is nearly 30,000l. sterling. Population of the town is about 3140. The parish of Cupar is an irregular square of 5 miles, divided into two parts by the river Eden, the banks of which are covered with numerous farm houses, and ornamented with elegant and stately villas. *Carslogie*, the seat of Colonel Clephane, is an ancient mansion. *Garlie bank*, the property of James Wemyss, Esq. of Winthank, is celebrated for the treaty concluded on the 13th of June 1559, between the duke de Chattelherault, on the part of the queen-regent, and the earl of Argyle commanding the forces of the congregation. The population of the parish (including the town of Cupar) in 1793, amounted to 3702; in 1801, there were 4463 inhabitants in the same district.

COUPED, in *Heraldry*, is used to express the head, or any limb, of an animal, cut off from the trunk, smooth; distinguishing it from that which is called *erassed*, that is, forcibly torn off, and therefore is ragged and uneven.

COUPED, is also used to signify such crosses, bars, bends, chevrons, &c. as do not touch the sides of the escutcheon, but are, as it were, cut off from them.

COUPEE, a motion in dancing, wherein one leg is a little bent, and suspended from the ground; and with the other a motion is made forwards.

The word in the original French signifies a *cut*.

COUPLE CLOSS, in *Heraldry*, the fourth part of a a chevron, never borne but in pairs, except there be a chevron between them, saith Guillim, though Bloom gives an instance to the contrary.

COUPLET, a division of a hymn, ode, song, &c. wherein

wherein an equal number, or equal meaſure, of verſes, is found in each part; which diviſions, in odes, are called *ſtrophes*. Couplet, by an abuſe of the word, is frequently made to ſignify a couple of verſes.

COURAGE, in *Ethics*, is that quality of the mind, derived either from conſtitution or principle, or both, that enables men to encounter difficulties and dangers. See FORTITUDE.

COURANT, a French term ſynonymous with *current*, and properly ſignifies running. See CURRENT.

COURANT, is alſo a term in muſic and dancing; being uſed to expreſs both the tune or air and the dance. With regard to the firſt, *courant* or *currant* is a piece of muſic in triple time: the air of the courant is ordinarily noted in triples of minims; the parts to be repeated twice. It begins and ends when he who beats the meaſure falls his hands; in contradiſtinction from the ſaraband, which ordinarily ends when the hand is raiſed. With regard to dancing, the courant was long the moſt common of all the dances practiſed in England: it conſiſts, eſſentially, of a time, a ſtep, a balance, and a coupee; though it alſo admits of other motions. Formerly they leaped their ſteps; in which point the courant differed from the low dance and pavades. There are ſimple courants and figured courants, all danced by two perſons.

COURAP, the modern name for a diſtemper very common in Java and other parts of the Eaſt Indies. It is a ſort of herpes or itch on the arm-pits, groins, breaſt, and face; the itching is almoſt perpetual; and the ſcratching is followed by great pain and a diſcharge of matter, which makes the linen ſtick ſo to the ſkin as not eaſily to be ſeparated without tearing off the cruſt. *Courap* is a general name for any ſort of itch; but this diſtemper is thus called by way of eminence. It is ſo contagious that few eſcape it. For the cure, gentle and repeated purging is uſed, and externally the ſublimate in a ſmall quantity is a good topic.

COURAYER, PETER FRANCIS, a Roman Catholic clergyman, diſtinguiſhed by great moderation, charity, and temper, concerning religious affairs, as well as by learning, was born at Vernon in Normandy, 1681. While canon regular and librarian of the abbey of St Genevieve at Paris, he applied to our archbiſhop Wake for the reſolution of ſome doubts, concerning the epiſcopal ſucceſſion in England, and the validity of our ordinations: he was encouraged to this by the friendly correſpondence which had paſſed between the archbiſhop and M. du Pin of the Sorbonne. The archbiſhop ſent him exact copies of the proper records; and on theſe he built his "Defence of Engliſh Ordinations," which was publiſhed in Holland, in 1727. This expoſed him to a proſecution in his own country; he therefore took refuge in England; where he was well received, and preſented the ſame year by the univerſity of Oxford with a doctor's degree. As it is ſomewhat uncommon for a Roman Catholic clergyman to be admitted to degrees in divinity by Proteſtant univerſities, the curious may be gratified with a ſight of the diploma, and the doctor's letter of thanks, in "The preſent State of the Republic of Letters, for June 1728." In 1736, he tranſlated into French, and publiſhed, "Father Paul's Hiſtory of the Council of Trent," in 2 vols folio, and dedicated it to Queen Caroline; who augmented to 200l. a penſion of 100l. a year, which he had obtained before from the court. The learned Jer. Markland, in a letter to his friend Bowyer, September 1756, ſays, "Mr Clarke has given me F. Courayer's tranſlation of the Hiſtory of the Council of Trent; with whoſe preface I am ſo greatly pleaſed, that if he be no more a Papiſt in other tenets than he is in thoſe he mentions (which are many, and of the moſt diſtinguiſhing claſs), I dare ſay there are very few conſiderate Proteſtants who are not as good Catholics as he is." His works are many, and all in French: he tranſlated Sleidan's "Hiſtory of the Reformation." He died in 1776, after two days illneſs, at the age of 95; and was buried in the cloiſter of Weſtminſter-abbey. In this will, dated Feb. 3. 1774, he declares, that he "dies a member of the Catholic church, but without approving of many of the opinions and ſuperſtitions which have been introduced into the Romiſh church, and taught in their ſchools and ſeminaries; and which they have inſiſted on as articles of faith, though to him they appear to be not only not founded in truth, but alſo to be highly improbable." And his practice was conformable to this declaration; for at London he conſtantly went to maſs, and at Ealling in the country, whither he often retired, as conſtantly attended the ſervice of the pariſh church; declaring at all times, that he "had great ſatisfaction in the prayers of the church of England."

COURBARIL. See HYMENEA.

COURIER, or CURRIER, (from the French *courir*, "to run,") a meſſenger ſent poſt, or expreſs, to carry diſpatches.

The ancients too, had their couriers. We meet with two kinds: 1. Thoſe who ran on foot, called by the Greeks *hemerodromi*, q. d. "couriers of a day." Pliny, Corn. Nepos, and Cæſar, mention ſome of thoſe who would run 20, 30, 36, and in the circus even 40 leagues per day. 2. Riding couriers *(curſores equitantes)*, who changed horſes as the modern couriers do.

Xenophon attributes the firſt couriers to Cyrus. Herodotus ſays they were very ordinary among the Perſians, and that there was nothing in the world more ſwift than theſe kind of meſſengers. "That prince (ſays Xenophon) examined how far a horſe would go in a day; and built ſtables, at ſuch diſtances from each other, where he lodged horſes, and perſons to take care of them; and at each place kept a perſon always ready to take the packet, mount a freſh horſe, and forward it to the next ſtage; and thus quite through his empire."

But it does not appear that either the Greeks or Romans had any regular fixed couriers till the time of Auguſtus; under that prince they travelled in cars; though it would appear that they afterwards went on horſeback. Under the weſtern empire they were called *viatores;* and under that of Conſtantinople, *curſores:* whence the modern name. See POST.

COURLAND, a duchy ſituated between E. Long. 21. 26. and between N. Lat. 56. 30. and 57. 20. It is bounded by the river Dwina, which divides it from Livonia on the north; by Lithuania, on the eaſt; by Samogitia, on the ſouth, and by the Baltic ſea on the weſt; being 120 miles long and 30 broad. This

duchy

duchy was formerly independent, and elected their own duke: but it is now subject to Russia.

COURSE (*route*), in *Navigation*, the angle contained between the nearest meridian and that point of the compass upon which a ship sails in any particular direction.

Course, in *Architecture*, denotes a continued range of stones, level, or of the same height, throughout the whole length of the building; and not interrupted by any aperture. It forms a parapet to the intermediate space between the body of the building and the wings.

Course of Plinths, is the continuity of a plinth of stone or plaster in the face of a building; to mark the separation of the stories.

Course is also used for the time ordinarily spent in learning the principles of a science, or the usual points and questions therein. Thus, a student is said to have finished his course in the humanity, in philosophy, &c.

Course is also used for the elements of an art exhibited and explained, either in writing or by actual experiment. Hence our courses of philosophy, anatomy, chemistry, mathematics, &c. probably so called as going throughout or running the whole length or course of the arts, &c.

COURSES, a name by which the principal sails of a ship are distinguished, viz. the main-sail, the fore-sail, and the mizen: the mizen stay-sail and fore-sail are also sometimes comprehended in this denomination; as are the main stay-sails of all brigs and schooners. See Sail.

COURSING, among sportsmen. There are three several sorts of courses with grehounds: 1. At the hare; 2. At the fox; and 3. At the deer.

For the *deer*, there are two sorts of courses; the one in the paddock, the other either in the forest or the purlieu. For the paddock course, there must be the grehound and the terrier, and the mongrel grehound, whose business it is to drive away the deer before the grehounds are slipped; a brace or a leash are the usual number slipped at a time, seldom at the utmost more than two brace. In coursing the deer in the forest or purlieu, there are two ways in use: the one is coursing from wood to wood; and the other, upon the lawns close by the keeper's lodge. In the coursing from wood to wood, the way is to throw in some young hounds into the wood to bring out the deer; and if any deer come out that is not weighty, or a deer or antler which is buck, sore, or sorrel, then you are not to slip your grehounds, which are held at the end of the wood, where the keepers, who can guess very well on these occasions, expect that the deer will come out. If a proper deer came out, and it is suspected that the brace or leash of grehounds slipped after him will not be able to kill him, it is proper to waylay him with a couple of fresh grehounds.

The coursing upon the lawn is the most agreeable of all other ways. When the keeper has notice of this, he will lodge a deer for the course; and then, by coming under the wind, the grehounds may be brought near enough to be slipped for a fair course.

The best method of coursing the *hare*, is to go out and find a hare sitting; which is easily done in the summer, by walking across the lands, either stubble, fallow, or corn grounds, and casting the eye up and down: for in summer they frequent those places for fear of the ticks, which are common in the woods at that season; and in autumn the rains falling from the trees offend them. The rest of the year there is more trouble required; as the bushes and thickets must be beat to rouse them, and oftentimes they will lie so close, that they will not stir till the pole almost touches them: the sportsmen are always pleased with this, as it promises a good course. If a hare lies near any close or covert, and with her head that way, it is always to be expected that she will take to that immediately on being put up; all the company are therefore to ride up, and put themselves between her and the covert before she is put up; that she may take the other way, and run upon open ground. When a hare is put up, it is always proper to give her ground, or *law*, as it is called; that is, to let her run 12 score yards, or thereabouts, before the grehounds are slipped at her; otherwise she is killed too soon, the greater part of the sport is thrown away, and the pleasure of observing the several turnings and windings that the creature will make to get away is all lost. A good sportsman had rather see a hare save herself after a fair course, than see her murdered by the grehounds as soon as she is up.

In coursing the *fox*, no other art is required, than standing close, and in a clear wind, on the outside of some grove where it is expected he will come out; and when he is come out, he must have head enough allowed him, otherwise he will return back to the covert. The slowest grehound will be able to overtake him, after all the odds of distance necessary; and the only danger is the spoiling the dog by the fox, which too frequently happens. For this reason, no grehound of any value should be run at this course; but the strong, hard, bitter dogs, that will seize any thing.

The laws of coursing established by the duke of Norfolk, and other sportsmen of the kingdom of England, are these:

1. He that is chosen fewterer or letter-loose of the dogs, shall receive the grehounds matched to run together into his leash as soon as he comes into the field; he is to march next to the hare-finder, or him who is to start the hare, until he come to the form; and no horseman or footman is to go before or sideways, but all straight behind, for the space of about 40 yards. 2. A hare ought never to be coursed with more than a brace of grehounds. 3. The hare-finder is to give the hare three sohoes before he puts her up from her form or seat, to the end that the dogs may be prepared and attend her starting. 4. If there be not a particular danger of losing the hare, she should have about twelve score yards law. 5. The dog that gives the first turn, if after that there be neither cote, slip, nor wrench, wins the wager. 6. A go-by, or bearing the hare, is counted equivalent to two turns. 7. If either dog turns the hare, he that leads to the last covert wins. 8. If any dog turns the hare, serves himself, and turns her again, it is as much as a cote, and a cote is esteemed as much as two turns. 9. If all the course be equal, he that bears the hare shall win; and if he be not borne, the course shall

Courfing, Court.

fhall then be judged *dead.* 10. If a dog take a fall in his courfe, and yet perform his part, he may challenge the advantage of a turn more than he gave. 11. If a dog turn the hare, ferve himfelf, and give divers cotes, and yet in the end fhall ftand ftill in the field, the other dog, if he turns home to the covert, although he gives no other, fhall be adjudged to win the wager. 12. If by misfortune a dog be rid over in the courfe, that courfe fhall be adjudged void, and he that did the mifchief is to make reparation to the owner. 13. If a dog gives the firft and laft turn, and there be no other advantage betwixt them, he that gives the odd turn wins. 14. A cote is when a grehound goes endways by the fide of his fellow, and gives the hare a turn. 15. A cote ferves for two turns, and two trippings or jerkings for a cote; and if the hare turns not quite about, fhe only *wrencheth*, in the fportfman's phrafe. 16. If there be no cotes given by either of the grehounds, but one ferves the other at turning, then he that gives the moft turns wins the wager. 17. Sometimes a hare does not turn, but wrenches; for fhe does not turn, except fhe turns as it were round. In thefe cafes, two wrenches ftand for one turn. 18. He that comes in firft at the death of the hare takes her up, and faves her from breaking; he cherifhes the dogs, and cleanfes their mouths from the wool; he is adjudged to have the hare for his pains. 19. Finally, thofe who are judges for the leafh, muft give their judgment before they depart out of the field, or elfe it is not to ftand as valid.

COURT, an appendage to a houfe or habitation; confifting of a piece of ground inclofed with walls, but open upwards.

Court is alfo ufed for the palace or place where a king or fovereign prince refides.

Court, in a law fenfe, is defined to be a place wherein juftice is judicially adminiftered. And, as, by our excellent conftitution, the fole executive power of the laws is vefted in the perfon of the king, it will follow that all courts of juftice, which are the medium by which he adminifters the laws, are derived from the power of the crown. For whether created by act of parliament or letters patent, or fubfifting by prefcription (the only methods by which any court of judicature can exift), the king's confent in the two former is exprefsly, and in the latter impliedly, given. In all thefe courts, the king is fuppofed in contemplation of law to be always prefent; but as that is in fact impoffible, he is there reprefented by his judges, whofe power is only an emanation of the royal prerogative.

Blackft. Comment.

For the more fpeedy, univerfal, and impartial adminiftration of juftice between fubject and fubject, the law hath appointed a prodigious variety of courts, fome with a more limited, others with a more extenfive jurifdiction; fome conftituted to inquire only, others to hear and determine; fome to determine in the firft inftance, others upon appeal and by way of review. See Law, N° xcviii. xcix. c. cxli. clvi. clvii. clviii. and the refpective articles in the order of the alphabet. One diftinction may be here mentioned, that runs throughout them all; viz. that fome of them are courts *of record*, others *not of record*. A court of record is that where the acts and judicial proceedings are enrolled in parchment for a perpetual memorial and teftimony: which rolls are called the *records of the court*, and are of fuch high and fupereminent authority, that their truth is not to be called in queftion. For it is a fettled rule and maxim, that nothing fhall be averred againft a record, nor fhall any plea, or even proof, be admitted to the contrary. And if the exiftence of a record be denied, it fhall be tried by nothing but itfelf; that is, upon bare infpection whether there be any fuch record or not; elfe there would be no end of difputes. But if there appears any miftake of the clerk in making up fuch record, the court will direct him to amend it. All courts of record are the king's courts in right of his crown and royal dignity, and therefore no other court hath authority to fine or imprifon: fo that the very erection of a new jurifdiction, with power of fine or imprifonment, makes it inftantly a court of records. A court not of record is the court of a private man; whom the law will not intruft with any difcretionary power over the fortune or liberty of his fellow fubjects. Such are the courts-baron incident to every manor, and other inferior jurifdictions; where the proceedings are not enrolled or recorded; but as well their exiftence as the truth of the matters therein contained fhall, if difputed, be tried and determined by a jury. Thefe courts can hold no plea of matters cognizable by the common law, unlefs under the value of 40s.; nor of any forcible injury whatfoever, nor having any procefs to arreft the perfon of the defendant.

Court.

In every court there muft be at leaft three conftituent parts, the *actor*, *reus*, and *judex:* the *actor*, or plaintiff, who complains of an injury done; the *reus*, or defendant, who is called upon to make fatisfaction for it; and the *judex*, or judicial power, which is to examine the truth of the fact, to determine the law arifing upon that fact, and, if any injury appears to have been done, to afcertain, and by its officers to apply the remedy. It is alfo ufual in the fuperior courts to have attorneys, and advocates or counfel, as affiftants. See Attorney and Counsel.

Court Baron, in *Englifh Law*, a court incident to every manor in the kingdom, to be holden by the fteward within the faid manor. This court-baron is of two natures: the one is a cuftomary court, appertaining entirely to the copyholders, in which their eftates are transferred by furrender and admittance, and other matters tranfacted relative to their tenures only. The other is a court of common law, and it is the court of the *barons*, by which name the freeholders were fometimes anciently called: for that it is held before the freeholders who owe fuit and fervice to the manor, the fteward being rather the regifter than the judge. Thefe courts, though in their nature diftinct, are equally confounded together. The court we are now confidering, viz. the freeholder's court, was compofed of the lord's tenants, who were the *pares* of each other, and were bound by their feodal tenure to affift their lord in the difpenfation of domeftic juftice. This was formerly held every three weeks; and its moft important bufinefs is to determine, by writ of right, all controverfies relating to the right of lands within the manor. It may alfo hold plea of any perfonal actions, of debt, trefpafs on the cafe, or the like, where the debt or damages do not amount to 40s. Which is the fame fum, or three marks, that bounded the jurifdiction

risdiction of the ancient Gothic courts in their lowest instance, or *fierding courts*, so called because four were instituted within every superior district or hundred. But the proceedings on a writ of right may be removed into the county-court by a precept from the sheriff called a *tolt*, *quia tollit atque eximit causam è curia baronum.* And the proceedings in all other actions may be removed into the superior courts by the king's writs of *pone*, or *accedas ad curiam*, according to the nature of the suit. After judgment given, a writ also of *false judgment* lies to the courts at Westminster to rehear and review the cause, and not a writ of *error*; for this is not a court of record; and therefore, in some of these writs of removal, the first direction given is to cause the plaint to be recorded, *recordari facias loquelam.*

Court-Martial, a court appointed for the punishing offences in officers, soldiers, and sailors, the powers of which are regulated by the mutiny-bill.

For other courts, see Admiralty, Arches, Bench, Chancery, Chivalry, *Common-Pleas*, County, Duchy, Ecclesiastical, Faculty, Forest, Hustings, Leet, Legate, Mayor, Piepoudre, Prerogative, Requests, Stannary, *Star-Chamber*, University, &c.

COURTESY, or Curtesy, *of England*; a certain tenure whereby a man marrying an heiress seized of lands of fee-simple, or fee-tail general, or seized as heir of the tail special, and getteth a child by her that cometh alive into the world, though both it and his wife die forthwith; yet, if she were in possession, he shall keep the land during his life, and is called *tenant per legem Angliæ*, "or tenant by the courtesy of England;" because this privilege is not allowed in any country except Scotland, where it is called *curialitas Scotiæ*.

COURTESAN, a woman who prostitutes herself for hire, especially to people of superior rank. Laïs the famous Theban courtesan, stands on record for requiring no less than 10,000 crowns for a single night. Of all places in the world, Venice is that where courtesans abound the most. It is now 300 years since the senate, which had expelled them, was obliged to recal them; in order to provide for the security of women of honour, and to keep the nobles employed, lest they should turn their heads to make innovations in the state.

COURTRAY, a town of the Austrian Netherlands, situated on the river Lys, about 23 miles south-west of Ghent, and 14 east of Ypres. E. Long. 3. 10. N. Lat. 50. 48.

COUSIN, a term of relation between the children of brothers and sisters, who in the first generation are called *cousins-german*, in the second generation, *second cousins*, &c. If sprung from the relations of the father's side, they are denominated *paternal* cousins; if on the mother's, *maternal*.

The word is ordinarily derived from *consanguineus*; though Menage brings it from *congenius*, or *congeneus*, q. d. *ex eodem genere*.

In the primitive times, it was allowed cousins-german to marry, to prevent their making alliances in heathen families: but Theodosius the Great prohibited it under pain of death; on pretence that they were, in some sort, brothers and sisters with regard to each other.

Cousin, *John*, a celebrated French painter, who excelled in painting on glass. His picture of the Last Judgment, in the vestry of the Minims of the Wood of Vincennes, is much admired. He was also a good sculptor. He wrote several works on geometry and perspective; and died after the year 1689.

COUSU, in *Heraldry*, signifies a piece of another colour or metal placed in the ordinary, as if it were sewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COUTANCES, a port town of Normandy, and capital of Coutantin, in W. Long. 1. 32. N. Lat. 49. 10. This town, anciently called *Constantia* or *Cosedia*, is pleasantly situated among meadows and rivulets about five miles distant from the sea. By the remains of a Roman aqueduct, and other ancient ruins, it appears to be a place of great antiquity. It is the see of a bishop, suffragan of Rome; and has a magnificent cathedral, esteemed one of the finest pieces of Gothic architecture in Europe. The trade of this town is very inconsiderable, and the fortifications are quite demolished. They have several religious houses, and two parochial churches.

COUTHUTLAUGH, from the Saxon *couth*, "knowing," and *utlaugh*, "outlaw;" he that wittingly receives a man outlawed, and cherishes or conceals him: for which offence he was in ancient times subject to the same punishment with the outlaw himself.

COVERT, in *Heraldry*, denotes something like a piece of hanging, or a pavilion falling over the top of a chief or other ordinary, so as not to hide, but only to be a covering to it.

COW. See Bos, Mammalia *Index*.

Cow-Burner. See Buprestis, Entomology *Index*.

Sea-Cow. See Trichecus, Mammalia *Index*.

Cow-Itch, or *Couhage*. See Couhage and Dolichos, Botany *Index*.

Cow's-Lip. See Primula, Botany *Index*.

COWARD, in *Heraldry*, a term given to a lion borne in an escutcheon, with his tail doubled, or turned in between his legs.

COWEL, Dr John, a learned and eminent civilian, born about the year 1554. In 1607 he compiled a Law Dictionary, which gave great offence to Sir Edward Coke and the common lawyers: so that they first accused him to James I. as asserting that the king's prerogative was in some cases limited; and when they failed in that attempt, they complained of him to the house of commons, as a betrayer of the rights of the people, by asserting that the king was not bound by the laws; for which he was committed to custody, and his book publicly burnt. He also published *Institutiones Juris Anglicani*, in the manner of Justinian's Institutes; and died in the operation for the stone, in 1611.

COWES, a town and harbour on the north-east coast of the Isle of Wight in Hampshire. It has no market, but is the best place for trade in the whole island; but as it lies low, the air is accounted unhealthy.

It is eight miles south-east of Portsmouth. W. Long. 1. 25. N. Lat. 50. 45.

COWL, or COUL, a sort of monkish habit worn by the Bernardines and Benedictines. The word is formed from *cucullus*, by confounding the two first syllables into one, as being the same twice repeated. There are two kinds of cowls: the one white, very large, worn in ceremony, and when they assist at the office; the other black, worn on ordinary occasions, in the streets, &c.

F. Mabillon maintains the coul to be the same thing in its origin with the scapular. The author of the apology of the emperor Henry IV. distinguishes two forms of couls: the one is a gown reaching to the feet, having sleeves, and a capuchin, used in ceremonies; the other a kind of hood to work in, called also a *scapular*, because it only covers the head and shoulders.

COWLEY, ABRAHAM, an eminent poet, was born at London in 1618. His father, who was a grocer, dying before he was born, his mother procured him to be admitted a king's scholar at Westminster. His first inclination to poetry arose on his lighting on Spenser's Fairy Queen, when he was but just able to read; and this inclination so far improved in him, that at 13 he began to write several poems; a collection of which was published in 1613, when he was but 15. He has been represented as possessed of so bad a memory that his teachers could never bring him to retain the ordinary rules of grammar. But the fact was, as Dr Johnson notices, not that he could not learn or retain the rules; but that being able to perform his exercises without them, he spared himself the labour. In 1636 he was elected a scholar of Trinity college, Cambridge, and removed to that university. Here he went through all his exercises with a remarkable degree of reputation; and at the same time must have pursued his poetical turn with great eagerness, as it appears that the greatest part of his poems were written before he left that university. He had taken his degree of master of arts before 1643, when, in consequence of the turbulence of the times, he, among others, was ejected from the college; whereupon, retiring to Oxford, he entered himself of St John's College; and that very year, under the denomination of a *scholar of Oxford*, published a satire called the Puritan and the Papist. It is apparent, however, that he did not remain very long at Oxford; for his zeal to the royal cause engaging him in the service of the king, who was very sensible of his abilities, and by whom he was frequently employed, he attended his majesty in many of his journeys and expeditions, and gained not only that prince's esteem, but that of many other great personages, and in particular of Lord Falkland, one of the principal secretaries of state.

During the heat of the civil war, he was settled in the earl of St Alban's family; and when the queen-mother was obliged to retire into France, he accompanied her thither, laboured strenuously in the affairs of the royal family, undertook several very dangerous journeys on their account, and was the principal instrument in maintaining an epistolary correspondence between the king and queen, whose letters he ciphered and deciphered with his own hand. His poems, entitled The Mistress, were published at London in 1647; and his comedy called The Guardian, afterwards altered and published under the title of Cutter of Coleman-street, in 1650. In 1656 it was thought proper by those on whom Mr Cowley depended that he should come over into England, and, under pretence of privacy and retirement, should give notice of the posture of affairs in this nation. Upon his return he published a new edition of all his poems, consisting of four parts; viz. I. Miscellanies. II. The Mistress, or Several copies of Love-verses. III. Pindaric Odes, written in imitation of the style and manner of Pindar. IV. Davideis, a sacred poem of the troubles of David, in four books.

Soon after his arrival, however, he was seized, in the search after another gentleman of considerable note in the king's party; but although it was through mistake that he was taken, yet when the republicans found all their attempts of every kind to bring him over to their party proved ineffectual, he was committed to a severe confinement, and it was even with considerable difficulty that he obtained his liberty; when, venturing back to France, he remained there, in his former situation, till near the time of the king's return. During his stay in England he wrote his Two Books of Plants, published first in 1662; to which he afterwards added four books more; and all six, together with his other Latin poems, were printed at London in 1678. It appears by Mr Wood's *Fasti Oxonienses*, that our poet was created doctor of physic at Oxford, December 2. 1657.

Soon after the Restoration he became possessed of a very competent estate, through the favour of his principal friends the duke of Buckingham and the earl of St Alban's; and being now upwards of 40 years of age, he took up a resolution to pass the remainder of a life which had been a scene of tempest and tumult, in that situation which had ever been the object of his wishes, a studious retirement. His eagerness to get out of the bustle of a court and city made him less careful than he might have been in the choice of a healthful habitation in the country; by which means he found his solitude from the very beginning suit less with the constitution of his body than with his mind. His first rural residence was at Barn Elms, a place which, lying low, and being near a large river, was subject to a variety of breezes from land and water, and liable in the winter-time to great inconvenience from the dampness of the soil. The consequence of this Mr Cowley too soon experienced, by being seized with a dangerous and lingering fever. On his recovery from this he removed to Chertsey, a situation not much more healthy, where he had not been long before he was seized with another consuming disease. Having languished under this for some months, he at length got the better of it, and seemed pretty well recovered from the bad symptoms, when one day in the heat of summer 1667, staying too long in the fields to give some directions to his labourers, he caught a most violent cold, which was attended with a defluxion and stoppage in his breast; and for want of timely care, by treating it as a common cold, and refusing advice till it was past remedy, he departed this life on the 28th of July in that year, being the 49th of his age; and on the 3d of August following, he was

was interred in Weſtminſter-abbey, near the aſhes of Chaucer, and his beloved Spenſer. He was a man of a very amiable character, as well as an admirable genius. King Charles II. on the news of his death, declared " that Mr Cowley had not left a better man behind him in England." A monument was erected to his memory by George Villiers duke of Buckingham in 1675.

Beſides the works already mentioned, Mr Cowley wrote, among other things, A Propoſition for the Advancement of Experimental Philoſophy; A Diſcourſe by way of Viſion concerning the Government of Oliver Cromwell; and Several Diſcourſes by way of Eſſays in Proſe and Verſe. Mr Cowley had deſigned alſo a Diſcourſe concerning Style, and a Review of the Principles of the Primitive Chriſtian Church, but was prevented by death. A ſpurious piece, entitled The Iron Age, was publiſhed under Mr Cowley's name during his abſence; and, in Mr Dryden's Miſcellany Poems, we find A Poem on the Civil War, ſaid to be written by our author, but not extant in any edition of his works. An edition of his works was publiſhed by Dr Spratt, afterwards biſhop of Rocheſter, who alſo prefixed to it an account of the author's life. The reverend editor mentions, as very excellent of their kind, Mr Cowley's letters to his Friends; none of which, however, were publiſhed.

The moral character of Mr Cowley appears, from every account of it, to have been very excellent; " He is repreſented by Dr Spratt (ſays Dr Johnſon), as the moſt amiable of mankind; and this poſthumous praiſe may be ſafely credited, as it has never been contradicted by envy or by faction."

As a poet, his merits have been variouſly eſtimated. Lord Clarendon has ſaid he made a flight above all men; Addiſon, in his account of the Engliſh poets, that he improved upon the Theban bard; the duke of Buckingham upon his tomb-ſtone, that he was the Engliſh Pindar, the Horace, the Virgil, the delight, the glory of his time. And with reſpect to the harſhneſs of his numbers, the eloquent Spratt tells us, that if his verſes in ſome places ſeem not as ſoft and flowing as one would have them, it was his choice and not his fault.

" Such (ſays Mr Knox) is the applauſe laviſhed on a writer who is now ſeldom read. That he could ever be eſteemed as a pindaric poet, is a curious literary phenomenon. He totally miſtook his own genius when he thought of imitating Pindar. He totally miſtook the genius of Pindar, when he thought his own incoherent ſentiments and numbers bore the leaſt reſemblance to the wild yet regular ſublimity of the Theban. He neglected even thoſe forms, the ſtrophe, antiſtrophe, and epode, which even imitative dulneſs can copy. Sublime imagery, vehement pathos, poetic fire, which conſtitute the eſſence of the Pindaric ode, are incompatible with witty conceits, accurate antitheſes and vulgar expreſſion. All theſe imply the coolneſs of deliberate compoſition, or the meanneſs of a little mind; both of them moſt repugnant to the truly Pindaric ode, in which all is rapturous and noble. Wit of any kind would be improperly diſplayed in ſuch compoſition: but to increaſe the abſurdity, the wit of Cowley is often falſe. That he had a taſte for Latin poetry, and wrote in it with elegance, the well known epitaph on himſelf, upon his retirement, and an admirable imitation of Horace, are full proofs. But ſurely his rhetorical biographer makes uſe of the figure hyperbole, when he affirms that Cowley has excelled the Romans themſelves. He was inferior to many a writer of leſs name in the *Muſæ Anglicanæ*. But ſtill he had great merit; and I muſt confeſs I have read his Latin verſes with more pleaſure than any of his Engliſh can afford." *Eſſays*, vol. ii. p. 363—365.

To Cowley's compoſitions in proſe Mr Knox has paid a very honourable teſtimony. He ſays, that in this department he is an elegant, a pleaſing, a judicious writer; and that it is much to be lamented that he did not devote a greater part of his time to a kind of writing which appeared natural to him, and in which he excelled.

Dr Joſeph Warton obſerves, that it is no caricature of Cowley to repreſent him as being poſſeſſed of a ſtrained affectation of ſtriving to be witty upon all occaſions. " It is painful (adds this excellent critic), to cenſure a writer of ſo amiable a mind, ſuch integrity of manners, and ſuch ſweetneſs of temper. His fancy was brilliant, ſtrong, and ſprightly; but his taſte falſe and unclaſſical, even though he had much learning."

Dr Beattie has characteriſed Cowley in the following terms. " I know not whether any nation ever produced a more ſingular genius than Cowley. He abounds in tender thoughts, beautiful lines, and emphatical expreſſions. His wit is inexhauſtible, and his learning extenſive; but his taſte is generally barbarous, and ſeems to have been formed upon ſuch models as Donne, Martial, and the worſt parts of Ovid: nor is it poſſible to read his longer poems with pleaſure, while we retain any reliſh for the ſimplicity of ancient compoſition. If this author's ideas had been fewer, his conceits would have been leſs frequent; ſo that in one reſpect learning may be ſaid to have hurt his genius. Yet it does not appear that Greek and Latin did him any harm; for his imitations of Anacreon are almoſt the only parts of him that are now remembered or read. His Davideis, and his tranſlations of Pindar, are deſtitute of harmony, ſimplicity, and every other claſſical grace."

But the works of this celebrated poet have been nowhere ſo amply criticiſed as in his Life by Dr Johnſon. After a particular examination of the different pieces, the Doctor, in taking a general review of Cowley's poetry, obſerves, that " he wrote with abundant fertility, but negligent or unſkilful ſelection; with much thought, but with little imagery; that he is never pathetic, and rarely ſublime, but always either ingenious or learned, either acute or profound." Of his proſe he ſpeaks with great approbation. " No author (ſays he) ever kept his verſe and his proſe at a greater diſtance from each other. His thoughts are natural, and his ſtyle has a ſmooth and placid equality, which has never yet obtained its due commendation. Nothing is far fought or hard laboured; but all is eaſy without feebleneſs, and familiar without groſſneſs." Upon the whole, he concludes as follows: " It may be affirmed, without any encomiaſtic fervour, that he brought to his poetic labours a mind replete with learning, and that his paſſages are embelliſhed with all the ornaments which books could ſup-

ply; that he was the firſt who imparted to Engliſh numbers the enthuſiaſm of the greater ode and the gaiety of the leſs; and he was qualified for ſprightly ſallies and for lofty flights; that he was among thoſe who freed tranſlation from ſervility, and, inſtead of following his author at a diſtance, walked by his ſide; and that though he had left verſification yet improveable, he left likewiſe from time to time ſuch ſpecimens of excellence as enabled ſucceeding poets to improve it."

So many of Cowley's productions being now eſteemed ſcarcely worthy of a peruſal, while others of them are diſtinguiſhed by their beauty, Dr Hurd (the preſent biſhop of Worceſter,) thought proper to make a ſelection of them, which he publiſhed in 1772, under the title of Select Works of Mr Abraham Cowley, in two volumes; with a preface and notes by the Editor.

COWPER, William, a diſtinguiſhed modern poet, was born at Berkhamſtead in Hertfordſhire, in the year 1732. His father who was rector of the pariſh, was nephew to Lord Chancellor Cowper. Mr Cowper was educated at Weſtminſter ſchool; and in that celebrated ſeminary he acquired his claſſical knowledge. But it would appear from his poem, entitled "*Tirocinium*," that the impreſſions which he then received were not favourable to this ſyſtem of education, and gave him a permanent diſlike to public ſchools. Through family intereſt, the honourable and lucrative place of clerk to the houſe of lords had been provided for him; he was therefore entered at the Temple for the ſtudy of the law, in order to qualify him for it. In this ſituation his manners were amiable and decent; and though it is probable that he did not refuſe to indulge in thoſe pleaſures which are uſual among young men ſimilarly ſituated, yet there ſeems no reaſon to ſuppoſe that he had any peculiar cauſes for ſelf-accuſation. His natural diſpoſition was timid and diffident; his ſpirits were conſtitutionally weak, even to the borders of abſolute unfitneſs for worldly concerns; ſo that when the time came for aſſuming that poſt to which he had been deſtined, he ſhrunk with ſuch terror from the idea of making his appearance before the moſt auguſt aſſembly in the nation, that, after a violent ſtruggle with himſelf, he actually reſigned the employment, and with it all his proſpects in life. It appears to have been under the agitation of mind which this circumſtance occaſioned, and which threw him into a ſerious illneſs, that he was led to a deep conſideration of his ſtate in a religious view; and from the ſyſtem he had adopted, this courſe of reflection excited in him the moſt alarming and diſtreſſful apprehenſions. In vain did his theological friends ſet before him thoſe encouraging views which the theory of Chriſtian juſtification is calculated to preſent, and which to many is the ſource of a confidence perhaps as exceſſive as their former fears; the natural diſpoſition of his mind fitted it to receive all the horrors, without the conſolations of his faith. We are told, that "the terror of eternal judgment overpowered and wholly diſordered his faculties; and he remained ſeven months in a continual expectation of being inſtantly plunged into final miſery." In this ſhocking condition he became the ſubject of medical care, and he was placed in the receptacle for lunatics kept by Dr Cotton at St Alban's, an amiable and worthy phyſician, and the author of ſome well-known poems. At length he recovered a degree of ſerenity; but his mind had acquired that indelible tinge of melancholy by which it was ever after characteriſed, and which rendered his whole life little more than a ſucceſſion of intervals of comfort between long paroxyſms of ſettled deſpondency. It is unneceſſary to follow him through all his ſcenes of retirement. Part of his time was ſpent at the houſe of his relation, Earl Cowper, at Cole-green; and part at Huntingdon, with his intimate friend the reverend Mr Unwin. After the death of the latter, he removed with his widow to Olney in Buckinghamſhire, which was thenceforth the principal place of his reſidence. The affectionate intimacy he enjoyed with this lady is ſtrongly expreſſed in the following lines, which have probably been underſtood by moſt readers as expreſſive of a conjugal union:

—Witneſs, dear companion of my walks,
Whoſe arm this twentieth winter I perceive
Faſt lock'd in mine, with pleaſure ſuch as love
Confirm'd by long experience of thy worth
And well-tried virtues could alone inſpire—
Witneſs a joy that thou haſt doubled long.
Taſk, Book I.

At Olney he contracted a cloſe friendſhip with the reverend Mr Newton, then miniſter there, and ſince rector of St Mary Woolnoth, London, whoſe religious opinions were in uniſon with his own. When Mr Newton publiſhed his volume of Hymns, called "The Olney's Collection," it was enriched with ſome compoſitions from the pen of Cowper, diſtinguiſhed by the letter C. They bear internal evidence of a cultivated underſtanding, and an original genius. His time was now wholly dedicated to that literary leiſure, in which the mind, left to its own operations, follows up that line of purſuit which is the moſt congenial to its taſte, and the moſt adapted to its powers. In his garden, in his library, and in his daily walks, he ſeems to have diſciplined his muſe to the pictureſque and vivid habits of deſcription, which will always diſtinguiſh Cowper among our national poets. No writer, with the exception of Thomſon, ſeems to have ſtudied nature with more diligence, and to have copied her with more fidelity. An advantage which he has gained over other men, by his diſdaining to ſtudy her "through the ſpectacles of books," as Dryden calls it; and by his purſuing her through her haunts, and watching her in all her attitudes, with the eye of a philoſopher as well as of a poet. As Mr Cowper had no reliſh for public concerns, it was not ſingular that he ſhould have neglected the ſtudy of the law, on which he had entered. That knowledge of active life, which is ſo requiſite for the legal profeſſion, would hardly be acquired on the banks of the Ouſe, and in ſilent contemplations on the beauties of nature. In this retreat, he exchanged for the ſociety and converſe of the muſes, the ambition and tumult of a forenſic occupation; dedicating his mind to the cultivation of poetry, and ſtoring it with thoſe images which he derived from the inexhauſtible treaſury of a rich and varied ſcenery, in a moſt beautiful and romantic country.—The firſt volume of his poems, which was publiſhed by Mr Newton in 1787, conſiſts of

Cowper.

of various pieces, on various subjects. It seems, that he had been assiduous in cultivating a turn for grave and argumentative versification, on moral and ethical topics. Of this kind is The Table Talk, and several other pieces in the collection. He who objects to these poems as containing too great a neglect of harmony in the arrangement of his words, and use of expressions too prosaic, will condemn him on principles of criticism which are by no means just, if the object and style of the subject be considered. Horace apologized for the style of his own satires, which are, strictly speaking, only ethical and moral discourses, by observing, that those topics required the *pedestrian* and familiar diction, and a form of expression not carried to the heights of poetry. But if the reader will forego the delight of smooth versification, and recollect that poetry does not altogether consist in even and polished metre, he will remark, in these productions, no ordinary depth of thinking and of judgment, upon the most important objects of human intercourse; and he will be occasionally struck with lines, not unworthy of Dryden for their strength and dignity. His lighter poems are well known. Of these, the verses supposed to be written by Alex. Selkirk, on the island of Juan Fernandez, are in the most popular estimation. There is great originality in the following stanza.

> I am out of humanity's reach;
> I must finish my journey alone;
> Never hear the sweet music of speech;
> I start at the sound of my own."

It would be absurd to give one general character of the pieces that were published in this volume: yet, this is true concerning Mr Cowper's productions; that in all the varieties of his style, there may still be discerned the likeness and impression of the same mind; the same unaffected modesty, which always rejects unseasonable ambitions and ornaments of language; the same easy vigour; the same serene and cheerful hope, derived from a steady and unshaken faith in the dogmas of Christianity. Mr Cowper, perhaps, does not derive praise from the choice and elegance of his words; but he has the higher praise of having chosen them without affectation. He appears to have used them as he found them; neither introducing fastidious refinements nor adhering to obsolete barbarisms. He understood the whole science of numbers, and he has practised their different kinds with considerable happiness; and, if his verses do not flow so softly as the delicacy of a modern ear requires, that roughness, which is objected to his poetry, is his choice, not his defect. But this sort of critics, who admire only what is exquisitely polished, like Cuyp's pictures, these lovers of "gentleness without sinews," ought to take into their estimate, that vast effusion of thought which is so abundantly poured over the writings of Cowper, without which human discourse is only an idle combination of sounds and syllables. The favourable reception which this volume experienced, produced another of superior merit. His principal performance was undoubtedly "The Task," a poem. The occasion that gave birth to it was trivial. A lady had requested him to write a piece in blank verse, and gave him for its subject a thing next to her, viz *the sofa*. This he expanded into one of the finest moral poems our language has produced.

Dr Spratt's Life of Cowley.

It is written in blank verse as desired; and though in that respect it resembles Milton's, it is nevertheless original and highly characteristic. It is not too stately for familiar description, or too depressed for sublime and elevated imagery. If it has any fault, it is that of being too much laden with idiomatic expression; a fault which the author, in the rapidity with which his ideas and his utterance seem to have flowed, very naturally incurred. In this poem, his fancy ran with the most excursive freedom. The poet enlarges upon his topics, and confirms his argument by every variety of illustration. He never however dwells upon them too long, and leaves off in such a manner, that it seems it was in his power to have said more. The arguments of the poem are various. The works of nature, the associations with which they exhibit themselves, the designs of Providence, and the passions of men. Of one advantage, the writer has amply availed himself. The work not being rigidly confined to any precise subject, he has indulged himself in all the laxity and freedom of a miscellaneous poem. Yet he has still adhered so faithfully to the general laws of congruity, that whether he inspires the softer affections into his reader, or delights him with keen and playful raillery, or discourses on the ordinary manners of human nature, or holds up the bright pictures of religious consolation to his mind, he adopts, at pleasure, a diction just and appropriate, equal in elevation to the sacred effusions of pious rapture, and sufficiently easy and familiar for descriptions of domestic life; skilful alike in soaring without effort, and descending without meanness. He who desires to put into the hands of youth a poem, which not destitute of poetic embellishment, is free from all matter of a licentious tendency, will find in the Task a book adapted to his purpose. It would be absurd and extravagant austerity to condemn those poetical productions in which love constitutes the leading feature. That passion has in every age been the concernment of life, the theme of the poet, the plot of the stage. Yet there is a kind of amorous sensibility, bordering on morbid enthusiasm, which the youthful mind too often imbibes from the glowing sentiments of the poets. Their genius describes, in the most splendid colours, the operations of a passion which requires rebuke rather than incentive, and lends to the most grovelling sensuality the enchantments of a rich and creative imagination. But in the Task of Cowper, there is no licentiousness of description. All is grave, majestic, and moral. A vein of sober thinking pervades every page, and, in finished poetry, describes the insufficiency and vanity of human pursuits. Not that he is always severe. He frequently enlivens the mind of his reader by sportive descriptions, and by representing in elevated measures, ludicrous objects and circumstances, a species of the mock heroic, so admired in Phillip's *Splendid Shilling*. The historical account he has given of chairs, in the first book of the Task, is a striking specimen of his powers of versification, and of his talent for humour in this latter style. The attention is however the most detained by those passages, in which the charms of rural life, and the endearments of domestic retirement are described. The Task abounds with incidents, introduced as episodes, and interposing an agreeable relief to the grave and serious part of the poetry. His

Crazy

Crazy Kate is a description of the calamity of a disordered reason, admirably exact and affecting.

"She begs an idle pin of all she meets."

What poet would have introduced so minute a circumstance into his representation! and yet that minuteness constitutes its happy effect.

Of his talent for painting there cannot be a better specimen than his sketch of the melancholy man, probably sketched from what too faithful remembrance suggested of himself:

> Look where he comes—In this embower'd alcove
> Stand close concealed, and see a statue move;
> Lips busy, and eyes fixt, foot falling slow,
> Arms hanging idly down, hands clasp'd below,
> Interpret to the marking eye, distress,
> Such as its symptoms only can express.
> That tongue is silent now;—that silent tongue
> Could argue once, could jest or join the song,
> Could give advice, could censure or commend,
> Or charm the sorrows of a drooping friend.
> Renounc'd alike its office and its sport,
> Its brisker and its graver strains fall short;
> Both fall beneath a fever's secret sway,
> And like a summer brook are past away.
>
> *Retirement.*

His John Gilpin is universally known, and may be considered as a sportive piece of humour, which would have done credit to many writers, but can hardly be said to have added to Mr Cowper's reputation. His next work was a translation of the Iliad and Odyssey into Miltonic blank verse. It is an unjust piece of criticism to compare the version of Mr Pope to that of Mr Cowper. The merits of each are distinct and appropriate. Mr Pope has exhibited Homer as he would have sung had he been born in England. Mr Cowper has endeavoured to pourtray him as he wrote in Greece, adhering frequently to the peculiarities of his original's idiom, and desiring to preserve his strength and energy, together with his harmony and smoothness. Mr Cowper died of a severe and lingering illness, at East Dereham, in Norfolk, April 25. 1800.

COX, Richard, a learned prelate, and principal pillar of the Reformation, was born at Whaddon in Buckinghamshire, of low parentage, in the year 1499. From Eton school he obtained a scholarship in King's college in Cambridge, of which he became a fellow in 1519: he was thence invited to Oxford by Cardinal Wolsey, and was there made one of the junior canons of Cardinal college. In 1525 he was incorporated bachelor; and the following year took the degree of master of arts in the same university. In this situation he became remarkable for his learning and poetical abilities; but his attachment to the opinions of Luther rendered him hateful to his superiors, who stripped him of his preferment, and threw him into prison on a suspicion of heresy. Being, however, soon released, he was chosen master of Eton school, which flourished remarkably under his care. In 1537 he commenced doctor of divinity at Cambridge; in 1540 was made archdeacon of Ely; and the following year prebendary of that cathedral, on its being new founded by King Henry VIII. In 1546 he was made dean of Christ-church, Oxford. By the recommendation of Archbishop Cranmer and Bishop Goodrich, to the latter of whom he had been chaplain, he not only obtained the above preferments, but was chosen preceptor to Prince Edward, on whose accession to the throne he became a favourite at court, was sworn of the privy council, and made king's almoner. In 1547 he was elected chancellor of Oxford; in 1548 canon of Windsor; and the next year dean of Westminster. About this time he was appointed one of the commissioners to visit the university of Oxford; in which office his zeal for reformation was so excessive, that he destroyed a number of curious and valuable books, for no better reason than because they were written by Roman Catholics. On the accession of Queen Mary he was stripped of all his preferments and committed to the Marshalsea. He was, however, soon released, and immediately left the kingdom. Having resided some time at Strasburg with his intimate friend Peter Martyr, on the death of Queen Mary he returned to England, and, with other divines, was appointed to revise the liturgy. He often preached before the queen; and in 1559 was preferred to the see of Ely, which he continued to enjoy upwards of 21 years. He was, however, no favourite with the queen: the reason assigned for which was, his zealous opposition to her retaining the crucifix and wax-candles on the altar of the royal chapel; also his strenuous defence of the marriage of the clergy, which her majesty always disapproved. He died on the 22d of July 1581, aged 81. He was a man of considerable learning, a zealous and rigid bulwark of the church of England, and an implacable enemy both to Papists and Puritans. In a letter to Archbishop Parker, he advises him to proceed vigorously in reclaiming or *punishing* the Puritans, and not to be discouraged at the frown of those court-favourites who protected them; assuring him that he might expect the blessing of God on his *pious* labours to free the church from their dangerous attempts, and to establish uniformity. This zealous reformer we find had not totally lost sight of the Popish text, *compel them to come in;* but a stronger proof of his implacability and self-importance appears in his letter to the lord treasurer Burleigh, in which he warmly expostulates with the council for interposing in behalf of the Puritans, or meddling in affairs of the church, admonishing them to keep their own sphere. Such language from a bishop would make a modern privy council stare. His works are, 1. Two Latin Orations on the Dispute between Dr Tresham and Peter Martyr, Lond. 1549, 4to. 2. Liturgy of the Church of England; in compiling, and afterwards correcting which, he was principally concerned. 3. The Lord's Prayer in verse, commonly printed at the end of David's Psalms by Sternhold and Hopkins. 4. Translation of the four Gospels, the Acts of the Apostles, and the Epistle to the Romans, in the new translation of the Bible in the reign of Queen Elizabeth. 5. Resolutions of some Questions concerning the Sacrament in the Collection of Records at the end of Burnet's History of the Reformation. 6. Several Letters to the Queen and others published in Strype's Annals of the Reformation. He is also said to have been concerned in the declaration concerning the divine institution of bishops, and to have assisted Lyle in his Grammar.

COXWOLD, a town in the north riding of Yorkshire,

ſhire, 14 miles north of York. W. Long. 1. 10. N. Lat. 54. 16.

COYPEL, Anthony, an excellent French painter, born at Paris in 1661. Noyel Coypel, his father, being choſen by M. Colbert to be director of the academy at Rome, he took his ſon with him into Italy, where Anthony Coypel formed himſelf on the works of the greateſt maſters, and on his return to France was made firſt painter to the duke of Orleans. That prince employed him in painting the grand gallery of the royal palace, and allowed him a penſion. In 1714, he was director of the Academy of Painting and Sculpture. In 1715, he was made the firſt painter to the French king, and was ennobled on account of his merit. He died in 1722. M. Coypel, his ſon, alſo excelled in the ſame art.

COZENING; tricking, or defrauding.—In law, it denotes an offence where any thing is done deceitfully, whether belonging to contracts or not, which cannot be properly termed by any ſpecial name.

COZUMEL, an iſland near the weſtern coaſt of Jucatan, where Cortez landed and refreſhed his troops before entering upon the conqueſt of Mexico. W. Long. 89. 0. and N. Lat. 13. 0.

CRAB. See Cancer, Entomology *Index*.

Crab's Claws, in the *Materia Medica*, are the tips of the claws of the common crab broken off at the verge of the black part, ſo much of the extremity of the claws only being allowed to be uſed in medicine as is tinged with this colour. The blackneſs, however, is only ſuperficial; they are of a grayiſh white within, and when levigated furniſh a white powder.

Crab's claws are of the number of the alkaline abſorbents; but they are ſuperior to the generality of them, in ſome degree, as they are found on a chemical analyſis to contain a volatile urinous ſalt.

Crab's Eyes, in *Pharmacy*, are a ſtrong concretion in the head of the cray-fiſh. They are rounded on one ſide, and depreſſed and ſinuated on the other, conſiderably heavy, moderately hard, and without ſmell. We have them from Holland, Muſcovy, Poland, Denmark, Sweden, and many other places. What are uſually met with in the ſhops are prepared by art.

Crab's eyes are much uſed both in the ſhop medicines and extemporaneous preſcription, being accounted abſorbent.

Crab-Lice, a troubleſome kind of vermin, which ſtick ſo faſt with their claws to the ſkin as to render it difficult to diſlodge them. They are called *plactulæ*, *morpiones*, *petolæ*, and *peſſolatæ*: they uſually infeſt the armpits and *pudenda*. Cleanlineſs is the beſt preventive. But theſe vermin may be eaſily removed with the application of a little mercurial ointment.

Crab, a ſort of wooden pillar, whoſe lower end, being let down through a ſhip's decks, reſt upon a ſocket like the capſtern; and having in its upper end three or four holes, at different heights, through the middle of it, one above another, into which long bars are thruſt, whoſe length is nearly equal to the breadth of the neck. It is employed to wind in the cable, or to purchaſe any other weighty body which requires a great mechanical power. This differs from a capſtern, as not being furniſhed with a *drum-head*, and by having the bars to go entirely through it, reaching from one ſide of the deck to the other; whereas thoſe of the capſtern, which are ſuperior in number, reach only about eight inches or a foot into the drum-head, according to its ſize. See Capstern.

Crab-Yaws, a name in Jamaica for a kind of ulcer on the ſoles of the feet, with hard callous lips, ſo hard that it is difficult to cut them. The *ungt. cærul. fort.* is their cure.

CRACATOA, the moſt ſoutherly of a cluſter of iſlands lying in the entrance of the ſtraits of Sunda in the Eaſt Indies. Its whole circumference does not exceed nine miles; and off its north-eaſtern extremity is a ſmall iſland forming a road, in which Captain Cook anchored when viſiting this iſland on his laſt voyage. On the ſouthern part of the ſmall iſland is a reef of rocks, within which is a tolerable ſhelter againſt all northerly winds, there being 27 fathoms water in the mid channel, and 18 near the reef. Between the two iſlands there is a narrow paſſage for boats. The ſhore that conſtitutes the weſt ſide of the road runs in a north-weſterly direction, having a bank of coral running into the ſea for a little way, ſo that it is difficult for boats to land except at the time of high water; but the anchoring ground is very good and free from rocks. In the inland parts the ground is elevated, riſing on all ſides gradually from the ſea, and is entirely covered with wood, excepting a few ſpots which are cleared by the inhabitants for ſowing rice. The climate is reckoned very healthy in compariſon with the neighbouring countries, but it is very thinly inhabited. There are abundance of turtle on the coral reefs; but other refreſhments are ſcarce, and ſold at an exorbitant price. Water is not plentiful: Captain Cook was obliged to ſupply himſelf from a ſmall ſpring oppoſite to the ſouthern extremity of the ſmall iſland above mentioned. To the ſouthward is a hot ſpring, whoſe waters are uſed as a bath by the inhabitants. The road where the Reſolution anchored lies in S. Lat. 8. 6.; and by obſervation, in 105. 36. E. Long. by the time-keeper in 104. 48. The variation of the compaſs one degree W. On the full and change days it is high water at ſeven o'clock in the morning, and the tide riſes three feet four inches perpendicular.

CRACKOW, or Cracow, a city of Poland, ſituated in a palatinate of the ſame name, E. Long. 20. 16. N. Lat. 50. 8. It was formerly the capital of Poland, where the kings were elected and crowned, and was once almoſt the centre of the Poliſh dominions, but is now a frontier town; a proof how much the power of this republic has been contracted.

Crackow ſtands in an extenſive plain, watered by the Viſtula, which is broad but ſhallow: the city and its ſuburbs occupy a vaſt tract of ground, but are ſo badly peopled, that they ſcarcely contain 16,000 inhabitants. The great ſquare in the middle of the town is very ſpacious, and has ſeveral well-built houſes, once richly furniſhed and well inhabited, but moſt of them now either untenanted or in a ſtate of melancholy decay. Many of the ſtreets are broad and handſome; but almoſt every building bears the moſt ſtriking marks of ruined grandeur: the churches alone ſeem to have preſerved their original ſplendour. The devaſtation of this unfortunate town was begun by the Swedes at the commencement of the preſent century, when it was beſieged and taken by Charles XII. but the

Crackow.

the miſchiefs it ſuffered from that ravager of the north were far leſs deſtructive than thoſe it experienced during the late dreadful commotions, when it underwent repeated ſieges, and was alternately in poſſeſſion of the Ruſſians and Confederates. The effects of cannon, grape, and muſket ſhot, are ſtill diſcernible on the walls and houſes. In a word, Crackow exhibits the remains of ancient magnificence, and looks like a great capital in ruins: from the number of fallen and falling houſes one would imagine it had lately been ſacked, and that the enemy had left it only yeſterday. The town is ſurrounded with high walls of brick, ſtrengthened by round and ſquare towers of whimſical ſhapes, in the ancient ſtyle of fortification: theſe walls were built by Venceſlaus king of Bohemia during the ſhort period in which he reigned over Poland.

The univerſity of Crackow was formerly, and not unjuſtly, called the mother of Poliſh literature, as it principally ſupplied the other ſeminaries with profeſſors and men of learning; but its luſtre has been greatly obſcured by the removal of the royal reſidence to Warſaw, and ſtill more by the late inteſtine convulſions. In this city the art of printing was firſt introduced into Poland by Haller; and one of the earlieſt books was the Conſtitutions and Statutes compiled by Caſimir the Great, and afterwards augmented by his ſucceſſors. The characters are Gothic, the ſame which were univerſally uſed at the invention of printing: the great initial letters are wanting, which ſhows that they were probably painted and afterwards worn away. The year in which this compilation was printed is not poſitively known; but its publication was certainly anterior to 1496, as it does not contain the ſtatutes paſſed by John Albert in that year. The moſt flouriſhing period of the univerſity was under Sigiſmond Auguſtus in the 16th century, when ſeveral of the German reformers fled from the perſecutions of the emperor Charles V. and found an aſylum in this city. They gave to the world ſeveral verſions of the ſacred writings, and other theological publications, which diffuſed the reformed religion over great part of Poland. The protection which Sigiſmond Auguſtus afforded to men of learning of all denominations, and the univerſal toleration which he extended to every ſect of Chriſtians, created a ſuſpicion that he was ſecretly inclined to the new church; and it was even reported that he intended to renounce the Catholic faith, and publicly profeſs the reformed religion.

Towards the ſouthern part of the town, near the Viſtula, riſes a ſmall eminence or rock, upon the top of which is built the palace, ſurrounded with brick walls and old towers, which form a kind of citadel to the town. This palace owes its origin to Ladiſlaus Jaghellon; but little of the ancient ſtructure now appears, as the greateſt part was demoliſhed by Charles XII. in 1701, when he entered this town in triumph after the battle of Cliſſow. It has been ſince repaired. The remains of the old palace conſiſt of a few apartments, which are left in their ancient ſtate as they exiſted in the laſt century. This palace was formerly the reſidence of the kings of Poland, who, from the time of Ladiſlaus Locketec, have been crowned at Crackow. The Poliſh and German hiſtorians differ concerning the time when the title of king was firſt claimed by the ſovereigns of this country; but the moſt probable account is, according to Mr Coxe, that in 1295 Premiſlaus aſſumed the regal title, and was inaugurated at Gneſna by the archbiſhop of that dioceſe. He was ſucceeded by Ladiſlaus Locketec, who offending the Poles by his capricious and tyrannical conduct, was depoſed before he was crowned; and Venceſlaus king of Bohemia, who had married Richſa daughter of Premiſlaus, being elected in his ſtead, was in 1300 conſecrated at Gneſna. Ladiſlaus, after flying from his country and undergoing a ſeries of calamitous adventures, was at length brought to a ſenſe of his miſconduct. Having regained the affection of his ſubjects, he was reſtored, in the lifetime of Venceſlaus, to part of his dominions; and he recovered them all upon the demiſe of that monarch in the year 1305: he governed, however, for ſome years without the title of king; but at length in 1320 was crowned at Crackow, to which place he transferred the ceremony of the coronation; and afterwards enacted, that for the future his ſucceſſors ſhould be inaugurated in the cathedral of this city.

Crackow, Cradle.

Since that period all the ſovereigns have been conſecrated at Crackow, excepting the laſt king. Previous to his election a decree was iſſued by the diet of convocation, that the coronation ſhould be ſolemnized for this turn at Warſaw, without prejudice in future to the ancient right of Crackow; a proviſo calculated to ſatisfy the populace, but which will not probably prevent any future ſovereign from being crowned at Warſaw, now become the capital of Poland and the reſidence of its kings. The diadem and other regalia uſed at the coronation are ſtill kept in the palace of Crackow, under ſo many keys, and with ſuch care, that it is impoſſible to obtain a ſight of them.

Adjoining to the palace ſtands the cathedral, alſo within the walls of the citadel. Here all the ſovereigns, from the time of Ladiſlaus Locketec, have been interred, a few only excepted, viz. Louis and Ladiſlaus II. who were kings of Hungary as well as of Poland, and whoſe bodies were depoſited in Hungary; Alexander, who died and was buried at Vilna; Henry of Valois, interred in France; and the late monarch Auguſtus III. The ſepulchres of the kings of Poland are not diſtinguiſhed by any peculiar magnificence; their figures are carved in marble of no extraordinary workmanſhip, and ſome are without inſcriptions.

The biſhop of Crackow is the firſt in the kingdom, duke of Saveria, and very often a cardinal. His revenues are larger than thoſe of his metropolitan the archbiſhop of Gneſna, and are computed to amount to 40,000 dollars per annum.

CRADLE, a well known machine in which infants are rocked to ſleep.

It denotes alſo that part of the ſtock of a croſs bow where the bullet is put.

CRADLE, in *Surgery*, a caſe in which a broken leg is laid after being ſet.

CRADLE, in engraving, is the name of an inſtrument uſed in ſcraping mezzotintos, and preparing the plate. It is formed of ſteel, reſembling a chiſſel with one ſloping ſide, upon which are cut hollow lines very near each other, and at equal diſtances. The acting part of this tool is made circular, and the corners are rounded;

rounded. After being properly tempered, it muſt be ſharpened on the whetſtone. There are various ſizes of this inſtrument.

CRADLE, among ſhipwrights, a frame placed under the bottom of a ſhip, in order to conduct her ſmoothly and ſteadily into the water when ſhe is going to be launched; at which time it ſupports her weight while ſhe ſlides down the deſcent or ſloping paſſage called *the ways*, which are for this purpoſe daubed with ſoap and tallow.

CRAFT, a general name for all ſorts of veſſels employed to load or diſcharge merchant ſhips, or to carry alongſide or return the ſtores of men of war. Such are lighters, hoys, barges, prames, &c. See thoſe articles.

CRAKE, or CORN-CRAKE. See RALLUS, ORNITHOLOGY *Index*.

CRAIL, or CAREIL, a borough town of Scotland, ſituated on the ſea-coaſt of the county of Fife, about ſeven miles ſouth-eaſt of St Andrews. W. Long. 2. 20. N. Lat. 56. 17.

CRAMBE, SEA-CABBAGE, SEA-BEACH KALE, or SEA-COLEWORT, a genus of plants belonging to the tetradynamia claſs, and in the natural method ranking under the 39th order, *Siliquoſæ*. See BOTANY *Index*.

CRAMERIA, a genus of plants belonging to the tetrandria claſs. See BOTANY *Index*.

CRAMOND, OVER and NETHER, two villages about four miles weſt of Edinburgh; of which only the laſt deſerves notice, as having been once a famous naval ſtation of the Romans. It is ſituated at the influx of the river Almond into the Forth. Three Roman roads meet at this place, which was called by them *Alaterva*, and whither they brought their grain for the ſupport of their troops. The village contains about 300 inhabitants. Here are the remains of a bath and ſudatory; and many altars, medals, &c. have been dug up.

CRAMP, a ſpaſmodic affection of the muſcles of different parts of the body, as of thoſe of the neck, arms, legs, &c. accompanied with a violent but tranſitory pain. See MEDICINE *Index*.

CRAMP-Fiſh, or *Torpedo*. See RAJA, ICHTHYOLOGY *Index*.

CRAMP-Iron, or *Cramps*, a piece of iron bent at each end, which ſerves to faſten together pieces of wood, ſtones, or other things.

CRAMPONEE, in *Heraldry*, an epithet given to a croſs which has at each end a cramp or ſquare piece coming from it; that from the arm in chief towards the ſiniſter angle, that from the arm on that ſide downwards, that from the arm in baſe towards the dexter ſide, and that from the dexter arm upwards.

CRANAGE, the liberty of uſing a crane at a wharf, and alſo the money paid for drawing up wares out of a ſhip, &c. with a crane.

CRANE. See ARDEA, ORNITHOLOGY *Index*.

CRANE, in *Mechanics*, a machine uſed in building for raiſing large ſtones and other weights. See MECHANICS.

CRANE's Bill. See GERANIUM, BOTANY *Index*.

CRANE-Fly, a ſpecies of TIPULA. See ENTOMOLOGY *Index*.

CRANGANOR, a Dutch factory on the Malabar coaſt in the Eaſt Indies, ſeated in E. Long. 75. 5. N. Lat. 10. 0. See COCHIN.

CRANIOLARIA, a genus of plants belonging to the didynamia claſs; and in the natural method ranking under the 40th order, *Perſonatæ*.

CRANIUM, in *Anatomy*, an aſſemblage of ſeveral bones which cover and encloſe the brain and cerebellum, popularly called the *ſkull*. See ANATOMY *Index*.—The word comes from the Greek κρανιον, of κρανος, *galea*, "helmet;" becauſe it ſerves to defend the brain like a head-piece. Pezron, again, derives κρανιον from the Celtic *cren*, becauſe of its roundneſs.

CRANK, a contrivance in machines, in manner of an elbow, only of a ſquare form, projecting out from an axis or ſpindle; and ſerving, by its rotation, to raiſe and fall the piſtons of engines for raiſing water or the like.

CRANK, in ſea-language. A ſhip is ſaid to be *crank-ſided*, when for want of a ſufficient quantity of ballaſt or cargo, ſhe cannot bear her ſails, or can bear but ſmall ſail for fear of overſetting. She is ſaid to be *crank by the ground*, when her floor is ſo narrow that ſhe cannot be brought on ground without danger.

CRANK is alſo an iron brace which ſupports the lanthorns on the poop-quarters, &c.

CRANMER, THOMAS, a celebrated archbiſhop, reformer, and martyr, was the ſon of Thomas Cranmer, Eſq. of Aſlacton in Nottinghamſhire, where our author was born in 1489. At the age of 14, he was admitted a ſtudent of Jeſus College, Cambridge, of which he afterwards became fellow; but marrying the relation of an innkeeper's wife, he loſt his fellowſhip and quitted the college. On the death of his wife he was re-admitted fellow of Jeſus College. In 1523 he took the degree of doctor of divinity, and was made theological lecturer and examiner. The plague being at Cambridge, he retired to the houſe of a relation at Waltham Abbey, where, meeting with Fox the king's almoner, and Gardiner the ſecretary, he gave his opinion concerning King Henry's marriage with Catharine much to the ſatisfaction of his majeſty. This opinion was, that inſtead of diſputing about the validity of the king's marriage with Catharine, they ſhould reduce the matter to this ſimple queſtion, "Whether a man may marry his brother's wife or not?" When the king was told of it, he ſaid, "This fellow has got the right ſow by the ear." He then ſent for him to court, made him one of his chaplains, and ordered him to write in vindication of the divorce in agitation. This book having quieted the tender conſcience of the king, he was deſirous that all Europe ſhould be convinced of the illegality of his marriage with Queen Catharine; and for that purpoſe ſent Cranmer to France, Italy, and Germany, to diſpute the matter with the divines of thoſe countries. At Nuremberg Cranmer married a ſecond wife. Being returned to England, in March 1533 he was conſecrated archbiſhop of Canterbury; in May following he pronounced the ſentence of divorce between the king and queen; and ſoon after married the amorous monarch to Ann Boleyn. Being now at the head of the church, he exerted himſelf in the buſineſs of the Reformation. The Bible was tranſlated into Engliſh, and monaſteries diſſolved, principally by his means.

In 1536 the royal conſcience again required the aſ-

fistance of our archbishop: in this year he divorced the king from Ann Boleyn. In 1537 he visited his diocese, and endeavoured to abolish the superstitious observance of holidays. In 1539 he and some of the bishops fell under the king's displeasure, because they could not be brought to give their consent in parliament that the monasteries should be suppressed for the king's sole use. He also strenuously opposed the act for the six articles in the house of lords, speaking three days against it; and upon the passing of that statute sent away his wife into Germany. In 1540 he was one of the commissioners for inspecting into matters of religion and explaining some of its chief doctrines. The result of their commission was the book entitled A necessary Erudition of any Christian man. After Lord Cromwell's death (in whose behalf he had written to the king), he retired and lived in great privacy, meddling not at all with state affairs. In 1541 he gave orders, pursuant to the king's directions, for taking away superstitious shrines; and exchanging Bishopsbourn for Beckesbourn, united the latter to his diocese, In 1542 he procured the "Act for the advancement of true religion and the abolishment of the contrary," which moderated the rigour of the six articles. But the year following, some enemies preferring accusations against him, he had like to have been ruined, had not the king interposed in his behalf. His majesty continued afterwards to protect him from his enemies; and at his death appointed him one of the executors of his will, and one of the regents of the kingdom. In 1556 he crowned young Edward, during whose short reign he promoted the reformation to the utmost of his power; and was particularly instrumental in composing, correcting, and establishing the liturgy by act of parliament. He had also a share in compiling the thirty-nine articles of religion.

In 1553 he opposed the new settlement of the crown upon Lady Jane Gray, and would no way be concerned in that affair (though at last, through many importunities, he was prevailed upon to set his hand to it); neither would he join in any of Dudley's ambitious projects. Upon Queen Mary's accession to the throne, he was committed to the Tower; partly for setting his hand to the instrument of Lady Jane's succession, and partly for the public offer he had made a little before of justifying openly the religious proceedings of the late king. Some of his friends, foreseeing the storm that was likely to fall upon him, advised him to fly, but he absolutely refused. In the ensuing parliament, on November the 3d, he was attainted, and at Guildhall found guilty of high treason; whereupon the fruits of his archbishopric were sequestered. In April 1554, he and Ridley and Latimer were removed to Oxford, in order for a public disputation with the Papists; which was accordingly held there towards the middle of the month, with great noise, triumph, and impudent confidence on the Papists side, and with as much gravity, learning, modesty, and convincing sufficiency on the side of the Protestant bishops. The 20th of April, two days after the end of these disputations, Cranmer and the two others were brought before the commissioners, and asked, Whether they would subscribe (to Popery)? which they unanimously refusing, were condemned as heretics. From this sentence the archbishop appealed to the just judgment of the Almighty; and wrote to the council, giving them an account of the disputation, and desiring the queen's pardon for his treason, which it seems was not yet remitted. By the convocation, which met this year, his Defence of the true and Catholic Doctrine of the Sacrament of the Body and Blood of our Saviour Christ was ordered to be burnt. Some of his friends petitioned the queen in his behalf; putting her in mind how he had once preserved her in her father's time by his earnest intercessions with him for her, so that she had reason to believe he loved her, and would speak the truth to her more than all the rest of the clergy. All endeavours in his behalf, however, were ineffectual; and the archbishop being degraded and most ignominiously treated, was at last flattered and terrified into an insincere recantation and renunciation of the Protestant faith. But this triumph was not sufficient to gratify the pious vengeance of the Romish Mary. On the 24th of Feb. 1556, a writ was signed for the burning of Cranmer; and on the 24th March, which was the fatal day, he was brought to St Mary's church, Oxford, and placed on a kind of stage over against the pulpit, where Dr Cole, provost of Eton, was appointed to preach a sermon on the occasion. While Cole was haranguing, the unfortunate Cranmer expressed great inward confusion; often lifting up his hands and eyes to heaven, and frequently pouring out floods of tears. At the end of the sermon, when Cole desired him to make an open profession of his faith, as he had promised him he would, he first prayed in the most fervent manner; then made an exhortation to the people present, not to set their minds upon the world, to obey the king and queen, to love each other, and to be charitable. After this he made a confession of his faith, beginning with the creed, and concluding with these words: "And I believe every word and sentence taught by our Saviour Jesus Christ, his apostles, and prophets, in the Old and New Testament.—And now (added he) I come to the great thing that so much troubleth my conscience, more than any thing I ever did or said in my whole life; and that is the setting abroad a writing contrary to the truth, which I here now renounce as things written with my hand contrary to the truth which I thought in my heart; and written for fear of death, and to save my life if it might be: that is, all such bills and papers which I have written or signed with my hand since my degradation, wherein I have written many things untrue. And forasmuch as my hand offended, writing contrary to my heart, my hand shall first be punished; for, may I come to the fire, it shall be first burned. As for the pope, I refuse him as Christ's enemy and antichrist, with all his false doctrine. And as for the sacrament, I believe as I have taught in my book against the bishop of Winchester." Thunderstruck as it were with this unexpected declaration, the enraged Popish crowd admonished him not to dissemble. "Ah! (replied he with tears) since I lived hitherto, I have been a hater of falsehood and a lover of simplicity, and never before this time have I dissembled." Whereupon they pulled him off the stage with the utmost fury, and hurried him to the place of his martyrdom over against Baliol college; where he put off his clothes in haste, and standing in his shirt, and without shoes, was fastened with a chain to the stake. Some pressing him to agree to his former recantation, he

he anſwered, ſhowing his hand, "This is the hand that wrote it, and therefore it ſhall firſt ſuffer puniſhment." Fire being applied to him, he ſtretched out his right hand into the flame, and held it there unmoved (except that once with it he wiped his face) till it was conſumed; crying with a loud voice, "This hand hath offended;" and often repeating, "This unworthy right hand." At laſt the fire getting up, he ſoon expired, never ſtirring or crying out all the while; only keeping his eyes fixed to heaven, and repeating more than once, "Lord Jeſus receive my ſpirit." Such was the end of the renowned Thomas Cranmer, in the 67th year of his age.

It was noticed above, that after the paſſing of the act for the ſix articles, Archbiſhop Cranmer ſent his wife into Germany. But ſhe afterwards returned again to England; and Mr Strype informs us that "in the time of King Edward, when the marriage of the clergy was allowed, he brought her forth, and lived openly with her." Mr Gilpin ſays, "he left behind him a widow and children; but as he always kept his family in obſcurity for prudential reaſons, we know little about them. They had been kindly provided for by Henry VIII.; who, without any ſolicitation from the primate himſelf, gave him a conſiderable grant from the abbey of Walbeck in Nottinghamſhire, which his family enjoyed after his deceaſe. King Edward made ſome addition to his private fortune; and his heirs were reſtored in blood by an act of parliament in the reign of Elizabeth.

Archbiſhop Cranmer wrote a great number of books: many of them he publiſhed himſelf; and many of them ſtill remain in MSS. viz. two folio volumes in the king's library, ſeveral letters in the Cotton collection, &c.

Mr Gilpin remarks, That "the character of the archbiſhop hath been equally the ſubject of exaggerated praiſe and of undeſerved cenſure. The moſt indefenſible parts of the archbiſhop's character are the readineſs with which he ſometimes concurred in the unjuſtifiable proceedings of Henry VIII. and the inſtances wherein he ſhowed himſelf to be actuated by intolerant principles.

"He firſt recommended himſelf to Henry by the zeal which he diſplayed in promoting the king's divorce from Queen Catharine. As to this, it may be allowed, that Dr Cranmer might think the marriage wrong: but though it poſſibly might be a point of conſcience with the king, it could, however, be none with him; and there was manifeſtly a difference between adviſing not to do a thing, and adviſing to undo it when already done, at leaſt in a matter of ſo diſputable a nature. On the other hand, to repudiate a woman with whom the king had cohabited near 20 years as his wife, and to illegitimate a daughter, bred up in the higheſt expectations, and now marriageable, were acts of ſuch cruelty, that it ſeems to indicate a want of feeling to be in any degree acceſſary to them. To this may be added, that the notoriety of the king's paſſion for Ann Boleyn, which all men believed to be, if not the firſt mover, at leaſt the principal ſpring of his pretended ſcruples, threw a very indelicate imputation on all who had any concern in the affair. No ſerious churchman, one would imagine, could be fond of the idea of adminiſtering to the king's paſſions. It is with concern, therefore, that we ſee a man of Dr Cranmer's integrity and ſimplicity of manners acting ſo much out of character as to compound an affair of this kind, if not with his conſcience, at leaſt with all delicacy of ſentiment; and to parade through Europe, in the quality of an ambaſſador, defending everywhere the king's *pious intentions*. But the cauſe (continues Mr Gilpin) animated him. With the illegality of the king's marriage, he endeavoured virtually to eſtabliſh the inſufficiency of the pope's diſpenſation; and the latter was an argument ſo near his heart, that it ſeems to have added merit to the former. We cannot indeed account for his embarking ſo zealouſly in this buſineſs, without ſuppoſing his principal motive was to free his country from the tyranny of Rome, to which this ſtep very evidently led. So deſirable an end would in ſome degree, he might imagine, ſanctify the means."

Of two of the inſtances of perſecution in which Archbiſhop Cranmer was concerned, Mr Gilpin gives the following account. "Joan Bocher and George Paris were accuſed, though at different times; one for denying the humanity of Chriſt, the other for denying his divinity. They were both tried and condemned to the ſtake; and the archbiſhop not only conſented to theſe acts of blood, but even perſuaded the averſion of the young king into a compliance. "Your majeſty muſt diſtinguiſh (ſaid he, informing his royal pupil's conſcience) between common opinions and ſuch as are the eſſential articles of faith. Theſe latter we muſt on no account ſuffer to be oppoſed." Mr Gilpin juſtly obſerves, that "nothing even plauſible can be ſuggeſted in defence of the archbiſhop on this occaſion, except only that the ſpirit of Popery was not yet wholly repreſſed." Theſe inſtances of injuſtice and barbarity were indeed totally indefenſible, and a great diſgrace to Cranmer, and to all who were concerned in them. It does not appear that he endeavoured to promote the death of Lambert; but, as Mr Gilpin obſerves, it were to be wiſhed he had rid his hand of the diſputation likewiſe. The public diſputation, in which Cranmer bore ſome part, proved the means of bringing Lambert to the ſtake.

One of the moſt honourable tranſactions of Archbiſhop Cranmer's life, was the firm ſtand that he made againſt the act of the ſix articles. This act was ſo ſtrongly ſupported by the king, that even the Proteſtants in parliament made little oppoſition to it. But Cranmer oppoſed it with great zeal and ſteadineſs. "The good archbiſhop (ſays Mr Gilpin) never appeared in a more truly Chriſtian light than on this occaſion. In the midſt of ſo general a defection (for there were numbers in the houſe who had hitherto ſhown great forwardneſs in reformation) he alone made a ſtand. Three days he maintained his ground, and baffled the arguments of all oppoſers. But argument was not their weapon, and the archbiſhop ſaw himſelf obliged to ſink under ſuperior power. Henry ordered him to leave the houſe. The primate refuſed: "It was God's buſineſs (he ſaid), and not man's. And when he could do no more, he boldly entered his proteſt. Such an inſtance of fortitude is ſufficient to wipe off many of thoſe courtly ſtains which have faſtened on his memory."

His behaviour in the cauſe of the duke of Norfolk was alſo entitled to great commendation. "The laſt act

Cranmer. act of this reign (says Mr Gilpin) was an act of blood, and gave the archbishop a noble opportunity of showing how well he had learned that great Christian lesson of forgiving an enemy. Almost without the shadow of justice, Henry had given directions to have the duke of Norfolk attainted by an act of parliament. The king's mandate stood in lieu of guilt, and the bill passed the house with great ease. No man, except the bishop of Winchester, had been so great an enemy to the archbishop as the duke of Norfolk. He had always thwarted the primate's measures, and oftener than once had practised against his life. How many would have seen with secret pleasure the working of Providence against so rancorous an enemy; satisfied in having themselves no hand in his unjust fate! But the archbishop saw the affair in another light: he saw it with horror; and although the king had in a particular manner interested himself in this business, the primate opposed the bill with all his might; and when his opposition was vain, he left the house with indignation, and retired to Croydon."

He was indeed remarkable for the placability of his temper, and for showing kindness to those by whom he had been greatly injured. Hence it is mentioned in Shakespeare's Henry VIII. as a common saying concerning him:

———" Do my lord of Canterbury
But one shrewd turn, and he's your friend for ever."

Archbishop Cranmer was a great friend and patron of learned foreigners, who had been persecuted for their attachment to the principles of the reformation. Mr Gilpin says, " the suffering professors of Protestantism, who were scattered in great numbers about the various countries of Europe, were always sure of an asylum with him. His palace at Lambeth might be called a seminary of learned men; the greater part of whom persecution had driven from home. Here, among other celebrated reformers, Martyr, Bucer, Aless, Phage, found sanctuary. Martyr, Bucer, and Phage, were liberally pensioned by the archbishop till he could otherwise provide for them. It was his wish to fix them in the two universities, where he hoped their great knowledge and spirit of inquiry would forward his designs of restoring learning; and he at length obtained professorships for them all. Bucer and Phage were settled at Cambridge; where they only showed what might have been expected from them, both dying within a few months after their arrival. But at Oxford Martyr acted a very conspicuous part, and contributed to introduce among the students there a very liberal mode of thinking.

Of the learning of Archbishop Cranmer, Mr Gilpin remarks, that " it was chiefly confined to his profession. He had applied himself in Cambridge to the study of the Greek and Hebrew languages; which though esteemed at that time as the mark of heresy, appeared to him the only sources of attaining a critical knowledge of the Scriptures. He had so accurately studied canon law, that he was esteemed the best canonist in England; and his reading in theology was so extensive, and his collections from the Fathers so very voluminous, that there were few points in which he was not accurately informed, and in which he could not give the opinions of the several ages of the church from the times of the apostles. He was a sensible writer, rather nervous than elegant. His writings were entirely confined to the great controversy which then subsisted, and contain the whole sum of the theological learning of those times. His library was filled with a very noble collection of books, and was open to all men of letters.

Cranmer. Mr Gilpin, after remarking that Archbishop Cranmer preached often wherever he visited, says, " In his sermons to the people, he was very plain and instructive; insisting chiefly on the essentials of Christianity. The subjects of his sermons, for the most part, were from whence salvation is to be fetched, and on whom the confidence of men ought to lean. They insisted much on doctrines of faith and works; and taught what the fruits of faith were, and what place was to be given to works; they instructed men in the duties they owed their neighbour, and that every one was our neighbour, to whom we might any way do good; they declared what men ought to think of themselves after they had done all; and, lastly, what promises Christ hath made, and who they are to whom he will make them good. Thus he brought in the true preaching of the gospel, altogether different from the ordinary way of preaching in those days; which was to treat concerning saints, to tell legendary tales of them, and to report miracles wrought for the confirmation of transubstantiation and other popish corruptions. And such a heat of conviction accompanied his sermons, that the people departed from them with minds possessed of a great hatred of vice, and burning with a desire of virtue."

He was a great economist of his time. Mr Gilpin says, " he rose commonly at five o'clock and continued in his study till nine. These early hours, he would say, were the only hours he could call his own. After breakfast he generally spent the remainder of the morning either in public or private business. His chapel-hour was eleven, and his dinner-hour twelve. After dinner he spent an hour either in conversation with his friends, in playing at chess, or in what he liked better, overlooking a chess-board. He then retired again to his study till his chapel-bell rang at five. After prayers, he generally walked till six, which was in those times the hour of supper. His evening meal was sparing. Often he ate nothing; and when that was the case, it was his usual custom, as he sat down to table, to draw on a pair of gloves: which was as much as to say, that his hands had nothing to do. After supper, he spent an hour in walking and another in his study, retiring to his bedchamber about nine. This was his usual mode of living when he was most vacant, but very often his afternoons as well as his mornings were engaged in business. He generally, however, contrived, if possible, even in the busiest day, to devote some portion of his time to his books besides the morning. And Mr Fox tells us, he always accustomed himself to read and write in a standing posture; esteeming constant sitting very pernicious to a studious man."

Mr Gilpin also observes, " that he was a very amiable master in his family, and admirably preserved the difficult medium between indulgence and restraint. He had, according to the custom of the times, a very numerous retinue, among whom the most exact order

was

was obſerved. Every week the ſteward of his houſehold held a kind of court in the great hall of his palace; in which all family affairs were ſettled, ſervants wages were paid, complaints were heard, and faults examined. Delinquents were publicly rebuked, and after the third admonition diſcharged. His hoſpitality and charities were great and noble; equal to his ſtation, greater often than his abilities. A plentiful table was among the virtues of thoſe days. His was always bountifully covered. In an upper room was ſpread his own, where he ſeldom wanted company of the firſt diſtinction. Here a great many learned foreigners were daily entertained, and partook of his bounty. In his great hall a long table was plentifully covered every day for gueſts and ſtrangers of a lower rank: at the upper end of which were three ſmaller tables, deſigned for his own officers and inferior gentlemen. Among other inſtances of the archbiſhop's charity, we have one recorded which was truly noble. After the deſtruction of monaſteries, and before hoſpitals were erected, the nation ſaw no ſpecies of greater miſery than that of wounded and diſbanded ſoldiers. For the uſe of ſuch miſerable objects as were landed on the ſouthern coaſts of the iſland, the archbiſhop fitted up his manor-houſe of Beckeſbourn in Kent. He formed it indeed into a complete hoſpital; appointing a phyſician, a ſurgeon, nurſes, and every thing proper, as well for food as phyſic. Nor did his charity ſtop here. Each man, on his recovery, was furniſhed with money to carry him home, in proportion to the diſtance of his abode."

To conclude with the character given by Mr Hume; "Archbiſhop Cranmer was undoubtedly a man of merit; poſſeſſed of learning and capacity; and adorned with candour, ſincerity, and beneficence, and all thoſe virtues which were fitted to render him uſeful and amiable in ſociety. His moral qualities procured him univerſal reſpect; and the courage of his martyrdom, though he fell ſhort of the rigid inflexibility obſerved in many, made him the hero of the Proteſtant party."

CRANNY, in glaſs-making, an iron inſtrument wherewith the necks of glaſſes are formed.

CRANTARA, among the ancient Britons, was a ſort of military ſignal uſed for collecting the diſtant and ſcattered warriors to the ſtandard of their chief. A prince having immediate occaſion for the aſſiſtance of his followers to repel ſome ſudden invaſion or engage in ſome expedition, beſides ſtriking the ſhield and ſounding the horn to give warning to thoſe who were within hearing, he ſent the crantara, or a ſtick burnt at the end and dipped in the blood of a goat, by a ſwift meſſenger, to the neareſt hamlet, where he delivered it without ſaying one word but the name of the place of rendezvous. This crantara, which was well underſtood to denounce deſtruction by fire and ſword to all who did not obey this ſummons, was carried with great rapidity from village to village; and the prince in a little time found himſelf ſurrounded by all his warriors ready to obey his commands.

CRANTOR, a Greek philoſopher and poet, was born at Solos in Cilicia. He left his native country where he was admired; went to Athens, and there ſtudied with Polemon under Xenocrates. He was conſidered as one of the chief ſupporters of the Platonic ſect; and was the firſt who wrote commentaries upon Plato's works. He flouriſhed 270 years before Chriſt.

CRAPE, a light tranſparent ſtuff, in manner of gauze: made of raw ſilk gummed and twiſted on the mill; woven without croſſing, and much uſed in mourning.

Crapes are either craped, i. e. criſped, or ſmooth; the firſt double, expreſſing a cloſer mourning; the latter ſingle, uſed for that leſs deep. Note, White is reſerved for young people, or thoſe devoted to virginity. The ſilk deſtined for the firſt is more twiſted than that for the ſecond; it being the greater or leſs degree of twiſting, eſpecially of the warp, which produces the criſping given it when taken out of the loom, ſteeped in clear water, and rubbed with a piece of wax for the purpoſe.

Crapes are all dyed raw. The invention of this ſtuff came originally from Bologna: but the chief manufacture of it is ſaid to be at Lyons.

Hiſtory tells us, that St Bathilda, queen of France, made fine crape (*crepa*) of gold and ſilver, to lay over the body of St Eloy. The Bollandiſts own they cannot find what this *crepa* was. Binet ſays, it was a frame to cover the body of the ſaint: but others, with reaſon, take it to be a tranſparent ſtuff, through which the body might be ſeen; and that this was the *crepa* whence our word crape was formed.

CRAPULA, among phyſicians, a term for SURFEIT.

CRASHAW, RICHARD, who was in his lifetime honoured with the friendſhip of Cowley, and ſince his death by the praiſe of Mr Pope, who condeſcended both to read his poems, and to borrow from them, was the ſon of William Craſhaw, an eminent divine, and educated at the Charter-houſe near London. He was then ſent to Pembroke-hall in Cambridge, and was afterwards of Peter-houſe, where he was fellow; in both which colleges he was diſtinguiſhed for his Latin and Engliſh poetry. Afterwards he was ejected from his fellowſhip, together with many others, for denying the covenant in the time of the rebellion; and he changed his religion, being by catholic artifices perverted to the church of Rome; not *converted*, but rather, as Pope ſays, *outwitted*. He went to Paris, in hopes of recommending himſelf to ſome preferment there; but being a mere ſcholar, was incapable of executing the new plan he had formed. There he fell into great diſtreſs, which Cowley the poet hearing of in 1646, very kindly ſought him out, gave him all the aſſiſtance he could, and at laſt got him recommended to Henrietta Maria queen of England, then reſiding at Paris. Obtaining from her letters of recommendation, he travelled into Italy; and by virtue of thoſe letters became ſecretary to a cardinal at Rome, and at laſt one of the canons or chaplains of the rich church of our lady at Loretto, ſome miles diſtance from thence, where he died and was buried about 1650. Before he left England, he wrote certain poems, entitled, "Steps to the Temple:" becauſe (ſays Wood) he led his life in the temple of God, in St Mary's church, near to his college. There, as we learn from the preface to theſe poems, he lodged under Tertullian's roof of angels. There he made his neſt more gladly than David's ſwallow near the houſe of God; where, like

a

a primitive saint, he offered more prayers in the night than others usually offer in the day. There he penned the said poems called "Steps to the Temple for Happy Souls to Climb to Heaven by." To the said Steps are joined other poems called, "The Delight of the Muses," wherein are several Latin poems, which though of a mere human mixture, yet they are sweet as they are innocent. He hath also written *Carmen Deo Nostro*, being hymns and other sacred poems, addressed to the countess of Denbigh. He was excellent in five languages besides his mother tongue, namely, Hebrew, Greek, Latin, Italian, and Spanish.

CRASIS (from κεραγνυμι, "to mix,") the temper of the blood peculiar to every constitution.

CRASIS, in *Grammar*, is a figure whereby two different letters are either contracted into one long letter or a diphthong. Such, e. g. is οφις for οφιας; αληθη for αληθεα, &c. τυχȣς for τυχεος, &c. where ι and α are contracted into ι; and ε and α into η; and ε and ο into ȣ.

CRASSAMENTUM, in *Physic*, the thick red or fibrous part of the blood, otherwise called *cruor*, in contradistinction to the serum or aqueous part.

CRASSULA, LESSER ORPINE, or *Live-ever*; a genus of plants, belonging to the pentandria class; and in the natural method ranking under the 13th order, *Succulentæ*. See BOTANY *Index*.

CRASSUS, M. LICINIUS, a celebrated Roman, surnamed *Rich* on account of his opulence. At first he was very circumscribed in his circumstances, but by educating slaves and selling them at a high price he soon enriched himself. The cruelties of Cinna obliged him to leave Rome, and he retired to Spain, where he remained concealed for eight months. After Cinna's death he passed into Africa, and thence to Italy, where he served Sylla and ingratiated himself in his favour. When the gladiators with Spartacus at their head had spread an universal alarm in Italy and defeated some of the Roman generals, Crassus was sent against them. A battle was fought, in which Crassus slaughtered 12,000 of the slaves, and by this decisive blow soon put an end to the war, and was honoured with an *ovatio* at his return. He was soon after made consul with Pompey in the year of Rome 682, and in this high office he displayed his opulence by entertaining the populace at 10,000 tables. He was afterwards censor, and formed the first triumvirate with Pompey and Cæsar. As his love of riches was more predominent than that of glory, Crassus never imitated the ambitious conduct of his colleagues, but was satisfied with the province of Syria, which seemed to promise an inexhaustible source of wealth. With hopes of enlarging his possessions he set off from Rome, though the omens proved unfavourable, and every thing seemed to threaten his ruin. He crossed the Euphrates, and forgetful of the rich cities of Babylon and Seleucia, he hastened to make himself master of Parthia. He was betrayed in his march by the delay of Artavasdes king of Armenia, and the perfidy of Ariamnes. He was met in a large plain by Surena the general of the forces of Orodes king of Parthia, and a battle was fought in which 20,000 Romans were killed and 10,000 taken prisoners. The darkness of the night favoured the escape of the rest; and Crassus, forced by the mutiny and turbulence of his soldiers, and the treachery of his guides, trusted himself to the general of the enemy on pretence of proposing terms of accommodation, and he was killed. His head was cut off and sent to Orodes, who poured melted gold down his throat, and insulted his misfortunes. Though he has been called avaricious, yet he showed himself always ready of lending money to his friends without interest. He was fond of philosophy, and his knowledge of history was great and extensive.

CRATÆGUS, WILD-SERVICE tree, *Hawthorn*, &c. a genus of plants, belonging to the icosandria class; and in the natural method ranking under the 36th order, *Pomaceæ*. See BOTANY *Index*.

The oxycanthus, hawthorn, or white thorn, grows naturally all over Europe. It is sometimes cultivated as an ornamental tree, but it is chiefly propagated for the purpose of planting as a fence. In order to propagate a quantity of quicks, one method is generally practised; namely, first burying the haws, and taking them up to sow the October following; though, says Hanbury, there is another way more preferable; namely, to prepare the beds, and sow the haws soon after they are gathered. Whoever pursues the former method, having gathered what quantity of haws will answer his purpose, should in some bye-corner of the kitchen-garden or nursery dig a hole or pit capacious enough to receive them; some of the earth which came out of the hole, after the haws are put in it, should be laid upon them; and being thus carefully covered down, they may remain there till October. Then, having ground well dug, and cleared of the roots of all troublesome weeds, and the mould being fit for working, the beds should be made for the haws. Four feet is a very good width of these beds, as they may be easily reached over to be weeded; and if the alleys between be each one foot and a half wide, they will be of a good size. The beds being marked out with a line, sufficient mould must be raked out to cover the haws an inch and a half deep. This being done, and the bottom of the beds being made level and even, the haws should be sown, and afterwards gently tapped down with the back of the spade; and then the fine mould, which had been raked out of the beds, must be thrown over them, covering them an inch and a half deep. In the spring the plants will come up, and in the summer following should be kept clear of weeds; though it does sometimes happen, that few of them will appear till the second spring after sowing. Sometimes the young plants are planted out from the seed-beds at one, two, or three years old; but the best plants are obtained by transplanting them into fresh mould the first or second year, letting them remain in the nursery two or three years longer. The practice of the London nurserymen is this: The strongest of the seed-bed plants having been drawn at two or three years old for sale, they clean the beds entirely by drawing the remaining weak underling plants, and transplanting them into fresh beds in this manner, which they call *bedding them*: The ground having been trenched, and the tips of the plants as well as the lower fibres of their roots having been taken off with a sharp knife, they strain a line along one side of the bed; and by chopping with a spade by the side of the line, leave a clift or drill of a depth proportioned to the length of the plants to be laid in; and drawing the loose mould somewhat towards them, leave the side of the drill next to

to the line with a smooth polished face. Against this face the plants are set up, leaning towards the line, about three inches asunder, leaving their heads about an inch above the mould, and placing their roots at such a depth as to bury their stems from two to three inches deeper than they stood in the seed-bed. The loose mould being returned and pressed gently to the roots with the foot, the line is removed, and another row planted in the same manner about a foot from the first.

CRATCHES, in the manege, a swelling on the pastern, under the fetlock, and sometimes under the hoof; for which reason it is distinguished into the sinew cratches, which affect the sinew, and those upon the coronet, called *quittor-bones*.

CRATER, Cup, in *Astronomy*, a constellation of the southern hemisphere; whose stars, in Ptolemy's catalogue, are seven; in Tycho's, eight; in Hevelius's, ten; in the Britannic catalogue, thirty-one.

Crater is also used to signify the mouth or opening of a volcano or burning mountain, from whence the fire is discharged. See Volcano.

CRATES, of Thebes, a famous philosopher, was the disciple of Diogenes the Cynic. It is said that he threw all his money into the sea, that he might the more freely apply himself to the study of philosophy. Others assert that he placed it into another person's hands, with orders to give it to his children if they should happen to be fools: For (said Crates), if they should be philosophers, they will have no need of it: in which case it was to be given to the people. He flourished about 328 years before Christ.

He ought not be confounded with Crates, a famous Academic philosopher, the disciple and friend of Polemon. This last Crates had Arcesilaus and other celebrated philosophers for his disciples; and flourished about 300 years before Christ.

CRATEVA, the Garlic Pear; a genus of plants belonging to the dodecandria class; and in the natural method ranking under the 25th order, *Putamineæ*. See Botany *Index*.

CRATINUS, an ancient comic poet, of whom we should scarcely have known any thing, had not Quintilian, Horace, and Persius, mentioned him, Eupolis, and Aristophanes, as the great masters of what we call the ancient comedy. It is gathered that he died in the 87th Olympiad. Suidas tells us that he wrote 21 plays, and that he was splendid and bright in his characters.

CRATIPPUS, a celebrated Peripatetic philosopher, was a native of Mitylene, where he taught philosophy: but at length went to Athens where Brutus and the son of Cicero were his disciples. Pompey went to see him after the battle of Pharsalia, and proposed to him his difficulties in relation to the belief of a Providence: when Cratippus comforted him, and by forcible arguments answered his objections. He wrote some pieces about divination: and is supposed to be the same with him whom Tertullian, in his book *De Anima*, has ranked among the writers upon dreams.

CRATO, a small town of Portugal, in the province of Alentejo, with a rich priory. It is the chief commandery which the knights of Malta have in Portugal. W. Long. 8. 12. N. Lat. 38. 50.

CRAVEN, a town of France, in Burgundy, remarkable for its good wine, and for a battle fought there between the English and French. It is seated near the confluence of the rivers Cure and Yonne. E. Long. 3. 30. N. Lat. 47. 42.

Craven, or *Cravent*, a word of reproach, used in trials by battel. See Battel.

CRAX, the Curassou, a genus of birds belonging to the order of gallinæ. See Ornithology *Index*.

CRAY fish, or *Craw-Fish*. See Cancer, Entomology *Index*.

CRAYER, Caspar de, a celebrated painter, was born at Antwerp in 1585, and was a disciple of Raphael Coxis, the son of that Coxis who had studied under Raphael; but he soon showed such proof of genius, and of an elevated capacity, that he far surpassed his master. Afterwards he made judicious observations on the particular excellencies of the most renowned masters to which he had any access; and taking nature for his constant director and guide, he formed for himself a manner that was exceedingly pleasing. The first work which established him in the favour of the court at Brussels, was a portrait of Cardinal Ferdinand, brother to the king of Spain, which he painted at full length, and as large as life. In that picture he succeeded so happily, that it was sent to Madrid, and received there with such concurrent approbation of the king and the whole court, that it laid the foundation of the fame and fortune of Crayer. For the king, as an acknowledgment of the painter's merit, sent him a gold chain with a medal; and added, as a farther instance of his favour, an appointment for a considerable pension. But nothing places the talents of Crayer in a stronger light, than the testimony of so excellent an artist as Rubens. That great man went to Antwerp particularly to visit Crayer, and to see his works; and after examining attentively a picture of his painting, in the refectory of the abbey of Afflegem, he publicly declared that no painter could surpass Crayer. Nor was this master less distinguished by Vandyck, who always expressed a real esteem and friendship for him, and painted his portrait. He had somewhat less fire in his composition than Rubens, but his design is frequently more correct. His compositions generally consisted of a small number of figures; and with discreet judgment, he avoided the encumbering his design with superfluous particulars, or loading his subject with any thing that seemed not to contribute to its elegance or probability. He grouped his figures with singular skill, and his expressions have all the truth of nature. There is a remarkable variety in his draperies, and an equal degree of simplicity in their folds; and as to his colouring, it is admirable. Of all his contemporary painters, he was accounted to approach nearest to Vandyck, not only in history but in portrait. He principally painted religious subjects, and was continually at work; and although he lived to a great age, yet his temperance and constant regularity preserved to him the full use of all his faculties; and to the last month of his life his pencil retained the same force and freedom which it possessed in his most vigorous time. The subject of that picture which was so honoured by the approbation of Rubens is the Centurion alighting from his horse to prostrate himself at the feet of

of our Saviour. It is a capital defign of Crayer; and although it confifts of a great number of figures, the harmony and union are well preferved.

CRAYON, a general name for all coloured ftones, earths, or other minerals and fubftances, ufed in defigning or painting in paftel; whether they have been beaten and reduced to a pafte, or are ufed in their primitive confiftence, after fawing or cutting them into long narrow flips. In this laft manner are red crayons made, of blood-ftone or red chalk; black ones, of charcoal and black-lead. Crayons of all other colours are compofitions of earths reduced to pafte.

Crayon Painting. Whether the painter works with oil-colours, water-colours, or crayons, the grand object of his purfuit is ftill the fame: a juft imitation of nature. But each fpecies has its peculiar rules and methods. Painting with crayons requires in many refpects a treatment different from painting in oil-colours; becaufe all colours ufed dry are in their nature of a much warmer complexion than when wet with oils, &c. For this reafon, in order to produce a rich picture, a much greater portion of what painters term *cooling teints* muft be applied in crayon painting than would be judicious to ufe in oils. Without any danger of a miftake, it is to be fuppofed, the not being acquainted with this obfervation is one great caufe why fo many oil painters have no better fuccefs when they attempt crayon painting. On the contrary, crayon painters being fo much ufed to their teints which are of a cold nature when ufed wet, are apt to introduce them too much when they paint oils, which is feldom productive of a good effect.

We fhall now endeavour to give the ftudents fome directions towards the attainment of excellence in this art.

Of the Application of the Crayons, with fome previous Difpofitions. The ftudent muft provide himfelf with fome ftrong blue paper, the thicker the better, if the grain is not too coarfe or knotty, though it is almoft impoffible to get any entirely free from knots. The knots fhould be levelled with a penknife or razor, otherwife they will prove exceedingly troublefome. After this is done, the paper muft be pafted very fmooth on a linen cloth, previoufly ftrained on a deal frame, the fize according to the artift's pleafure: on this the picture is to be executed; but it is moft eligible not to pafte the paper on till the whole fubject is firft dead coloured. The method of doing this is very eafy, by laying the paper with the dead colour on its face, upon a fmooth board or table, when, by means of a brufh, the backfide of the paper muft be covered with pafte; the frame with the ftrained cloth, muft then be laid on the pafted fide of the paper; after which turn the painted fide uppermoft, and lay a piece of clean paper upon it, to prevent fmearing it: this being done, it may be ftroked gently over with the hand; by which means all the air between the cloth and the paper will be forced out.

When the pafte is perfectly dry, the ftudent may proceed with the painting. The advantages arifing from pafting the paper on the frame according to this method, after the picture is begun, are very great, as the crayons will adhere much better than any other way; which will enable the ftudent to finifh the picture with a firmer body of colour and greater luftre.

When the painters want to make a very correct copy of a picture, they generally make ufe of tiffany or black gauze, ftrained tight on a frame, which they lay flat on the fubject to be imitated, and with a piece of fketching chalk trace all the outlines on the tiffany. They then lay the canvas to be painted on flat upon the floor, placing the tiffany with the chalked lines upon it, and with an handkerchief brufh the whole over; this prefents the exact outlines of the picture on the canvas. The crayon-painter may alfo make ufe of this method when the fubject of his imitation is in oils; but in copying a crayon-picture, he muft have recourfe to the following method, on account of the glafs.

The picture being placed upon the eafel, let the outlines be drawn on the glafs with a fmall camel's hair pencil dipped in lake, ground thin with oils, which muft be done with great exactnefs. After this is accomplifhed, take a fheet of paper of the fame fize, and place it on the glafs, ftroking over all the lines with the hand, by which means the colour will adhere to the paper, which muft be pierced with pin-holes pretty clofe to each other. The paper intended to be ufed for the printing muft next be laid upon a table, and the pierced paper placed upon it; then with fome fine pounded charcoal, tied up in a piece of lawn, rub over the pierced lines, which will give an exact outline; but great care muft be taken not to brufh this off till the whole is drawn over with fketching chalk, which is a compofition made of whiting and tobacco-pipe clay, rolled like the crayons, and pointed at each end.

When a ftudent paints immediately from the life, it will be moft prudent to make a correct drawing of the outlines on another paper, the fize of the picture he is going to paint, which he may trace by the preceding method, becaufe erroneous ftrokes of the fketching chalk (which are not to be avoided without great expertnefs) will prevent the crayons from adhering to the paper, owing to a certain greafy quality in the compofition.

The ftudent will find the fitting pofture, with the box of crayons in his lap, the moft convenient method for him to paint. The part of the picture he is immediately painting fhould be rather below his face; for, if it be placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened, at leaft to the height of fix feet from the ground; and the fubject to be painted fhould be fituated in fuch a manner, that the light may fall with every advantage on the face, avoiding too much fhadow, which feldom has a good effect in portrait painting, efpecially if the face he paints from has any degree of delicacy.

Before he begins to paint, let him be attentive to his fubject, and appropriate the action or attitude proper to the age of the fubject: if a child, let it be childifh; if a young lady, exprefs more vivacity than in the majeftic beauty of a middle-aged woman, who alfo fhould not be expreffed with the fame gravity as a perfon far advanced in years. Let the embellifhments of the picture, and introduction of birds, animals, &c. be regulated by the rules of propriety and confiftency.

The features of the face being correctly drawn with chalks,

chalks, let the ſtudent take a crayon of pure carmine, and carefully draw the noſtril and edge of the noſe next the ſhadow; then, with the fainteſt carmine teint, lay in the higheſt light upon the noſe and forehead, which muſt be executed broad. He is then to proceed gradually with the ſecond teint, and the ſucceeding ones, till he arrives at the ſhadows, which muſt be covered brilliant, enriched with much lake, carmine, and deep green. This method will at firſt offenſively ſtrike the eye, from its crude appearance; but in the finiſhing, it will be a good foundation to produce a pleaſing effect, colours being much more eaſily ſullied when too bright than when the firſt colouring is dull, to raiſe the picture into a brilliant ſtate. The ſeveral pearly teints diſcernible in fine complexions muſt be imitated with blue verditer and white, which anſwers to the ultramarine teints uſed in oils. But if the parts of the face where theſe teints appear are in ſhadow, the crayons compoſed of black and white muſt be ſubſtituted in their place.

Though all the face when firſt coloured ſhould be laid in as brilliant as poſſible, yet each part ſhould be kept in its proper tone; by which means the rotundity of the face will be preſerved.

Let the ſtudent be careful, when he begins the eyes, to draw them with a crayon inclined to the carmine teint, of whatever colour the iriſes are of; he muſt lay them in brilliant, and at firſt not loaded with colour, but executed lightly: no notice is to be taken of the pupil yet. The ſtudent muſt let the light of the eye incline very much to the blue caſt, cautiouſly avoiding a ſtaring white appearance (which, when once introduced, is ſeldom overcome), preſerving a broad ſhadow thrown on its upper part by the eyelaſh. A black and heavy teint is alſo to be avoided in the eyebrows; it is therefore beſt to execute them like a broad glowing ſhadow at firſt, on which, in the finiſhing, the hairs of the brow are to be painted; by which method of proceeding, the former teints will ſhow themſelves through, and produce the moſt pleaſing effect.

The ſtudent ſhould begin the lips with pure carmine and lake, and in the ſhadow uſe ſome carmine and black; the ſtrong vermilion teints ſhould be laid on afterwards. He muſt beware of executing them with ſtiff, harſh lines, gently intermixing each with the neighbouring colours, making the ſhadow beneath broad, and enriched with brilliant crayons. He muſt form the corner of the mouth with carmine, brown ochre, and greens, variouſly intermixed. If the hair is dark, he ſhould preſerve much of the lake and deep carmine teints therein; this may eaſily be overpowered by the warmer hair-teints, which, as obſerved in painting the eyebrows, will produce a richer effect when the picture is finiſhed; on the contrary, if this method is unknown or neglected, a poverty of colouring will be diſcernible.

After the ſtudent has covered over, or, as artiſts term it, has dead-coloured the head, he is to ſweeten the whole together, by rubbing it over with his finger, beginning at the ſtrongeſt light upon the forehead, paſſing his finger very lightly, and uniting it with the next teint, which he muſt continue till the whole is ſweetened together, often wiping his finger on a towel to prevent the colours being ſullied. He muſt be cautious not to ſmooth or ſweeten his picture too often, becauſe it will give riſe to a thin and ſcanty effect, and have more the appearance of a drawing than a ſolid painting; as nothing but a body of rich colours can conſtitute a rich effect. To avoid this (as the ſtudent finds it neceſſary to ſweeten with the finger), he muſt commonly repleniſh the picture with more crayon.

When the head is brought to ſome degree of forwardneſs, let the back ground be laid in, which muſt be treated in a different manner, covering it as thin as poſſible, and rubbing it into the paper with a leather ſtump. Near the face the paper ſhould be almoſt free from colour, for this will do great ſervice to the head, and by its thinneſs give both a ſoft and ſolid appearance. In the back ground alſo, no crayon that has whiting in its compoſition ſhould be uſed, but chiefly ſuch as are the moſt brilliant and the leaſt adulterated. The ground being painted thin next the hair, will give the ſtudent an opportunity of painting the edges of the hair over in a light and free manner when he gives the finiſhing touches.

The ſtudent having proceeded thus far, the face, hair, and back ground being entirely covered, he muſt carefully view the whole at ſome diſtance, remarking in what reſpect it is out of keeping, that is, what parts are too light, and what too dark, being particularly attentive to the white or chalky appearances, which muſt be ſubdued with lake and carmine. The above method being properly put into execution, will produce the appearance of a painting principally compoſed of three colours, viz. carmine, black, and white, which is the beſt preparation a painter can make for the producing a fine crayon picture.

The next ſtep is, to complete the back-ground and the hair, as the duſt, in painting theſe, will fall on the face, and would much injure it if that was completed firſt. From thence proceed to the forehead, finiſhing downward till the whole picture is completed.

In painting over the forehead the laſt time, begin the higheſt light with the moſt faint vermilion teint, in the ſame place where the faint carmine was firſt laid, keeping it abroad in the ſame manner. In the next ſhade ſucceeding the lighteſt, the ſtudent muſt work in ſome light blue teints, compoſed of verditer and white, intermixing with them ſome of the deeper vermilion teints, ſweetening them together with great caution, inſenſibly melting them into one another, increaſing the proportion of each colour as his judgment ſhall direct. Some brilliant yellows may alſo be uſed, but ſparingly; and towards the roots of the hair, ſtrong verditer teints intermixed with greens, will be of ſingular ſervice. Cooling crayons, compoſed of black and white, ſhould ſucceed theſe, and melt into the hair. Beneath the eyes, the ſweet pearly teints are to be preſerved, compoſed of verditer and white, and under the noſe, and on the temples, the ſame may be uſed; beneath the lips, teints of this kind alſo are proper, mixing them with the light greens and ſome vermilion.

In finiſhing the cheeks, let the pure lake clear them from any duſt contracted from the other crayons; then with the lake may be intermixed the bright vermilion; and laſt of all (if the ſubject ſhould require it) a few touches

touches of the orange-coloured crayon, but with extreme caution; after, ſweeten that part with the finger as little as poſſible, for fear of producing a heavy diſagreeable effect on the cheeks; as the beauty of a crayon-picture conſiſts in one colour ſhowing itſelf through, or rather between, another: this the ſtudent cannot too often remark, it being the only method of imitating beautiful complexions.

The eye is the feature moſt difficult to execute in crayons, as every part muſt be expreſſed with the utmoſt nicety, to appear finiſhed; at the ſame time that the painter muſt preſerve its breadth and ſolidity while he is particularizing the parts. To accompliſh this, it will be a good general rule for the ſtudent to uſe his crayon in ſweetening as much, and his finger as little, as poſſible. When he wants a point to touch a ſmall part with, he may break off a little of his crayon againſt the box, which will produce a corner fit to work with in the minuteſt parts. If the eye-laſhes are dark, he muſt uſe ſome of the carmine and brown ochre, and the crayon of carmine and black; and with theſe he may alſo touch the iris of the eye (if brown or hazel), making a broad ſhadow, cauſed by the eye-laſh. Red teints of vermilion, carmine, and lake, will execute the corners of the eye properly; but if the eyelids are too red, they will have a diſagreeable ſore appearance. The pupil of the eye muſt be made of pure lamp-black: between this and the lower part of the iris, the light will catch very ſtrong, but it muſt not be made too ſudden, but be gently diffuſed round the pupil till it is loſt in ſhade. When the eye-balls are ſufficiently prepared, the ſhining ſpeck muſt be made with a pure white crayon, which ſhould be firſt broken to a point, and then laid on firm; but as it is poſſible they may be defective in neatneſs, they ſhould be corrected with a pin, taking off the redundant parts, by which means they may be formed as neat as can be required.

The difficulty with reſpect to the noſe, is to preſerve the lines properly determined, and at the ſame time ſo artfully blended into the cheek, as to expreſs its projection, and yet no real line to be perceptible upon a cloſe examination; in ſome circumſtances it ſhould be quite blended with the cheek, which appears behind it, and determined entirely with a ſlight touch of red chalk. The ſhadow cauſed by the noſe is generally the darkeſt in the whole face, partaking of no reflection from its ſurrounding parts. Carmine and brown ochre, carmine and blacks, and ſuch brilliant crayons will compoſe it beſt.

The ſtudent having before prepared the lips with the ſtrongeſt lake and carmine, &c. muſt with theſe colours make them completely correct; and when finiſhing, introduce the ſtrong vermilions, but with great caution, as they are extremely predominant. This, if properly touched, will give the lips an appearance equal, if not ſuperior, to thoſe executed in oils, notwithſtanding the ſeeming ſuperiority the latter has by means of glazing (A), of which the former is entirely deſtitute.

When the ſtudent paints the neck, he ſhould avoid expreſſing the muſcles too ſtrong in the ſtem, nor ſhould the bones appear too evident on the cheſt, as both have an unpleaſing effect, denoting a violent agitation of the body; a circumſtance ſeldom neceſſary to expreſs in portrait-painting. The moſt neceſſary part to be expreſſed, and which ſhould ever be obſerved, (even in the moſt delicate ſubjects), is a ſtrong marking juſt above the place where the collar bones unite; and if the head is much thrown over the ſhoulders, ſome notice ſhould be taken of the large muſcle that riſes from behind the ear, and is inſerted into the pit between the collar bones. All inferior muſcles ſhould be, in general, quite avoided. The ſtudent will find this caution neceſſary, as moſt ſubjects, eſpecially thin perſons, have the muſcles of the neck much more evident than would be judicious to imitate. As few necks are too long, it may be neceſſary to give ſome addition to the ſtem, a fault on the other ſide being quite unpardonable, nothing being more ungraceful than a ſhort neck. In colouring the neck, let the ſtudent preſerve the ſtem of a pearly hue, and the light not ſo ſtrong as on the cheſt. If any part of the breaſt appears, its tranſparency muſt alſo be expreſſed by pearly teints; but the upper part of the cheſt ſhould be coloured with beautiful vermilions delicately blended with the other.

Of the Drapery. Dark blue, purple, black, pink, and all kinds of red draperies alſo, ſhould be firſt tinged with carmine, which will render the colours much more brilliant than any other method; over this ſhould be laid on the paper the middle teint (a medium between the light and dark teints), of which the drapery is to be painted, except the dark maſſes of ſhadow, which ſhould be laid on at firſt as deep as poſſible; theſe, ſweetened with the finger, being deſtitute of the ſmaller folds, will exhibit a maſterly breadth, which the leſſer folds when added ought by no means to deſtroy. With the light and dark teints, the ſmaller parts are next to be made with freedom, executing as much with the crayon, and as little with the finger, as poſſible; in each fold touching the laſt ſtroke with the crayon, which ſtroke the finger muſt never touch. In the caſe of reflections, the ſimple touch of the crayon will be too harſh, therefore fingering will be neceſſary afterwards, as reflected lights are always more gentle than thoſe which are direct. With reſpect to reflections in general, they muſt always partake of the ſame colour as the object reflecting, but in the caſe of ſingle figures, it may be uſeful to make ſome particular obſervations.

In a blue drapery, let the reflections be of a greeniſh caſt; in green draperies make them of a yellow teint; in yellow, of an orange; in orange, reflect a reddiſh caſt; all reds, ſomething of their own nature, but inclined to the yellow: black ſhould have a reddiſh reflection; the reflection of a reddiſh teint will alſo preſent purples to the beſt advantage.

Of whatever colour the drapery is, the reflection on the face muſt partake thereof, otherwiſe the picture,

(A) The method with which painters in oils expreſs tranſparency in the lips is, by painting them firſt with light vermilion teints, and, when dry, touching them over with pure lake.

ture, like paintings on glaſs, will have but a gaudy effect.

Linen, lace, fur, &c. ſhould be touched ſpiritedly with the crayon, fingering very little, except the latter; and the laſt touches, even of this, like all other parts, ſhould be executed with the crayon, without ſweetening with the finger.

The methods above recommended have been practiſed by the moſt celebrated crayon-painters, whoſe works have been held in public eſtimation; but the knowledge of, and ability to execute, each ſeparate part with brilliancy and truth, will be found very inſufficient to conſtitute a complete painter, without his judgment enables him to unite them with each other, by correctneſs of drawing, propriety of light and ſhadow, and harmony of colouring. In order to accompliſh this, the ſtudent ſhould carefully avoid finiſhing one part in particular, till he has properly conſidered the connection it is to have with the reſt. The neglect of this is the principal reaſon why the performances of indifferent painters are ſo deſtitute of what is termed breadth, ſo conſpicuouſly beautiful in the works of great maſters. It muſt be granted, that this obſervation relates more particularly to large compoſitions, where a diverſity of figures requires ſuch a judicious diſpoſition, that each may aſſiſt in the combination of a kind of univerſal harmony; yet, even in portrait-painting, the ſtudent ſhould be particularly attentive to obſerve this idea of breadth, if he is deſirous of acquiring that importance and dignity which conſtitutes excellence in painting.

Of the Materials. The perfection of the crayons conſiſts, in a great meaſure, in their ſoftneſs; for it is impoſſible to execute a brilliant picture with them if they are otherwiſe; on which account great care ſhould be obſerved in the preparing them, to prevent their being hard. In all compoſitions, flake-white and white-lead ſhould be wholly rejected, becauſe the ſlighteſt touch with either of theſe would unavoidably turn black.

The uſual objection to crayon-paintings is, that they are ſubject to change; but whenever this happens, it is entirely owing to an injudicious uſe of the above-mentioned whites, which will ſtand only in oils. To obviate the bad effects ariſing from the uſe of ſuch crayons, let the ſtudent make uſe of common whiting prepared in the following manner.

Take a large veſſel of water, put the whiting into it, and mix them well together; let this ſtand about half a minute, then pour off the top into another veſſel, and throw the gritty ſediment away; let what is prepared reſt about a minute, and then pour it off as before, which will purify the whiting and render it free from all dirt and grittineſs. When this is done, let the whiting ſettle, and then pour the water from it; after which, lay it on the chalk to dry, and keep it for uſe, either for white crayons, or the purpoſe of preparing teints with other colours, for with this all other teints may be ſafely prepared. If the ſtudent chooſes to make crayons of the whiting immediately after it is waſhed, it is not neceſſary to dry it on the chalk, for it may be mixed inſtantly with any other colour, which will ſave conſiderable trouble. All colours of a heavy or gritty nature, eſpecially blue verditer, muſt be purified by waſhing after this method.

The ſtudent muſt be provided with a large, flexible pallet-knife, a large ſtone and muller to levigate the colours, two or three large pieces of chalk to abſorb the moiſture from the colours after they are levigated, a piece of flat glaſs to prevent the moiſture from being abſorbed too much, till the colours are rolled into form, and veſſels for water, ſpirits, &c. as neceſſity and convenience ſhall direct.

I. Reds. It is rather difficult to procure either good carmine or good lake. Good carmine is inclined to the vermilion teint, and good lake to the carmine teint. The carmine crayons are prepared in the following manner.

1. Carmine. As their texture is inclinable to hardneſs, inſtead of grinding and rolling them, take a ſufficient quantity of carmine, lay it upon the grinding-ſtone, mix it with a levigating knife with ſpirit of wine till it become ſmooth and even. The chalk-ſtone being ready, lay the colour upon it to abſorb the ſpirit; but be careful that it is laid on in a proper ſtate for painting. If it is levigated too thin, the crayons will be too flat; and if too thick, it will occaſion a waſte of colour, by their adhering to the pallet-knife; but practice will render the proper degree of conſiſtency familiar. The ſimple colour being prepared, the next ſtep is to compoſe the different teints by a mixture with whiting; the proportion to be obſerved conſiſting of 20 gradations to one, which may be clearly underſtood by the following directions. Take ſome of the ſimple colour, and levigate it with ſpirit of wine, adding about one part of waſhed whiting to three parts of carmine, of which, when properly incorporated, make two parcels. The next gradation ſhould be compoſed of equal quantities of carmine and whiting, of which four crayons may be made. The third compoſition ſhould have one fourth carmine and three fourths whiting; of this make ſix crayons, which will be a good proportion for the reſt. The laſt teint ſhould be made of whiting, very faintly tinged with carmine, of which make about eight crayons, which will complete the above-mentioned proportion. As theſe compound teints are levigated, they are to be laid immediately upon the chalk, that the moiſture may be abſorbed to the proper degree of dryneſs for forming into crayons, which may be known by its loſing the greater part of its adheſive quality when taken into the hand; if the conſiſtency is found to be right, it may be then laid upon the glaſs, which having no pores, will prevent the moiſture from being carried off before it is convenient to form it into crayons, otherwiſe the crayons would be full of cracks and very brittle, which will be a great inconvenience when they are uſed in painting.

2. Lake. This is a colour very apt to be hard; to prevent which the ſtudent muſt obſerve the following particulars. Take about half the quantity of lake intended for the crayons, and grind it very fine with ſpirit of wine; let it dry, and then pulverize it, which is eaſily done if the lake is good; then take the other half, and grind it with ſpirits, after which mix it with the pulverized lake, and lay it out directly in crayons on the chalk. This colour will not bear rolling. The ſimple colour being thus prepared, proceed with the compound crayons as directed before, and in the ſame degrees of gradation as the carmine teints.

3. Vermilion.

3. Vermilion. The beſt is inclined to the carmine teint. Nothing is required to prepare this colour more than to mix it on the ſtone with ſoft water or ſpirits, after which it may be rolled into crayons. The different teints are produced by a mixture of the ſimple colour with whiting, according to the proportion already given.

II. Blues. 1. Pruſſian blue is a colour very apt to bind, and is rendered ſoft with more difficulty than carmine and lake. The ſame method of preparation is to be followed with this as is directed with reſpect to lake, only it is neceſſary to grind a larger quantity of the pure colour, as it is chiefly uſed for painting draperies. The different teints may be made according to neceſſity, or the fancy of the painter. 2. Blue verditer is a colour naturally gritty, and therefore it is neceſſary to waſh it well. Its particles are ſo coarſe as to require ſome binding matter to unite them, otherwiſe the crayons will never adhere together. To accompliſh this, take a quantity ſufficient to form two or three crayons, to which add a piece of ſlaked plaſter of Paris about the ſize of a pea; mix theſe well together, and form the crayons upon the chalk. This blue is extremely brilliant, and will be of great uſe in heightening draperies, &c. The teints muſt be formed with whiting as directed in the former inſtances, and are highly ſerviceable for painting fleſh, to produce thoſe pearly teints ſo beautiful in crayon pictures. It is not neceſſary to mix the compounds with ſpirits, as clear water will be ſufficient.

III. Greens. Brilliant greens are produced with great difficulty. In Switzerland, they have a method of making them far ſuperior to ours. We uſually take yellow ochre, and after grinding it with ſpirits, mix it with the powder of Pruſſian blue, then temper it with a knife, and lay the crayons on the chalk, without rolling them. Inſtead of this, ſome uſe king's yellow mixed with Pruſſian blue, and others brown ochre and Pruſſian blue. The crayons made of the two laſt may be rolled. Various teints may be produced by theſe colours, according to fancy or neceſſity; ſome to partake more of the blue, and others of the yellow.

IV. Yellows. 1. King's yellow is the moſt uſeful and the moſt brilliant, levigated with ſpirits of wine, to compoſe the different teints as before directed. 2. Yellow ochre, and Naples yellow ground with ſpirits, will make uſeful crayons. 3. Orange is produced with king's yellow and vermilion ground together with ſpirits, and the teints formed as in other caſes, but no great quantity of them is required.

V. Browns. 1. Cullen's earth is a fine dark brown. After ſix or eight of the ſimple crayons are prepared, ſeveral rich compound teints may be produced from it, by a mixture with carmine, in various degrees. Black, carmine, and this colour, mixed together, make uſeful teints for painting hair; ſeveral gradations may be produced from each of theſe by a mixture with whiting. Roman or brown ochre is an excellent colour, either ſimple or compounded with carmine. Whiting tinged in ſeveral degrees with either of theſe, will prove very ſerviceable in painting. 2. Umber may be treated in juſt the ſame manner; only it is neceſſary to levigate it with ſpirit of wine.

VI. Purples. Pruſſian blue ground with ſpirits and mixed with pulverized lake, will produce a good purple. Carmine, thus mixed with Pruſſian blue, will produce a purple ſomething different from the former. Various teints may be made from either of theſe compounds by a mixture with whiting.

VII. Black. 1. Lamp-black is the only black that can be uſed with ſafety, as all others are ſubject to mildew; but as good lamp-black is very ſcarce, the ſtudent will, perhaps, find it moſt expedient to make it himſelf; the proceſs of which is as follows: Provide a tin cone, fix it over a lamp at ſuch a height that the flame may juſt reach the cone for the ſoot to gather within it. When a ſufficient quantity is collected, take it out, and burn all the greaſe from it in a crucible. It muſt then be ground with ſpirits, and laid on the chalk to abſorb the moiſture. Various gray teints may be formed from this by a mixture with whiting, as mentioned in former inſtances.—2. Vermilion mixed with carmine: this is a compoſition of great uſe, and teints made from this with whiting will be found to be very ſerviceable. 3. Carmine and black is another good compound, of which five or ſix gradations ſhould be made, ſome partaking more of the black, and others having the carmine moſt predominant, beſides ſeveral teints by a mixture with whiting. 4. Vermilion and black is alſo a very uſeful compound, from which ſeveral different teints ſhould be made. 5. Pruſſian blue and black is another good compound, and will be found of ſingular ſervice in painting draperies.

It is impoſſible to lay down rules for the forming every teint neceſſary in compoſing a ſet of crayons, there being many accidental compoſitions, entirely dependent on fancy and opinion. The ſtudent ſhould make it a rule to ſave the leavings of his colours; for of theſe he may form various teints, which will occaſionally be uſeful.

Of Rolling the Crayons, and diſpoſing them for painting. The different compoſitions of colours muſt be cut into a proper magnitude, after they are prepared, in order to be rolled into paſtils, for the convenience of uſing them. Each crayon ſhould be formed in the left hand with the ball of the right, firſt formed cylindrically, and then tapering at each end. If the compoſition is too dry, dip the finger in water; if too wet, the compoſition muſt be laid upon the chalk again to abſorb more of the moiſture. The crayons ſhould be rolled as quick as poſſible; and when finiſhed, muſt be laid upon the chalk again, to abſorb all remaining moiſture. After the gradation of teints from one colour is formed, the ſtone ſhould be well ſcraped and cleanſed with water before it is uſed for another colour.

When the ſet of crayons is completed according to the rules preſcribed, they ſhould be arranged in claſſes for the convenience of painting with them. Some thin drawers, divided into a number of partitions, is the moſt convenient method of diſpoſing them properly. The crayons ſhould be depoſited according to the ſeveral gradations of light. The bottom of the partitions muſt be covered with bran, as a bed for the colours; becauſe it not only preſerves them clean, but prevents their breaking.

The box made uſe of when the ſtudent paints ſhould be

be about a foot square, with nine partitions. In the upper corner on the left hand (supposing the box to be in the lap when he paints), let him place the black and gray crayons, those being the most seldom used; in the second partition, the blues; in the third, the greens and browns; in the first partition on the left hand of the second row, the carmines, lakes, vermilions, and all deep reds; the yellows and orange in the middle, and the pearly teints next; and as these last are of a very delicate nature, they must be kept very clean, that the gradations of colour may be easily distinguished; in the lower row, let the first partition contain a piece of fine linen rag to wipe the crayons with while they are using; the second, all the pure lake and vermilion teints; and the other partition may contain those teints which, from their complex nature, cannot be classed with any of the former.

CRAZE MILL, or *Crazing Mill*, a mill in all respects like a grist-mill to grind corn, and so called by the tin miners, who use it to grind their tin, which is yet too great after trambling.

CREAM, a general name applicable to all substances that separate from a liquor, and are collected upon its surface; but more particularly applied to the following

Cream of Lime, is that part of the lime which had been dissolved in the water in its caustic state, but having again attracted some fixed air from the atmosphere, becomes incapable of solution, and therefore separates from the water in the mild state of chalk or limestone.

Cream of Milk, generally called simple *cream*, is the most oily part of the milk; which being naturally only mixed, and not dissolved in the rest, soon separates from them, as being specifically lighter; after which it collects on the surface; from which it is generally skimmed, to complete the disengagement of the oily parts, for the purpose of making butter, from the caseous and serous parts. See Agriculture *Index*. Cream of milk is not only an agreeable aliment when recent, but also useful in medicine as a lenient, when applied to tetters and erysipelas attended with pain and proceeding from an acrid humour.

Cream of Tartar, the trivial name of the supertartrate or the acidulous tartrate of potash. It is also denominated *crystals* of *tartar*. In this salt there is an excess of the tartaric acid. See Chemistry *Index*.

CREAT, in the manege, an usher to a riding master; or a gentleman bred in the academy, with intent to make himself capable of teaching the art of riding the great horse.

CREATION, in its primary import, seems to signify the bringing into being something which did not before exist. The term is therefore most generally applied to the original production of the materials whereof the visible world is composed. It is also, however, used in a secondary or subordinate sense, to denote those subsequent operations of the Deity upon the matter so produced, by which the whole system of nature and all the primitive genera of things received their form, qualities, and laws.

There is no subject concerning which there have been more disputes than this of creation. It is certain that none of the ancient philosophers had the smallest idea of its being possible to produce a substance out of nothing, or that even the power of the Deity himself could work without any materials to work upon. Hence some of them, among whom was Aristotle, asserted that the world was eternal both as to its matter and form. Others, though they believed that the gods had given the world its form, yet imagined the materials whereof it is composed to have been eternal. Indeed the opinions of the ancients, who had not the benefit of revelation, were on this head so confused and contradictory, that nothing of any consequence can be deduced from them. The freethinkers of our own and of former ages have denied the possibility of creation, as being a contradiction to reason; and of consequence have taken the opportunity from thence to discredit revelation. On the other hand many defenders of the sacred writings have asserted, that creation out of nothing, so far from being a contradiction to reason, is not only probable, but demonstrably certain. Nay, some have gone so far as to say, that from the very inspection of the visible system of nature, we are able to infer that it was once in a state of non-existence. It would be impossible for us, however, to enter into the multiplicity of arguments used on both sides; nor can we pretend to settle it, as the subject is confessedly above human comprehension.

1
What works of creation God is known to have performed.

As to the works of creation which the Deity is known to us to have performed; all other beings, beside himself, are his creatures. Men and other animals that inhabit the earth and the seas; all the immense varieties of herbs and plants of which the vegetable kingdom consists; the globe of the earth, and the expanse of the ocean; these we know to have been produced by his power. Besides the terrestrial world which we inhabit, we see many other material bodies disposed around it in the wide extent of space. The moon, which is in a particular manner connected with our earth, and even dependent upon it; the sun, and the other planets with their satellites, which, like the earth, circulate round the sun, and appear to derive from him life and heat; those bodies which we call fixed stars, and consider as illuminating and cherishing with heat each its peculiar system of planets; and the comets which at certain periods surprise us with their appearance, and the nature of whose connection with the general system of nature, or with any particular system of planets, we cannot pretend to have fully discovered;—these are so many more of the Deity's works, from the contemplation of which we cannot but conceive the most awful ideas of his creative power.

Matter, however, whatever the varieties of form under which it is made to appear, the relative disposition of its parts, or the motions communicated to it, is but an inferior part of the works of creation. We believe ourselves to be animated with a much higher principle than brute matter; in viewing the manners and economy of the lower animals, we can scarcely avoid acknowledging even them to consist of something more than various modifications of matter and motion. The other planetary bodies which seem to be in circumstances nearly analogous to those of the earth, are surely, as well as it, destined for the habitations of rational,

Creation.

rational, intelligent beings. The existence of intelligences of a higher order than man, though infinitely below the Deity, appears extremely probable.—Of those spiritual beings called Angels we have express intimation in Scripture; (see the article ANGELS). Such are our notions concerning the existence of beings essentially distinct from matter, and in their nature far superior to it; these, too, must be the creatures of the Deity, and of his works of creation the noblest part. But the limits of creation we must not pretend to define. How far the regions of space extend, or how they are filled, we know not. How the planetary worlds, the sun and the fixed stars, are occupied, we do not pretend to have ascertained. We are even ignorant how wide a diversity of forms, what an infinity of living animated beings may inhabit our own globe. So confined is our knowledge of creation; yet so grand, so awful, that part which our narrow understandings can comprehend!

2
The periods of time at which God executed his works of creation.

Concerning the periods of time at which the Deity executed his several works of creation, it cannot be pretended that mankind have had opportunities of receiving very particular information. From viewing the phenomena of nature, and considering the general laws by which they are regulated, we cannot draw any conclusive or even plausible inference with respect to the precise period at which the universe must have begun to exist. We know not, nor can we hope to ascertain, whether the different systems of planets circulating round our sun and the other fixed stars, were all created at one period, or each at a different period. We cannot even determine, from any thing that appears on the face of nature, whether our earth was not created at a later period than any of her fellow planets which revolve round the same sun. Astronomers are, from time to time, making new discoveries in the heavens; and it is impossible to say whether some of these successive discoveries may not be owing to successive creations.

Philosophers have, indeed, formed some curious conjectures concerning the antiquity of the earth, from the appearances of its surface, and from the nature and disposition of its interior strata. The beds of lava in the neighbourhood of volcanoes have afforded ground for some calculations, which, though they do not fix the period of the earth's origin, are yet thought to prove that period to have been much more remote than the earliest age of sacred or profane history. * In the neighbourhood of Mount Ætna, or on the sides of that extensive mountain, there are beds of lava covered with a considerable thickness of earth; and at least another, again, which though known from ancient monuments and historical records to have issued from the volcano at least 2000 years ago, is still almost entirely destitute of soil and vegetation: in one place a pit has been cut through seven different strata of lava; and these have been found separated from each other by almost as many thick beds of rich earth. Now, from the fact that a stratum of lava 2000 years old is yet scantily covered with earth, it has been inferred by the ingenious canon Recupero, who has laboured 30 years on the natural history of Mount Ætna, that the lowest of these strata which have been found divided by so many beds of earth, must have been emitted from the volcanic crater at least 14,000 years ago; and consequently that the age of the earth, whatever it may exceed this term of years, cannot possibly be less. Other facts of a similar nature likewise concur to justify this conjecture.

* *Brydon's Tour through Sicily and Malta.*

But all these facts are as nothing in comparison with the long series which would be requisite to establish such a conjecture as an incontrovertible truth. And besides, any evidence which they can be supposed to afford, may be very easily explained away. The bed of lava which in the course of 2000 years has scarce acquired a covering of earth, is confessed to stand in a situation in which it is exposed to the spray of the sea, and to all the violence of winds and rains. In such a situation, it cannot be thought that a thick bed of earth could, in any length of time, be formed on it: we might as well expect depth of soil, and vigorous vegetation, on the craggy cliffs of hills. In crevices here and there over it, in which the earth has been retained, there is a depth of soil which supports large trees. This fact, therefore, admits of no such inference as that which Recupero has pretended to deduce from it. The local circumstances, again, of the seven strata that have been pierced through, are very different. They are situated at Jaci Reale, in a situation where showers of ashes from the volcano must frequently fall; and where whatever falls must be naturally retained and accumulated:—so that seven beds of earth might be formed on these seven strata of lava much sooner than one thin layer could be formed on the stratum above mentioned. In other places, some of which are within the influence of the same awful volcano, and some adjacent to that of Vesuvius, soil is known to have accumulated on lava with the help of showers of ashes from the volcanoes, with sufficient rapidity to justify this supposition concerning the coverings of the strata at Jaci Reale. From the observation of these phenomena of volcanoes, therefore, no facts have been gained that can help us to determine with any certainty the earth's age. And so wide is the variety of circumstances to be here taken into account, that it cannot be hoped that this *desideratum* will be ever supplied from that quarter. See farther the article EARTH.

But by examining the composition and arrangement of the interior strata of the globe, and by viewing the general appearance of its surface, the ingenuity of philosophers has, with better hopes, sought to guess at the length of time during which it must have existed. Observing the exuviæ of sea and land animals deposited at profound depths under ground, and accompanied with vegetable bodies in a good state of preservation, as well as with oleaginous and bituminous substances which have in all probability been formed from vegetable bodies; and remarking at the same time with what confusion the other materials, composing the crust of this terrestrial ball, are, in various instances not arranged, but cast together; they have concluded that the earth must have existed for many an age before the earliest events recorded in sacred or profane history, and must have undergone many a revolution, before it settled in its present state. Such at least are the ideas which Buffon and M. de Luc, and also Dr Hutton †, seem desirous to impress us with concerning its changes and antiquity. It will be only doing justice to these philosophers to acknowledge, that they

† *Ed. Phil. Trans.* vol. i.

Creation. they have collected, with amazing induftry, almoft every fact in the natural hiftory of the earth that can ferve to give plaufibility to their conjectures. But ftill their facts, befides the inconfiftency of many of them, are by far too fcanty to warrant the conclufions which they have deduced from them. See the article EARTH.

3 Accounts of the antiquity of the earth in profane hiftory.

The voice of profane hiftory is far from being decifive concerning the age of the world; nor is it to be expected that it fhould. When the earth firft arofe into exiftence, we can be at no lofs to conceive that mankind were not fpectators of the event; and we may naturally imagine that the firft human beings who occupied it, would be too much bufied in furnifhing themfelves with the immediate neceffaries and the conveniences of life, to think of curious refearches into its origin, or even their own. Profane hiftory is not, however, without accounts of the age of the earth and the origin of human fociety; but thofe accounts are various and contradictory.—Plato in his dialogue entitled *Critias*, mentions his celebrated Atalantis to have been buried in the ocean about 9000 years before the age in which he wrote. He afferts it to have been well known to the Egyptian priefts and to the contemporary inhabitants of Attica. The learned world, indeed, generally agree in regarding his accounts of that ifland as a fiction, which the author himfelf did not defign to be underftood in any other light: fome, however, are more credulous, and others go fo far as to acknowledge doubts: and, if the exiftence of fuch an ifland, at a period fo diftant, be admitted as a fact worthy of any credit, the age of the world may be reckoned as at leaft confiderably more than 12,000 years. The pretenfions of the Chinefe reprefent the world as fome hundreds of thoufands of years older: and we are alfo told * that the aftronomical records of the ancient Chaldeans carried back the origin of fociety to a very remote period; no lefs than 473,000 years. The Egyptian priefts reckoned between Menes and Sethon 341 generations †. But thefe accounts are fo difcordant, and fo flenderly fupported by evidence, that we cannot hefitate to reject them all as falfe; the fables of hiftorians fcarce merit fo much attention as the hypothefes of philofophers.

* Univerfal Hift. vol. i. Preface.

† Herod. l. ii. c. 142.

4 The era of the creation as ftated in facred hiftory.

When from profane we turn to facred hiftory, we may reafonably expect more accurate and more credible information concerning the antiquity of the globe. As the authenticity of the Holy Scriptures is fo incontrovertibly eftablifhed, wherever they afford evidence concerning any fact, that evidence muft be regarded as decifive. A fact fo important as the prefent may be thought highly worthy of a place in them. Unfortunately, however, even the facred writings do not fix the era of the creation with fufficient accuracy; they leave us, in fome meafure, at a lofs whether to extend what they fay concerning that era to the whole contents of created fpace, or to confine it to our earth and its inhabitants: different copies give different dates; and even in the fame copy, different parts relating the fame events, either difagree or do not fpeak decifively with regard to the length of the time in which they paffed.—In the beginning of the fixth chapter of the firft book of Kings, the time which elapfed between the departure of the children of Ifrael from Egypt, and the period at which Solomon laid the foundation of his temple, is faid to have been 480 years: And in the book of Judges again, the age of all the patriarchs amounts to 592 years ‡. The Hebrew copy of the Bible, which we Chriftians for good reafons confider as the moft authentic, dates the creation of the world 3944 years before the Chriftian era. The Samaritan Bible, again, fixes the era of the creation 4305 years before the birth of Chrift. And the Greek tranflation, known by the name of the *Septuagint* verfion of the Bible, gives 5270 as the number of the years which intervened between thofe two periods. As many other different calculations of the years contained in the fame intermediate fpace of time, might be formed upon other dates in the facred volume, differing in the different copies. By comparing the various dates in the facred writings, examining how thefe have come to difagree and to be diverfified in different copies, endeavouring to reconcile the moft authentic profane with facred chronology, and eking out deficiency of dates and evidence with conjecture; fome ingenious men have formed fchemes of chronology, plaufible indeed, but not fupported by fufficient authorities, which they would gladly perfuade us to receive in preference to any of thofe above mentioned. Ufher makes out from the Hebrew Bible 4004 years, as the term between the creation and the birth of Chrift: Jofephus, according to Dr Wills and Mr Whifton, makes it 4658 years; and M. Pezron, with the help of the Septuagint, extends it to 5872 years. Ufher's fyftem is the moft generally received.

‡ Univerfal Hift. vol. i. Preface.

But though thefe different fyftems of chronology are fo inconfiftent and fo flenderly fupported, yet the differences among them are fo inconfiderable in comparifon with thofe which arife before us when we contemplate the chronology of the Chinefe, the Chaldeans, and the Egyptians, and they agree fo well with the general information of authentic hiftory and with the appearances of nature and of fociety, that they may be confidered as nearly fixing the true period of the creation of the earth.

5 No information on this head to be obtained from any other fource but facred hiftory.

Profane hiftory cannot be expected to contain an account of the firft events which paffed after the creation of the fubftances of which the univerfe confifts. The conjectures of ancient philofophers on this fubject cannot merit attention; for vague tradition, and the appearances of nature, the only data on which they could proceed in forming their conjectures, could admit of no fair injunctions concerning thofe events; and befides, inftead of liftening to tradition, or examining the appearances of nature, they generally confulted imagination, and imagination alone, on fuch occafions. Here, therefore, we have nothing to hope but from the facred writings. From them we may expect hiftorical information, not to be obtained from any other fource. What they communicate is communicated on divine authority; and it is only on fuch authority we can receive any accounts concerning the creation.

6 Hints concerning the creation in the book of Job.

A few hints in the book of Job afford the earlieft information to be found in the fcriptures concerning the creation of the world. "Where waft thou when I laid the foundations of the earth, when the morning ftars fang together, and all the fons of God fhouted for joy * ?" "Behold, he put no truft in his fervants, and

* Chap. xxxviii. ver. 4. & 7.

Creation.

and his angels he charged with folly *." "And unto man (or to Adam), he said, Behold, the fear of the Lord is wifdom, and to depart from evil is underftanding †." Thefe paffages rather hint at than relate facts. But it has been inferred from them, that there were ftars in the firmament, and angels in heaven, before the formation of our globe; that angels as well as man have fallen; and that other injunctions, befides that of abftaining from the forbidden fruit, were laid on Adam when he was firft placed in Paradife ‡. If the interpretation be admitted as juft, the firft of thefe facts may be confidered as forming, as it were, a point with which our knowledge of the works of the Deity commences: the period of time at which the fecond event took place is not fpecified: and the precept to Adam muft no doubt have been uttered after he was formed and infpired with intelligence. Yet with regard to the firft of the above quotations from the book of Job, the only one that is of importance to us at prefent, it muft be acknowledged, that it has been differently underftood. The morning ftars might fing together, and the fons of God fhout for joy, on account both of their own creation and of the creation of the earth at one time; and yet Job, having been himfelf made a confcious being at a much later period, not be able to tell where he was at that era of exulting gratitude and congratulation.

* Chap. iv. ver. 18.

† Ch. xxviii. ver. 28.

‡ *Milne's Lectures*, Lect. I.

7 Mofaic account of the creation.

Mofes relates, that || "in the beginning God created the heavens and the earth. And the earth (continues he) was without form and void; and darknefs was upon the face of the deep: and the fpirit of God moved upon the face of the waters. And God faid, Let there be light; and there was light. And God faw the light, that it was good: and God divided the light from the darknefs. And God called the light day, and the darknefs he called night: and the evening and the morning were the firft day." During five fucceeding days the work of creation was carried on. On the fecond day, a firmament was made to feparate the waters, and that firmament called *heaven*: on the third day the waters were collected into feas, and the land from which the waters retired caufed to produce grafs and trees and other plants: on the fourth day, lights were made to appear in the firmament; to enlighten the earth, to divide the day from the night, and to diftinguifh time into feafons and years: on the fifth day the feas were peopled with whales and other fifhes, and the air with fowls: on the fixth day, the earth was furnifhed with reptiles and quadrupeds of all kinds; and on the fame day, the firft human pair, the progenitors of all the human race, were created in God's own image.

|| Gen. i. 1.

8 Difficulties occurring in the above account.

Some difficulties occur in comparing this account of the creation with the laws which appear at prefent to regulate the fyftem of nature. We find it hard to conceive how the earth, while yet a ftranger to the influence of the fun, could experience the viciffitude of day and night; and are aftonifhed at the rapidity with which trees and herbage firft overfpread its furface. The condition of matter when the earth was without form and void, and the operation of the fpirit of God on the face of the waters are equally myfterious.

9 Attempts to folve thofe difficulties. Dr Burnet's theory.

Some ingenious men have eagerly laboured to remove thefe difficulties. Among thefe is Dr Burnet, whofe theory of the earth has now been long confidered as fanciful and ill-founded. He fuppofes all the celeftial bodies, even the fun and all the other planets of the folar fyftem, to have exifted long before the earth. The chaos on which the fpirit of God moved, confifted, according to him, of the firft principles from which all terreftrial bodies have been formed. When thofe laws by which the material world is regulated firft began to operate on the mafs, he fuppofes that its groffer and heavier parts would fink towards the centre, and there form a folid ball. Around this folid ball two fpecies of particles would ftill float together in confufion. Of thefe he thinks one, being more volatile, would by degrees make its efcape from the other, would leave it ftill recumbent on the folid centre, and fpread around it in an atmofphere. The middle ftratum he compofes of aqueous and oleaginous fluids; and he makes no doubt, that after the air had made its efcape, the levity of the oleaginous fluids would enable them to rife above the aqueous, and difpofe themfelves next the furface of the liquid mafs. On them he fuppofes the impure atmofphere to have then depofited a quantity of terrene particles, fufficient to form, by intermixture with the oils, a thick cruft of rich earth for the production of plants and herbage, and to afford an habitation to animals. This delicate fhell he was careful not to furrow with feas or load with mountains: either of thefe would have reduced all to confufion. Such is his earth; and after moulding it with fo much ingenuity, and into fo happy a form, he contents himfelf, without venturing to ufe the fame freedoms with the remaining part of Mofes's account of the creation.

10 Objection to Dr Burnet's theory.

But Mofes affords nothing that can be with any propriety ufed in the foundation of fuch a theory: he tells not whether the chaos confifted of thofe terrene, and aqueous, and oleaginous, and aerial particles which Dr Burnet finds in it; he confines not the feas within a cruft of earth; nor does he inform us that the fcenery of nature was not diverfified by hills and vales. Befides the author of this theory has, without any evidence, fuppofed matter to have been originally under the influence of laws very different from thofe by which it is at prefent regulated. Oil, indeed, while fluid, floats above water: but in a concrete ftate, it finks in water like other folid bodies. If reduced into that ftate by combination with terrene matters, fufficient to render the mixture proper for the nourifhment and production of vegetables, its fpecific gravity will be ftill greater, and it will confequently fink fo much the fooner. How a concrete fubftance, confifting of earth and oil, could float on water, appears an inexplicable enigma. But we need not here take farther pains in combating and triumphing over this theory, which has long fince fallen and funk to its grave.

11 Mr Whifton's theory.

Mr Whifton treats both the fcriptures and the laws of nature with greater reverence. Yet he certainly involves himfelf in no trifling difficulties in attempting to folve thofe which Mofes prefents. He fuppofes the fun, moon, and ftars, to be all more ancient than the earth. The chaos from which the earth was formed he reprefents as having been originally the atmofphere of a comet. The fix days of the creation he would perfuade us to believe equal to fix of our years:

years: for he is of opinion, that the earth did not revolve daily round its axis, but only annually round its orbit, till after the fall of man.

On the firſt day or year, therefore, the more ponderous parts of the chaos were, according to this theory, conglomerated into an orb of earth, the chinks and interſtices over that orb filled up with water, and the exterior part or atmoſphere rarefied, ſo as to admit ſome faint glimmering of the rays of the ſun.

On the ſecond day, the atmoſphere was diffuſed to its due extent around the earth, and reduced to a degree of rarity and purity which rendered it ſtill more ſuitable for the tranſmiſſion of light; the earth was ſtill more conſolidated; and the waters being almoſt entirely excluded from the interſtices which they before occupied, were partly ſpread over the ſurface of the earth, and partly raiſed in vapour into the atmoſphere or firmament.

On the third day, the earth's ſurface became ſo irregular, in one place riſing into hills, in another ſinking into vales, as to cauſe the waters, which were before equally diffuſed, to collect into ſeas and lakes, leaving large tracts of ground unoccupied. And no ſooner was a part of the earth's ſurface left bare by the waters, than the general influence of the ſun produced on it a rich covering of herbage, and all the different ſpecies of vegetables.

On the fourth day, the earth was rendered ſubject to the regular influence of the ſun, moon, and ſtars.

On the fifth day or year, things were ſo far advanced, that fiſhes and fowls were now produced from the waters.

On the ſixth day was the earth furniſhed with animals; and the lord of all the other animals, man, was now created.

12
Objections to Mr Whiſton's theory.

Such is Mr Whiſton's account of the phenomena of the Moſaic creation. But he likewiſe aſſumes much more than can be reaſonably granted. The atmoſphere of a comet could not well be the primitive chaos: it is not an obſcure, but a pellucid fluid; and its exterior ſtrata, if of the ſame nature with the matter of our earth, muſt be ſcorified by its near approaches to the ſun. Had the earth not begun to move round its axis till after the work of creation was completed, the immoderate degrees of heat and cold which its different parts would have alternately felt, would in all probability have proved fatal to both plants and animals. Even the moſt artful interpretation of Moſes's words cannot repreſent him as meaning to inform us that the ſun and moon were created at different periods. But philoſophy will ſcarce permit us to imagine that the moon was formed before the earth. And therefore we cannot upon good grounds agree with Mr Whiſton, that the creation of the earth was later than that of the other bodies of the ſolar ſyſtem.

13
M. de Luc's theory and objections.

Among others who have endeavoured to explain the original formation of the earth, and the changes which it has undergone, is M. de Luc. This coſmologiſt, like Mr Whiſton, thinks that the days of the creation were much longer periods of time than our preſent days. He ſeems to think that the earth had exiſted long before the Moſaic creation; but began at that era to experience new changes, and to be regulated by new laws: that all the different events deſcribed by Moſes in his hiſtory of the creation, actually took place in the order in which he relates them; but that Moſes's days are indefinite ſpaces of time, which muſt have been very long, but of which we cannot hope to aſcertain the preciſe length. Theſe are ingenious conjectures; but they do not appear neceſſary, nor are they juſtified by facts. For a fuller and more cloſe inveſtigation of this part of the ſubject, we muſt refer to the article EARTH: and ſhall now cloſe the preſent article with a ſhort explanation of what appears to us the moſt natural way of underſtanding Moſes's account of the creation.

It has been conjectured *, with great probability, that the creation of which Moſes is the hiſtorian, was neither confined to the earth alone, nor extended to the whole univerſe. The relation which all the planets of the ſolar ſyſtem bear to the ſame illuminating body countenances the conjecture, that they, together with the luminary by which they are enlightened were all created at one period: but it would perhaps be to conceive too meanly of the benevolence, wiſdom, and active power of the Deity, to ſuppoſe that before that period theſe had never been exerted in any work of creation. Yet even here we have not demonſtrative evidence.

* *Univerſal Hiſt.* vol. i. p. 85.

On the ſuppoſition that the whole ſolar ſyſtem was created at once, which has at leaſt the merit of doing no violence to the narrative of Moſes, the creation of the ſun and the other planets may be underſtood to have been carried on at the ſame time with the creation of the earth. In that caſe, even in the courſe of the firſt day, though not longer than our preſent days, thoſe bodies might be reduced to ſuch order, and their relative motions ſo far eſtabliſhed, as to begin the diſtinction between light and darkneſs, day and night.

On the ſecond day, we may naturally underſtand from Moſes's narrative, that the atmoſphere was purified, and the ſpecific gravities of aqueous vapour and atmoſpheric air ſo adjuſted, as to render the latter capable of ſupporting the former.

On the third day the waters were firſt collected into lakes and ſeas: but in what manner, we cannot well determine. Some call in the operation of earthquakes; others tell us, that when the earth was firſt formed, the exterior ſtrata, were, at different parts over its ſurface, of different ſpecific gravities; and that the more ponderous parts now ſunk nearer the common centre, while the lighter parts ſtill remaining equally remote from it as before, formed iſlands, continents, hills, and mountains. But theſe are mere fancies; and we have no facts to offer in their ſtead. On the latter part of this day vegetables were cauſed to ſpring up over the earth. Their growth muſt have been much more rapid than we ever behold it now; but by what particular act of ſupernatural power that might be effected, we ſhould in vain inquire.

On the fourth day the ſun, moon, and ſtars, were made to appear. But according to the conjecture which we have mentioned, as plauſible, though without aſcribing to it the evidence of certain truth, thoſe heavenly bodies are to be conſidered as having been created before this day. But they might now begin to exert their full influence on the earth in the ſame manner as they have ſince continued to do.

The creation of the inanimate world was now fi-

 niſhed,

nished, and the earth prepared for the reception of animals. On the fifth day, therefore, were the living inhabitants of the air and the waters created.

On the sixth day the inferior animals inhabiting the earth were first created; and after that, the whole work was crowned by the creation of a male and female of the human species. To the account of the creation of the animals, nothing certain can be added in explanation of Moses's narrative. No more but one pair of the human species were at first created: the same economy might possibly be observed in the creation of the inferior animals.

CREBILLON, Prosper Joliot de, a French writer of tragedy, and usually ranked after Corneille and Racine, was born at Dijon in 1674. He was originally destined to the profession of the law, and placed at Paris with that view; but the impetuosity of his passions rendering him unfit for business, he was urged by some friends, who discerned very well his natural turn, to attempt dramatic compositions. He complied, but not till after many refusals; and gave at length a tragedy, which met with great success. He then marched on in the career he had begun, but was checked by a fit of love for an apothecary's daughter; which fit of love ended in marriage. His father, doubly enraged at his son for thus surrendering himself to the two demons of Love and Poetry, disinherited him; but falling sick some years after, in 1707, he re-established him in all his rights, and died. Crebillon was, however, little better for his acquisitions, the greatest part being probably wasted before they came; and thus, though high in fame, and at the prime of life, he still continued poor. He lost his wife in 1711, and fortune long frowned upon him, till at last he obtained a place in the French academy, and the employment of censor of the police. He was afterwards in more prosperous circumstances, which continued to the end of a long life. He died in 1762, at the age of 88, much regretted on account of his numerous virtues. He was of a temperament extremely robust, without which he could not have held out so long; for he ate prodigiously, and continued to the last so to do. He slept little, and lay as hard as if upon the floor; not from any pious principle of mortifying, but because he liked it. He was always surrounded with about 30 dogs and cats; and used to smoke a good deal of tobacco, to keep his room sweet against their exhalations. Whenever he was ill, he used to manage himself according to his own fancy and feelings; for he made a jest of physic and physicians. He was a dealer in *bon mots*. Being asked one day in full company, which of his works he thought the best? "I don't know (says he) which is my best production; but this (pointing to his son) is certainly my worst."

CRECY, Crescy, or Cressy. See Cressy.

CREDENTIALS, letters of recommendation and power, especially such as are given to ambassadors or public ministers, by the prince or state that sends them to foreign courts.

CREDIBILITY, a species of evidence, less indeed than absolute certainty or demonstration, but greater than mere possibility; it is nearly allied to probability, and seems to be a mean between possibility and demonstration.

CREDIT, in *Commerce*, a mutual trust or loan of merchandise or money, on the reputation of the probity and solvability of a dealer.

Credit is either public or private. Every trader ought to have some estate, stock, or portion of his own, sufficient to carry on the traffic he is engaged in: they should also keep their dealings within the extent of their capital, so that no disappointment in their returns may incapacitate them from supporting their credit. Yet traders of worth and judgment may sometimes lie under the necessity of borrowing money for carrying on their business to the best advantage; but then the borrower ought to be so just to his own reputation, and to his creditors, as to be well assured that he has sufficient effects within his power to pay off his obligations in due time. But if a trader should borrow money to the extent of his credit, and launch out into trade so as to employ it with the same freedom as if it was his own proper stock, such a way of management is very precarious, and may be attended with dangerous consequences. Merchants ought never to purchase their goods for exportation upon long credit, with intent to discharge the debt by the return of the same goods; for this has an injurious influence on trade several ways; and if any merchant has occasion to make use of his credit, it should always be for the borrowing of money, but never for the buying of goods; nor is the large credit given to wholesale traders a prudential or justifiable practice in trade.

The public credit of a nation is said to run high when the commodities of that nation find a ready vent, are sold at a good price, and when dealers may be safely trusted with them: also when lands and houses find ready purchasers; when money is to be borrowed at a low interest; when people think it safe and advantageous to venture large stocks in trade; and when notes, mortgages, &c. will pass for money.

Letters of Credit, are those given to persons in whom a merchant, &c. can trust, to take money of his correspondent abroad, in case he happens to need it.

Credit is also used for the currency which papers or bills have in the public or among dealers. In this sense credit is said to rise, when in negociating the shares of the company, they are received and sold at prices above *par*, or the standard of their first creation. Discredit is opposed to credit, and is used where money, bills, &c. fall below *par*.

Credit was also anciently a right which lords had over their vassals; consisting in this, that during a certain time they might oblige them to lend them money. In this sense, the duke of Brittany had credit during fifteen days on his own subjects, and those of the bishop of Nantes; and the bishop had the same credit or right among his subjects and those of that prince.

CREDITON, a market town in Devonshire, considerable for a good woollen manufactory; it is situated about 9 miles north-west of Exeter, in W. Long. 3. 50. and N. Lat. 50. 50.

CREDITOR, a person to whom any sum of money is due, either by obligation, promise, or otherwise. See Debt.

CREDULITY denotes a weakness of mind, by reason of which a person yields his assent to propositions

tions or facts, before he has considered their evidence.

CREECH, Thomas, eminent for his translations of ancient authors both in prose and verse, was son of Thomas Creech, and born near Sherborne in Dorsetshire in 1659. He was educated in grammar learning under Mr Curganven of Sherborne, to whom he afterwards dedicated a translation of one of Theocritus's Idylliums: and entered a commoner of Wadham college in Oxford in 1675. Wood tells us that his father was a gentleman; but Giles Jacob says, in his Lives and Characters of English poets, that his parents circumstances not being sufficient to afford him a liberal education, his disposition and capacity for learning raised him up a patron in Colonel Strangeways, whose generosity supplied that defect. Be that as it will, Creech distinguished himself much, and was accounted a good philosopher and poet, and a diligent student. June 13. 1683, he took the degree of master of arts, and not long after was elected probationer fellow of All-souls college; to which, Jacob observes, the great reputation acquired by his translation of Lucretius recommended him. Wood tells us, that upon this occasion he gave singular proofs of his classical learning and philosophy before his examiners. He also took the degree of B. D. on the 18th of March 1696. He now began to be well known by the works he published; but Father Niceron observes, that they were of no great advantage to his fortune, since his circumstances were always indifferent. In 1699, having taken holy orders, he was presented by his college to the living of Welwynn in Hertfordshire; but this he had not long enjoyed before he put an end to his own life. The motives of this fatal catastrophe have been variously represented. The author of the *Nouvelles de la Republique des Lettres* informs us, that in the year 1700 Mr Creech fell in love with a woman who treated him with great neglect, though she was complaisant enough to several others. This affront he could not bear, and resolved not to survive it. Whereupon he shut himself up in his study, where he hanged himself about the end of June 1700, and was found in that situation three days after. The Poetical Register says nothing of the particular manner of his death, but only that he unfortunately made away with himself in the year 1701; and ascribes this fatal catastrophe of Mr Creech's life to the morosenefs of his temper, which made him less esteemed than his great merit deserved, and engaged him in frequent animosities and disputes upon that account. But from an original letter of Arthur Charlett, preserved in the Bodleian library, it has lately been discovered, that this unhappy event was owing to a very different cause. There was a fellow collegian of whom Creech frequently borrowed money: but repeating his applications too often, he met one day with such a cold reception, that he retired in a fit of gloomy disgust, and in three days was found hanging in his study. Creech's principal performances are, 1. A translation of Lucretius. 2. A translation of Horace; in which, however, he has omitted some few odes. 3. The Idylliums of Theocritus, with Rapin's Discourse of Pastorals. 4. A translation of Manilius's Astronomicon. Besides translations of several parts of Virgil, Ovid, and Plutarch; printed in different collections.

CREED, a brief summary of the articles of a Christian's belief.

The most ancient form of creeds is that which goes under the name of the apostolic creed: besides this, there are several other ancient forms and scattered remains of creeds to be met with in the primitive records of the church. The first is the form of apostolical doctrine, collected by Origen; the second is a fragment of a creed preserved by Tertullian; the third remains of a creed is in the works of Cyprian; the fourth, a creed composed by Gregory Thaumaturgus, for the use of his own church; the fifth, the creed of Lucian the martyr; the sixth, the creed of the apostolical constitutions. Besides these scattered remains of the ancient creeds, there are extant some perfect forms, as those of Jerusalem, Cæsarea, Antioch, &c.

The most universal creeds are, the Apostolical, the Athanasian, and the Nicene creeds. See these articles.

These three creeds are used in the public offices of the church of England; and subscription to them is required of all the established clergy. Subscription to these was also required of the dissenting teachers, by the toleration act; but from which they are now relieved by 19 Geo. III.

CREEK, a part of a haven, where any thing is landed from the sea. So many landing places as there are in a harbour or port, so many creeks there are. It is also said to be a shore or bank whereon the water beats, running in a small channel from any part of the sea; from the Latin *crepido*. This word is used in the stat. 4 Hen. IV. c. 20. and 5 Eliz. c. 5.

CREENGLES. See Cringle.

CREEPER. See Certhia, Ornithology *Index*.

Creeper, in naval affairs, an instrument of iron resembling a grappling, having a *shank*, and four hooks or claws. It is used to throw into the bottom of any river or harbour, with a rope fastened to it, to hook and draw up any thing from the bottom which may have been lost. See Plate CL.

CRELLIUS, John, a famous Socinian, born in 1590, in a village near Noremberg. In 1612, he went into Poland, where the Unitarians had a school, in which he became professor of divinity, and minister at Crackow, where he died in 1632, aged 42. He was the author, 1. Of a famous Treatise against the Mystery of the Trinity; 2. Commentaries on a part of the New Testament; and other works. All of them are scarce.

CREMA, a city and bishop's see of Italy, capital of a district of the Milanese, called from it *Cremasco*; it stands almost in the middle between Milan and Mantua, in E. Long. 10. 15. and N. Lat. 45. 20.

CREMASTER, in *Anatomy*, the name of a muscle of the testicle, of which there is one on each side. See Anatomy, *Table of the Muscles*.

CREMATION is sometimes used for burning, particularly when applied to the ancient custom of burning the dead. This custom is well known to have prevailed among most eastern nations, and continued with their descendants after they had peopled the different parts of Europe. Hence we find it prevailing in Greece, Italy, Gaul, Britain, Germany, Sweden, Norway, and Denmark, till Christianity abolished it.

CREMONA,

CREMONA, in *Ancient Geography*, a Roman colony, with municipal rights, settled beyond the Po, below the confluence of the Addua, on the report of Hannibal's march into Italy (Polybius): a town at this day still maintaining its name and flourishing state. It was an opulent and mercantile city; but suffered greatly in the civil wars of Augustus (Virgil). In the war with Vitellius, it was destroyed by the partizans of Vespasian; but was soon after rebuilt by the munificence of the citizens and exhortations of Vespasian, (Tacitus.) Now capital of the Cremonese, in the duchy of Milan. E. Long. 10. 30. N. Lat. 45.

CRENATED, a term used in botany. See Botany *Index*.

CRENELLE, or Imbattled, in *Heraldry*, is used when any honourable ordinary is drawn, like the battlements on a wall to defend men from the enemies shot. This attribute belongs to the arms of such as have defended castles for their prince or country, or of such as are skilled in architecture.

CRENOPHYLAX, in antiquity, a magistrate of Athens, who had the inspection of fountains.

CREODIBA, in the customs of the middle age, a robbery and murder committed in a wood, where the body of the person killed was burnt in order to prevent any discovery of the crime. The word, says Wendelinus, is compounded of *cruy* and *diven*, that is, "wood-robbers."

CREOLES, a name originally given to the families descended from the Spaniards who first settled at Mexico in America. These are much more numerous than the Spaniards properly so called, and the Mulattoes, which two other species of inhabitants they distinguish; and are excluded from all considerable employments. It is now used in a more extensive sense, and applied to all natives of the West Indies.

CREON, king of Corinth, was son of Sisyphus. He promised his daughter Glauce to Jason, who had repudiated Medea. To revenge the success of her rival, Medea sent her for a present a gown covered with poison. Glauce put it on, and was seized with sudden pains. Her body took fire, and she expired in the greatest torments. The house also was consumed by the fire, and Creon and his family shared Glauce's fate.

Creon, son of Menœtius, was father to Jocasta, the wife and mother of Oedipus. At the death of Laius, who had married Jocasta, Creon ascended the vacant throne of Thebes. As the ravages of the Sphynx were intolerable, Creon offered his crown and daughter in marriage to him who could explain the enigmas which the monster proposed. Oedipus was happy in his explanations, and he ascended the throne of Thebes, and married Jocasta without knowing that she was his mother, and by her he had two sons, Polynices and Eteocles. These two sons mutually agreed after their father's death to reign in the kingdom each a year alternately. Eteocles first ascended the throne by right of seniority; but when he was once in power he refused to resign at the appointed time, and his brother led against him an army of Argives to support his right. The war was decided by a single combat between the two brothers. They both killed one another, and Creon ascended the throne till Leodamus the son of Eteocles should be of sufficient age to assume the reins of government. In his regal capacity he commanded that the Argives, and more particularly Polynices, who was the cause of all the bloodshed should remain unburied. If this was in any manner disobeyed, the offenders were to be buried alive. Antigone the sister of Polynices transgressed, and was accordingly punished. Hæmon the son of Creon, who was passionately fond of Antigone, killed himself on her grave, when his father refused to grant her pardon. Creon was afterwards killed by Theseus, who had made war with him because he refused burial to the Argives.

CREPANCE, in the manege, a chop or cratch in a horse's leg, given by the spunges of the shoes of one of the hinder feet crossing and striking against the other hinder foot. This cratch degenerates into an ulcer.

CREPIDÆ, among the Romans, a kind of slippers or shoes, which were always worn with the *pallium*, as the *calcei* were with the *toga*.

CREPIS, Hawk-weed, a genus of plants belonging to the syngenesia class; and in the natural method ranking under the 49th order, *Compositæ*. See Botany *Index*.

CREPITATION, that noise which some salts make over the fire in calcination, called also *detonation*.

Crepitation is also used in surgery, for the noise made by the ends or pieces of bones, when the surgeon moves a limb to assure himself by his ear of the existence of a fracture.

CREPUNDIA, in antiquity, a term used to express such things as were exposed along with children, as rings, jewels, &c. serving as tokens whereby they afterwards might be known.

CREPUSCULUM in *Astronomy*, twilight; the time from the first dawn or appearance of the morning to the rising of the sun; and again, between the setting of the sun and the last remains of day.

Papias derives the word from *creperus;* which, he says, anciently signified *uncertain*, *doubtful*, q. d. *a dubious light*. The crepusculum is usually computed to begin and end when the sun is about 18 degrees below the horizon; for then the stars of the sixth magnitude disappear in the morning and appear in the evening. It is of longer duration in the solstices than in the equinoxes, and longer in an oblique than in a right sphere.

The crepuscula are occasioned by the sun's rays refracted in our atmosphere, and reflected from the particles thereof to the eye. See Twilight.

CRESCENT, the new moon, which as it begins to recede from the sun, shows a little rim of light, terminating in points or horns, which are still increasing till it become full and round in the opposition. The word is formed from *cresco*, "I grow."

The term is also used for the same figure of the moon in its wane or decrease, but improperly; because the points or horns are then turned towards the west, whereas they look to the east in the just crescent.

Crescent, in *Heraldry*, is a bearing in form of a half moon. The Ottomans bear sinople, a crescent montant, argent.

The

The crescent is frequently used as a difference in coat armour, to distinguish it for that of a second brother or junior family.

The figure of the crescent is the Turkish symbol; or rather is that of the city Byzantium, which bore this device from all antiquity; as appears from medals struck in honour of Augustus, Trajan, &c.

The crescent is sometimes montant, i. e. its points look towards the top of the chief, which is its most ordinary representation; whence some contend, that the crescent, absolutely so called, implies that situation; though other authors blazon it montant, when the horns are towards the dexter side of the escutcheon, in which position others call it *incroissant*.

Crescents are said to be *adossed*, when their backs or thickest parts are turned towards each other; their points looking to the sides of the shield. *Crescent inverted*, is that whose points look towards the bottom; *turned crescents* are placed like those adossed; the difference is, that all their points look to the dexter side of the shield: *conturned crescents*, on the contrary, look to the sinister side: *affronted* or *appointed crescents*, are contrary to the adossed, the points looking towards each other.

CRESCENT is also the name of a military order, instituted by Renatus of Anjou, king of Sicily, &c. in 1448; so called from the badge or symbol thereof, a crescent of gold enamelled. What gave occasion to this establishment was, that Renatus took for his device a crescent, with the word *loz*, "praise," which, in the style of rebus, makes *loz in crescent*, q. d. *by advancing in virtue, one merits praise*.

CRESCENTIA, the CALABASH TREE; a genus of plants belonging to the didynamia class; and in the natural method ranking under the 25th order, *Putamineæ*. See BOTANY *Index*.

The shells of calabashes are made use for various purposes. At Barbadoes, besides drinking-cups and punch bowls, there are made of them spoons, dishes, and other utensils for the slaves. Some of these shells are so large, as to be capable of holding 15 pints of water. The pulp is seldom eaten, except by cattle in the time of drought. The wood, which is hard and smooth, is made into stools, chairs, and other furniture.

CRESCIMBENI, JOHN MARIA, an Italian poet, was born at Macerata in Anconia, 1663. His talents for poetry and eloquence developed themselves early. His verses at first had too much pomp and point; but residing in Rome, and reading the best Italian poets, brought him back to nature. He not only reformed himself, but undertook to reform bad taste in general. From this motive he projected the establishment of a new academy, under the name of *Arcadia;* the members of which at first did not exceed 14, but afterwards increased much. They called themselves the shepherds of Arcadia, and each took the name of some shepherd and some place in that ancient kingdom. The founder of this society was appointed the director of it in 1690, and held this honourable post 38 years; namely, to the year of his death, which happened in 1728. Among a great number of works, in verse and prose, the principal is, A History of the Italian Poetry, very much esteemed, and reprinted, in 1731, at Venice, in six volumes 4to. This history is accompanied with a commentary, containing anecdotes of Italian poets. He published also A History of the Academy of Arcadia, together with the lives of the most illustrious Arcadians: and many other works.

CRESCY, or CRESSY. See CRESSY.

CRESS, WATER CRESS, or CRESSES. See SISYMBRIUM, BOTANY *Index*.

Indian Cress. See TROPÆOLUM, BOTANY *Index*.

CRESSY, a port town of Picardy in France, about 44 miles south of Calais, and 27 north-west of Abbeville, remarkable on account of the victory obtained there over the French by Edward III. of England, in the year 1346. E. Long. 2. 0. N. Lat. 50. 20.

Edward having encountered and overcome many difficulties in his expedition, was at last so closely followed and harassed by the French army, commanded by the king of France in person, that he determined to make a stand at this place, and to give his pursuers a check. For this purpose he chose his ground with great judgment, on the gentle declivity of a hill, with a thick wood in his rear. He ordered deep entrenchments to be made on each flank, and waited with firmness the approach of his enemies. The king of France, dreading nothing so much as the escape of the English, began the march of his great army from Abbeville early in the morning, August 26. and continued it several hours with great eagerness, till he received intelligence that the English had halted at Cressy, and were prepared to give him battle. He was advised at the same time not to engage that day, when his troops were much fatigued with their march, and in great disorder; and he was disposed to have taken this advice. But the discipline of these times was so imperfect, that the orders given for halting were not obeyed; and one corps of this mighty host impelling another, they continued advancing till they came into the presence of their enemies in much confusion.

Edward had employed the forenoon of this important day in drawing up his army in the most excellent order, in three lines. The first line, which consisted of 800 men at arms, 4000 English archers, and 600 Welsh foot, was commanded by his young, amiable, and heroic son, the prince of Wales, assisted by the earls of Warwick and Oxford, and several other noblemen. The second line, composed of 800 men at arms, 4000 halbardiers, and 2400 archers, was led by the earls of Arundel and Northampton; the last line or body of reserve, in which were 700 men at arms, 5300 billmen, and 6000 archers, was ranged along the summit of the hill, and conducted by the king in person, attended by the lords Moubray, Mortimer, and others. When the army was completely formed, Edward rode along the lines, and by his words and looks inspired his troops with the most ardent courage and strongest hopes of victory. He then commanded the cavalry to dismount, and the whole army to sit down upon the grass, in their ranks, and refresh themselves with meat, drink, and rest. As soon as the French army came in view, they sprung from the ground, full of strength and spirit, and stood ready to receive them.

The king of France, assisted by the kings of Bohemia and Majorca, the dukes of Lorraine and Savoy, and several other sovereign princes, with the flower of the French nobility, laboured to restore some degree

of

of order to his prodigious army, and drew it up alſo in three lines, but very indiſtinctly formed. The firſt line was commanded in chief by the king of Bohemia; the ſecond by the earl of Alençon, the king of France's brother; and the third by Philip in perſon; and each of theſe lines contained a greater number of troops than the whole Engliſh army.

The battle of Creſſy was begun about three o'clock in the afternoon, Auguſt 26. by a great body of Genoeſe croſs-bowmen, in the French ſervice, who let fly their quarrels at too great a diſtance to do any execution, and were preſently routed by a ſhower of arrows from the Engliſh archers. The earl of Alençon, after trampling to death many of the flying Genoeſe, advanced to the charge, and made a furious attack on that corps commanded by the prince of Wales. The earls of Arundel and Northampton advanced with the ſecond line to ſuſtain the prince, and Alençon was ſupported by as many troops as could crowd to his aſſiſtance. Here the battle raged for ſome time with uncommon fury; and the earl of Warwick anxious for the fate of the day and the ſafety of the prince, ſent a meſſenger to the king, entreating him to advance with the third line. Edward, who had taken his ſtand on a wind-mill on the top of the hill, from whence he had a full view of both armies, aſked the meſſenger, if his ſon was unhorſed, or wounded, or killed? and being anſwered, that the prince was unhurt, and performed prodigies of valour. "Go then," ſaid he, "and tell my ſon and his brave companions, that I will not deprive them of any part of the glory of their victory." This flattering meſſage being made known, inſpired the prince and his troops with redoubled ardour; and the king of Bohemia, the earl of Alençon, and many other great men, being ſlain, the whole firſt and ſecond lines of the French army were put to flight. Philip, undiſmayed at the ſlaughter of his troops, and the fall of ſo many princes, advanced to the charge with the line under his immediate command. But this body ſoon ſhared the ſame fate with the other two; and Philip, after having been unhorſed, and wounded in the neck and thigh, was carried off the field by John de Hainault, and fled with no more than five knights and about 60 ſoldiers in his company, of all his mighty army, which at the beginning of the battle conſiſted of more than 120,000 men. Such was the famous victory of Creſſy, the greateſt ever gained by any king of England. After the battle, the king flew into the arms of the prince of Wales, and graſping him to his boſom, cried in an ecſtaſy of joy, "My dear ſon, you have this day ſhowed yourſelf worthy of the knighthood which you lately received, and of the crown for which you have ſo bravely fought; perſevere in your honourable courſe." The prince, as modeſt as he was brave, ſunk down on his knees, his face covered with bluſhes, and begged his father's bleſſing. Edward continued with his army at Creſſy three days, employed in numbering and burying the dead. The French had left on this bloody ſcene the king of Bohemia, 11 other princes, 80 bannerets, 1200 knights, 1500 gentlemen, 4000 men at arms, and 30,000 other ſoldiers.

CREST, in armoury, denotes the uppermoſt part of an armoury; or that part riſing over the caſk or helmet. Next to the mantle, ſays Guillim, the creſt or cognizance claims the higheſt place; being ſeated on the moſt eminent part of the helmet; yet ſo as to admit an interpoſition of ſome eſcrol, wreath, chapeau, crown, &c.

The ancient warriors wore creſts to ſtrike terror in their enemies, as the ſight of the ſpoils of animals they had killed; or to give them the more formidable mien, by making them appear taller, &c.

In the ancient tournaments, the cavaliers had plumes of feathers, eſpecially thoſe of oſtriches and herons, for their creſts: theſe tufts they called *plumarts;* and were placed in tubes, on the tops of high caps or bonnets. Some had their creſts of leather; others of parchment, paſteboard, &c. painted or varniſhed, to keep out the weather; others of ſteel, wood, &c. on which were ſometimes repreſented a member or ordinary of the coat; as an eagle, fleur-de-lys, &c. but never any of thoſe called *honourable ordinaries*, as pale, feſſe, &c. The creſts were changeable at pleaſure; being reputed no other than as an arbitrary device or ornament.

Herodotus attributes the riſe of creſts to the Carians, who firſt bore feathers on their caſks, and painted figures on the bucklers; whence the Perſians called them *cocks*.

The creſt is eſteemed a greater mark of nobility than the armoury, as being borne at tournaments; to which none were admitted till they had given proof of their nobility. Sometimes it ſerves to diſtinguiſh the ſeveral branches of a family. It has alſo ſerved, on occaſion, as the diſtinguiſhing badge of factions. Sometimes the creſt is taken from the device; but more uſually it is formed of ſome piece of the arms: thus, the emperor's creſt is an eagle; that of Caſtile, a caſtle, &c. Families that exchange arms, as the houſes of Brunſwick and Cologne have done, do not change their creſts; the firſt ſtill retain the horſe, and the latter the mermaid.

CREST, in *Heraldry*, the figure placed above the helmet in an atchievement. See HERALDRY.

Crest-fallen, a fault of a horſe, when the upper part of his neck, called the *creſt*, hangs to one ſide: this they cure by placing it upright, clipping away the ſpare ſkin, and applying plaſters to keep it in a proper poſition.

CRETA, or CHALK, in *Natural Hiſtory*. See CHALK, MINERALOGY *Index*.

CRETE, one of the largeſt iſlands in the Mediterranean, lying between 22 and 27 degrees of eaſt longitude, and between 35 and 36 degrees of north latitude. According to Strabo, this iſland is 287 miles in length; and according to Pliny, 270; and according to Scylax, 312. As to its breadth, it is not, as Pliny obſerves, above 55 miles where wideſt; whence it was ſtyled, as Stephanus obſerves, the *Long Iſland.* It has the Archipelago to the north, the African ſea to the ſouth, the Carpathian ſea to the eaſt, and the Ionian to the weſt. Anciently it was known by the names of *Aeria*, *Chthonia*, *Idea*, *Curete*, *Macaris*, &c. but its moſt common name was that of *Crete.*

The Cretan mythologiſts, quoted by Diodorus Siculus, relate that the firſt inhabitants of the iſland were the Dactyli Idæi, who dwelt around Mount Ida; they were regarded as magicians, becauſe they poſſeſſed a variety of knowledge, and were particularly ſkilled

led in religious myſteries. Orpheus, who diſtinguiſhed himſelf ſo highly in poetry and muſic, was their diſciple. They diſcovered the uſe of fire, iron, and braſs, and invented the art of working theſe metals in Berecynthius, a mountain near Aptera. Thoſe invaluable diſcoveries procured them divine honours. One of them, named Hercules, rendered himſelf famous by his courage and great exploits. He inſtituted the Olympic games; though poſterity, by a miſtake ariſing from his bearing the ſame name have aſcribed that inſtitution to the ſon of Alcmena; who, indeed, trode in the ſteps of his predeceſſor, and raiſed himſelf alſo to immortality.

The Dactyli Idæi were the anceſtors of the Curetés. Theſe laſt at firſt inhabited the foreſts and caves of the mountains. Afterwards they entered into domeſtic life, and contributed, by their inſtitutions, to the civilization of mankind. They taught men to collect flocks of ſheep, to tame the ferocity of wild animals for domeſtic purpoſes, and to invite bees into hives, that they might rifle them of the fruit of their labours. They firſt prompted men to the chaſe, and taught the uſe of the bow. They were the inventors of ſwords and of military dances. The noiſe which they made, by dancing in armour, hindered Saturn from hearing the cries of Jupiter, whoſe education Rhea had entruſted to them. With the aſſiſtance of the nymphs, they brought up that a god in a cave in Mount Ida, feeding him with the milk of the goat Amalthea, and with honey.

To this period mythology aſſigns the origin of the Titans; their abode near Gnoſſus, where ſtood the palace of Rhea; their travels over the whole earth; their war againſt Ammon, and his defence by Bacchus; the nuptials of Jupiter and Juno, celebrated nigh the river Therenus in Crete; the gods, goddeſſes, and heroes, who deſcended from them.

The moſt illuſtrious of thoſe heroes were Minos and Rhadamanthus. They are ſaid to have been the ſons of Jupiter and Europa, who was conveyed into the iſland on a bull. Minos becoming king, built ſeveral cities; the moſt conſiderable of which are—Gnoſſus, on that ſide of the iſland which faces Aſia, Phœſtus on the ſouthern ſhore, and Cydon on the weſtern, facing Peloponneſus. He gave to his ſubjects a code of admirable laws, which he pretended to have received from his father Jupiter in the grotto of Mount Ida.

Rhadamanthus diſtinguiſhed himſelf by the impartiality of his judgments, and by the inflexible ſeverity with which he inflicted puniſhment on the impious and wicked. His empire extended over the chief iſles of the Archipelago, and the inhabitants of the adjacent coaſts of Aſia ſubmitted to him on account of his high reputation for probity and juſtice. Mythologiſts have conſtituted him judge in the regions below, to determine the future ſtate of the righteous and the wicked. They have conferred on him the ſame honours which were beſtowed on Minos, the juſteſt of kings.

Thus far have been followed the Cretan traditions as they are related by Diodorus; but hiſtorians differ about the truth of them. There are a variety of opinions concerning the firſt inhabitants of Crete. Strabo, who has diſcuſſed them with great erudition, ſays, after ſeveral pages on the ſubject: "I am not fond of fables; yet I have detailed theſe at ſome length, becauſe they are connected with theology. Every diſcourſe concerning the gods ſhould examine the religious opinions of antiquity, and diſtinguiſh them from fable. The ancients were pleaſed to conceal their knowledge of nature under a veil. It is now impoſſible to unfold the meaning of their enigmas. But by expoſing to light the numerous allegories which they have left us, and by examining attentively their mutual relations and differences, genius may perhaps be able to unfold the truths which are couched under them."

But leaving mythology for the more certain records and monuments of hiſtory, we find that Crete received its name from Crés, the firſt of its monarchs. He was author of ſeveral uſeful inventions, which contributed to the happineſs of his ſubjects. Prompted by gratitude, they endeavoured to perpetuate the memory of his favours, and to immortalize his name, by naming the iſland after him.

In order to diſtinguiſh the true Cretans from ſtrangers, they were named *Eteocretes*. A number of colonies, from different parts of Greece, ſettled in the iſland. The agreeableneſs of the climate, and the fertility of the ſoil, invited them to fix their habitation there. The Lacedæmonians, Argives, and Athenians, were the principal people who ſent colonies into Crete. This is what makes Homer ſay, "Crete is an extenſive iſland in the midſt of the ſtormy main. The ſoil is rich and fertile. It contains an immenſe number of inhabitants. It is adorned with a hundred cities. Its inhabitants ſpeak in various languages. We find there Achæans, valiant Eteocretes, Cydonians, Dorians, and godlike Pelaſgians." The Eteocretes inhabited the ſouthern diviſion of the iſland; they built there the city of Prœſus, and erected a temple to Dictæan Jove.

Crés was not the only monarch who reigned in the iſland of Crete. He had a ſeries of ſucceſſors. But hiſtory affords little information concerning them: only the names of a few of them are preſerved, and a ſmall number of events which happened under the reign of ſome others, but blended and disfigured with an intermixture of fable. Among thoſe monarchs we find two Jupiters, and two of the name of Minos. However, moſt writers confound them, and aſcribe to one thoſe tranſactions and exploits which ſhould be ſhared between the two.

This remark chiefly regards Minos, who was eſteemed the wiſeſt legiſlator of antiquity. The office aſſigned him in the regions below is a clear and certain proof of his having gained an exalted reputation by his juſtice. Greece, ſays Plato, has with great propriety adopted the laws of Crete; for they are founded on the ſolid baſis of reaſon and equity, and have a natural tendency to render the people, who live in ſubjection to them, opulent and happy. One of thoſe laws forbade "the Cretans ever to carry their feſtivity ſo far as to intoxicate themſelves with wine." The following was very ſuitable to repreſs the preſumptuous ardour of youth: "Let young people not canvaſs the laws with an indiſcreet curioſity; let them not examine whether the lawgiver has done right or wrong in promulgating them; but let them join unanimouſly in declaring them good, ſince they proceed from the gods. If any of the old men perceive ſomething in them meriting amendment, let

Crete.

let him mention it to the magiſtrate, or diſcuſs it with his equals, but never in the preſence of the young people." That excellent code was engraven on tables of braſs: and Talos, chief miniſter to Minos, viſited all the towns and cities in the iſland, three times a-year, to obſerve in what manner the laws were executed and obeyed. The king of Crete, well knowing that the marvellous is neceſſary to command the belief and enforce the obedience of the people, pretended that he had received thoſe laws from his father Jupiter, in the grotto of Mount Ida. In the ſame manner, Lycurgus, before promulgating his laws, repaired to Delphos, and gave out they had received the ſanction of Apollo. A like reaſon induced Numa to pretend to an intimacy with the nymph Egeria, and Mahomet to aſcribe his doctrines and inſtitutions to the revelation of the angel Gabriel.

In contradiction to this account, others of the ancients deſcribe Minos as a prince impotently abandoned to the fury of his paſſions, and a barbarous conqueror. Falling paſſionately in love with the nymph Dictynna, who refuſed to gratify his wiſhes, he purſued her to the brink of the ſhore, and forced her to plunge into the ſea, where ſhe was ſaved by ſome fiſhermen, who received her in their nets. He was the firſt of the Greeks who appeared in the Mediterranean at the head of a naval armament. He conquered the Cyclades, expelled the Carians, eſtabliſhed Cretan colonies in thoſe iſlands, and committed the government of them to his ſon.

Being informed, while he was at Paros, that his ſon Androgeus was ſlain at Athens, he declared war againſt Egeus, and impoſed on him a diſgraceful tribute; from the payment of which Theſeus delivered his country. He took arms againſt Niſus, king of Megara, made him priſoner by the treachery of his daughter Scylla, and put him to death, together with Megarus, the ſon of Hippomanes, who had brought ſome forces to his aſſiſtance. Dædalus, who had by ſome means incurred his diſpleaſure, deſpairing of pardon from ſo ſevere and inflexible a prince, employed the reſources of his inventive genius, in order to eſcape from his power. He fled to Sicily, gained the protection of King Cocalus, and obtained an aſylum in his court. Valerius Flaccus has deſcribed his flight in a very lively and picturesque manner. "Thus Dædalus, with the wings of a bird, aſcended from Mount Ida. Beſide him flew the comrade of his flight, with ſhorter wings. They appeared like a cloud riſing in the air. Minos, ſeeing his vengeance thus eluded, glowed with impotent rage. In vain he followed with his eyes the ſecure flight of his enemies through the wide expanſe of heaven. His guards returned to Gortynia with their quivers filled with arrows." The Cretan monarch did not, however, give up his prey. He equipped a fleet, purſued the fugitive to Sicily, and fell before the walls of Camicum.

It is plain, that thoſe actions cannot agree to the character of that juſt monarch, whoſe merits raiſed him to the office of determining, in the regions below, the unalterable fate of the righteous and the wicked. We may, therefore, reaſonably conclude, that Minos the legiſlator is a different perſon from the conqueror; that it was the former who gained a laſting reputation by his wiſdom and juſtice; and the latter who ſubdued moſt of the iſlands of the Archipelago, but being enſlaved by his paſſions, tarniſhed his glory by his cruelty and mercileſs thirſt for vengeance.

The laſt king of Crete was Idomeneus. This prince, accompanied by Merion, conducted 24 ſhips to the aſſiſtance of Agamemnon. Homer informs us of the illuſtrious exploits by which he ſignalized himſelf before the walls of Troy. At his departure, he committed the government of his kingdom to Leucus his adopted ſon, promiſing him the hand of his daughter Cliſithera if he governed wiſely in his abſence. That ambitious young man ſoon forgot the favours which had been ſo laviſhly beſtowed on him. Gaining a number of partiſans, he in a ſhort time aſpired to the immediate poſſeſſion of the crown. His impatience would not wait till he ſhould obtain it lawfully by marriage. Flattering himſelf, from the long abſence of the king, that he was perhaps fallen before Troy, he determined to mount the throne. Mida, wife to Idomeneus, and the princeſs Cliſithera, were an obſtacle to his wiſhes. But ambition knows no reſtraint, and tramples under foot the moſt ſacred obligations. The baſe wretch having ſeduced the people from their allegiance, and captivated the affections of the nobles, ſacrificed thoſe unfortunate victims in the temple. When Idomeneus, crowned with laurels, landed on the coaſt of Crete, Leucus, who had now firmly eſtabliſhed his power, attacked him with an armed force, and obliged him to reimbark. A different account is alſo given of the baniſhment of Idomeneus. Servius ſays that he had vowed, in a ſtorm, to ſacrifice to the gods the firſt perſon that his eyes ſhould behold on the Cretan ſhore; that his ſon having met him firſt after his arrival, he fulfilled his vow, by ſacrificing him; and that the iſland, being ſoon after depopulated by peſtilence, the inhabitants looked upon that affliction as the effect of divine vengeance, and expelled the parricide; who, retiring to Italy, founded Salentum, on the Meſſapian coaſt. But that opinion appears entirely groundleſs. Hiſtory mentions no ſon of Idomeneus. If he had a ſon of his own blood, why did he adopt Leucus? Why did he truſt to him the government of the iſland, when he promiſed him his daughter in marriage? The more probable opinion is, that the plague was introduced into the iſland by his ſhips, when he returned from the ſiege of Troy, as Herodotus aſſerts; and that Leucus artfully made uſe of that pretext to expel his lawful ſovereign from the iſland. But it appears that the uſurper did not long enjoy the fruit of his crimes. Soon after the departure of Idomeneus, monarchy was aboliſhed, and the government of Crete became republican.

The republic of Crete has been celebrated by the panegyric of Plato, ſerved Lycurgus as a model for that which he eſtabliſhed in Lacedemon, and was beheld by all Greece with reſpect and admiration. Strabo has thought it not unworthy of his pencil, and has conſecrated the leading features of its conſtitution to laſting fame in his immortal work. It was indeed a ſyſtem of legiſlature, whoſe direct tendency was to call forth the buds of virtue in the heart of infancy; to open and expand them in youth; to inſpire man, as he reached maturity, with the love of his country, of glory,

Crete.

glory, and of liberty; and to comfort and ſupport the infirmities of age with the reſpect and eſteem due to the experience and wiſdom of that period of life. It laboured to form affectionate friends, patriotic citizens, and worthy magiſtrates. It made no uſe, however, of a multitude of acts and ſtatutes to produce thoſe ineſtimable advantages. They flowed all from one ſource; the public education of youth, judiciouſly directed. The virtuous examples ſet before youth in the courſe of that education, the illuſtrious deeds which were recited to them with high applauſe, the honours conferred on valour and on noble actions, the opprobrium invariably caſt on vice; theſe were the only means which the Cretan lawgiver made uſe of to form a warlike, humane, and virtuous nation.

The Cretan government, ſoon after the expulſion of Idomeneus, became ariſtocratical. The power was divided between the nobles and the people. Yet as the chief employments were occupied by the nobles, they directed the adminiſtration of affairs. Ten magiſtrates were annually elected, by a majority of voices, in the national aſſembly. Theſe were named *Coſmoi;* and their public office and character were the ſame with thoſe of the Ephori at Sparta. They were the generals of the republic in time of war, and directed all affairs of any importance. They had the right of chooſing certain old men for counſellors. Thoſe old men, to the number of twenty-eight, compoſed the Cretan ſenate. They were choſen from among ſuch as had diſcharged the office of Coſmoi, or had diſtinguiſhed themſelves by extraordinary merit and blameleſs probity. Thoſe ſenators continued in office during life, poſſeſſed a weighty influence, and were conſulted in every affair of any importance. This body was a barrier oppoſed by the wiſdom of the legiſlator againſt the ambition of the ten chief rulers. He had impoſed another reſtraint on their power, by limiting the period of their adminiſtration to one year. His foreſight went ſtill farther. The ſuffrages of the people might be obtained by bribery or perſonal influence, and of conſequence their choice might ſometimes fall on a man unworthy of ſo honourable an office. When that happened, he who had been undeſervedly advanced to the dignity of Coſmos was degraded, either in a national aſſembly, or ſimply by the voices of his colleagues. This, doubtleſs, is what Plato alludes to, when he ſays, "Neither the commonwealth, which approaches too near to a monarchical conſtitution, nor that which affects a licentious liberty, is founded on the ſolid baſis of a juſt medium between anarchy and deſpotiſm. O Cretans! O Lacedæmonians! by eſtabliſhing yours on firmer foundations, you have avoided thoſe fatal extremes."

Such were the diſtribution of power and the adminiſtration of public affairs in the Cretan government. Its ſimplicity was admirable. A people who were bleſſed with the ſacred enjoyment of liberty, but poſſeſſed not ſufficient knowledge and diſcernment to direct themſelves, elected magiſtrates, to whom they delegated their authority. Thoſe magiſtrates, thus arrayed with ſovereign power, choſe ſenators to aſſiſt and direct their deliberations. Theſe counſellors could neither enact nor decide of themſelves; but they held their office for life; and that circumſtance contributed to ſtrengthen their influence and to increaſe their experience. The magiſtrates were animated by the moſt powerful motives to diſtinguiſh themſelves when in office, by unwearied activity in the public ſervice. On one ſide, they were reſtrained by the fear of degradation; on the other, actuated by the hope of becoming one day members of the national council.

Yet let us inquire what means the Cretan lawgiver uſed to form virtuous citizens. All the Cretans were ſubjected to the power of the magiſtrates; and divided into two claſſes, the adults and the youth. Men arrived at maturity were admitted into the firſt. The ſecond conſiſted of all the young men who were not below the age of ſeventeen. The ſociety of adults ate together in public halls. There rulers, magiſtrates, poor and rich, ſeated together, partook, without diſtinction, of the ſame ſimple fare. A large bowl, filled with wine and water, which went round the company from one to another, was the only drink that they were allowed. None but the old men had a right to call for more wine. Doubtleſs, that people, ſo celebrated for wiſdom, were not ſtrangers to the power of beauty; for a woman was appointed to preſide at each table. She openly diſtributed the moſt exquiſite meats to thoſe who had diſtinguiſhed themſelves by their valour or wiſdom. That judicious preference was ſo far from exciting envy or jealouſy, that it only prompted every perſon to deſerve it by brave and prudent conduct. Near where the citizens ſat, two tables were laid, which they named *Hoſpitable;* all ſtrangers and travellers were entertained at theſe; and there was alſo a particular houſe ſet apart by the public, in which they might ſpend the night.

To ſupply the public expences, every citizen was obliged to bring a tenth part of his annual income into the treaſury. The chief magiſtrates were to take care that every perſon contributed his proportion. In Crete, ſays Ariſtotle, one part of the fruits of the earth, of the produce of the flocks, of the revenues of the ſtate, and of the taxes and cuſtoms, is ſacred to the gods: the other is diſtributed among the members of the community; ſo that men, women, and children, all ſubſiſt at the public expence.

After dinner, the magiſtrates and ſenators uſually ſpent ſome time in deliberating on the affairs of the ſtate; they next recounted the noble deeds which had been done in war, celebrated the courage of their moſt diſtinguiſhed warriors, and animated the youth to heroic valour. Thoſe aſſemblies were the firſt ſchool of the youth. At the age of ſeven, the boy was permitted to handle the bow;—from that time he was admitted into the ſociety of the adults, where he continued till the age of ſeventeen. There, ſitting on the ground, and clothed in a plain and coarſe dreſs, he ſerved the old men, and liſtened, with reſpectful ſilence, to their advices. His young heart was inflamed with the recital of noble deeds in arms, and glowed with ardour to imitate them. He acquired habits of ſobriety and temperance. And being conſtantly witneſs of illuſtrious examples of moderation, wiſdom, and patriotiſm, the ſeeds of virtue were thus ſown and foſtered in his heart before he attained the uſe of reaſon.

He was early accuſtomed to arms and to fatigue, that he might learn to endure exceſſive heat or cold,

to

Crete.

to clamber and leap among hills and precipices, and to bear manfully the blows and wounds which he might receive amid the gymnaſtic exerciſes or in battle. His education was not confined to the gymnaſtic exerciſes; he was alſo taught to ſing the laws, which were written in verſe, with a certain ſpecies of melody; in order that the charms of muſic might diſpoſe him to learn them with more pleaſure, and might impreſs them more deeply on his heart, and that, if he ſhould ever tranſgreſs them, he might not have the excuſe of ignorance to offer. He next learned hymns in honour of the gods, and poems compoſed in praiſe of heroes. When he reached his ſeventeenth year, he retired from the ſociety of the adults, and became a member of that of the young men.

Here his education was ſtill carried on. He exerciſed himſelf in hunting, wreſtling, and fighting with his companions. The lyre played tunes of martial muſic; and he learned to follow exactly the ſounds and meaſure of the muſician. Thoſe ſports and exerciſes were ſometimes attended with danger; becauſe arms of ſteel were ſometimes uſed in them. One dance, in which the youth aſpired moſt ardently to excel, was the Pyrrhic, originally invented in Crete. The performers in that dance were arrayed in complete armour:—they wore a light ſhort coat, which did not fall below the knee, and was bound with a girdle going twice round the waiſt: on their feet and legs were buſkins; above theſe they bore their arms, and performed various military evolutions to the ſound of muſical inſtruments. "The Lacedæmonians and Cretans (ſays Libanius) cultivated dancing with amazing ardour; they conſidered that their laws had directed them to practiſe it for the moſt important purpoſes; and it was ſcarce leſs diſhonourable for a Lacedæmonian or Cretan to neglect the military dances, than to deſert his poſt in battle."

Thoſe Cretans who were opulent and high-born, were permitted to form ſocieties of young men of their own age. They often ſtrove, with emulation, who ſhould form the moſt numerous ones. The father of the young man who formed one of thoſe ſocieties uſually preſided in it. He had a right to educate thoſe warlike youth, to exerciſe them in running and in hunting, to confer rewards and inflict puniſhments.

Friendſhip was in high eſtimation among the Cretans; but, ſays Strabo, the manner in which they conducted the intercourſe of friendſhip was pretty extraordinary. Inſtead of mild perſuaſion, they made uſe of violence to gain the objects of their affections. He who conceived an affection for a young man of his own age, and wiſhed to attach him to himſelf by indiſſoluble bonds, formed a ſcheme for carrying him off by violence. Three days before putting it into execution, he communicated it to his comrades. They could not then interfere to prevent it; becauſe if they had, they would have appeared to think the young man unworthy of ſuch an exceſſive attachment. At the appointed day they aſſembled to protect their companion. If the raviſher appeared to them not unworthy of the object of his affection, they made at firſt a faint reſiſtance in obedience to the law—but, at laſt, joyfully favoured his enterpriſe; if, on the other hand, they thought him unworthy of the object of his choice, they made ſuch reſiſtance as to prevent him from executing his deſign. The feigned reſiſtance continued till the raviſher had conducted his friend into the hall of that ſociety to which he belonged. They did not regard him who poſſeſſed ſuperior beauty and gracefulneſs of perſon as the moſt amiable; but him who had moſt diſtinguiſhed himſelf by his modeſty and valour.

The raviſher loaded his young friend with favours, and conducted him wherever he deſired; they were accompanied by thoſe who had favoured the rape: he carried him from feaſt to feaſt, procured him the pleaſures of the chaſe and good cheer; and after uſing all poſſible means to gain his heart for the courſe of two months, brought him back to the city, and was obliged to give him up to his parents. But firſt he preſented him with a ſuit of armour, an ox, and a drinking cup; which were the uſual and legal preſents on ſuch occaſions. Sometimes his generoſity went ſtill farther; and he made more expenſive preſents; to defray the expence of which his comrades contributed. The young man ſacrificed the ox to Jupiter, and gave an entertainment to thoſe who had aſſiſted when he was carried off. He then declared his ſentiments concerning a connection with his raviſher, and told whether or not it was agreeable to him. If he had reaſon to complain of the treatment which he had received, the law allowed him to forſake a friend ſo unworthy of the name, and to demand his puniſhment.

It would have been diſgraceful, adds Strabo, to a young man who was handſome and well born, to be rejected by his friends on account of the depravity of his manners. Thoſe who had been carried off received public honours. Theirs were the firſt places in the halls and at the race. They were permitted to wear, during the reſt of life, thoſe ornaments which they owed to the tenderneſs of friendſhip; and that mark of diſtinction teſtified to all who ſaw them, that they had been the objects of ſome fond attachment.

When the youth had finiſhed their exerciſes, and attained the legal age, they became members of the claſs of adults; being then conſidered as men, they were permitted to vote in the national aſſemblies, and were entitled to ſtand candidates for any public office. They were then obliged to marry: but did not take home their wives till ſuch time as they were capable of managing their domeſtic concerns.

"The legiſlator (ſays Strabo) had conſidered liberty as the greateſt bleſſing that cities can enjoy. Liberty alone can ſecure the property of the citizens of any ſtate. Slavery either robs them of it, or renders it precarious. The firſt care of nations ſhould therefore be to preſerve their liberty. Concord ſtrengthens and ſupports her empire; ſhe flouriſhes wherever the ſeeds of diſſenſion are extinguiſhed. Almoſt all thoſe hoſtilities which prevail among nations or individuals ſpring either from an inordinate deſire of wealth or the love of luxury. Introduce, inſtead of thoſe baneful principles, frugality, moderation, and equality of conditions; you will thus baniſh envy, hatred, injuſtice, and haughty diſdain." This was what the Cretan lawgiver happily effected. And the community, which was regulated by his wiſe inſtitutions, roſe to glory, opulence, and power; and was honoured with the panegyrics of the moſt celebrated philoſophers

losophers of Greece: but the highest honour it ever obtained, was that of serving Lycurgus as a model for the admirable form of government which he established at Sparta.

The republic of Crete continued to flourish till the age of Julius Cæsar. No other state has enjoyed so long a period of strength and grandeur. The legislature, regarding liberty as the only sure basis of a nation's happiness, had instituted a system of laws, the natural tendency of which was, to inspire men with an ardent passion for liberty, and with such virtue and valour as are necessary to support and defend it. All the citizens were soldiers: all of them were skilled in the art of war. The valiant youth of other nations resorted to Crete, to learn the exercises, manœuvres, and evolutions, of the military art. "Philopœmen (says Plutarch) being impatient of indolence, and eager to acquire skill in arms, embarked for Crete. After spending a considerable time in the noblest exercises among that brave people, who were skilled in the art of war, and accustomed to an austere and temperate life, he returned to the Achæans. The knowledge which he had acquired made him so eminent among them, that he was immediately appointed general of their cavalry."

On the other hand, the legislator, being persuaded that conquests are generally unjust and criminal, that they often exhaust the strength of the victorious nation, and almost always corrupt its manners, endeavoured to preserve the Cretans from the ambition of conquest. The fertility of the island abundantly supplied their wants. They needed not that commerce should introduce among them the riches of foreign countries, along with which luxury and her train of attendant vices would also be introduced; and he knew how to inspire them with an indifference for such acquisitions without expressly forbidding them. The gymnastic exercises, which occupied the leisure of the gallant youth; the pleasures of the chase; the ardour of friendship; the public shows, at which all the different orders of the community, both men and women, used to assemble; the love of equality, order, and their country, with which he inflamed every breast; the wise institutions, which united a whole nation so closely that they composed but one family;—all these ties attached the Cretans to their native island: and finding at home that happiness which was the object of their wishes, they never thought of wandering abroad in search of an imaginary glory, or of extending their empire over other nations. Therefore, from the period at which that state assumed a republican form till the time when they were attacked by the arms of Rome, the nation was not once known to send a hostile force into the territories of any of their neighbours. This instance of moderation is unparalleled in history; no other nation can divide the glory of it with the Cretans. Individuals indeed might leave their country to engage in foreign armies. Those princes and states who knew their valour and skill in archery eagerly sought to take them into their pay; all the neighbouring monarchs were desirous of having in their armies a body of Cretan archers. Over the whole world none were more celebrated than they for bending the bow. "The arrows of Gortynia (says Claudian), aimed from a trusty bow, are sure to wound, and never miss the destined mark."

Though the multitude of independent cities which flourished in Crete did not unite their arms to subjugate the neighbouring islands, and drench them with the blood of their inhabitants; yet they were not so wise as to live in peace among themselves. Discord often stalked among them with her flaming torch. The most powerful wished to enslave the rest. Sometimes Gnossus and Gortynia marched with social banners against their neighbours, levelled their fortresses, and subjected them to their power, at other times they attacked each other with hostile violence, and saw their bravest youth perish amid the horrors of civil war. Lyctos and Cydon opposed an invincible barrier to their ambition, and preserved their own liberty. The last of these cities had acquired such strength and influence, that she held the balance between the rival powers of the island. Those wars destroyed a number of the cities, and drenched the native country of Jupiter with blood.

To what source must we attribute those intestine dissensions? One part of the island was occupied by the Eteocretes, the original inhabitants; the rest was peopled with colonies from Athens, Sparta, Argos, and Samos. Perhaps the ancient grudges which had subsisted among those strangers, being still unextinguished in their breasts, were easily rekindled by accident or circumstances, and inflamed with new fury. We may also suppose, that the most powerful among them, exulting in their superiority, would endeavour to take advantage of the weakness of the rest, and disregard all laws but those of force: besides, the glowing ardour of the youth, trained to military exercises, was ever ready to fly to arms. Such, probably, were the causes which fomented discord and hostility among a people living under the same religion, customs, and laws.—Whatever these might be, the Cretans being persuaded that the firm union of their soldiers was essential to victory, arrayed the bravest youths of the army in splendid robes, and caused them to sacrifice to friendship before engaging in battle. In some countries it would be very proper to oblige the generals on such occasions, to sacrifice to concord. If such a sacrifice were performed with sincerity, it might preserve their glory unstained, and prevent such deluges of blood from being wasted without producing any advantages to the state.

Their passion for war did not extinguish in the breasts of the Cretans that exquisite sensibility which is the mother and nurse of the fine arts. "The Cretans (says Sozomen) gave an illustrious proof of their munificence to genius, by making Homer a present of a thousand pieces of silver; and to perpetuate the memory of this act of generosity, they recorded it by an inscription on a public column." In Crete, adds Ptolemy, men are still more desirous of cultivating their understandings than of exercising their bodily powers. Often when dissensions arose, the voice of wisdom and the charms of poesy recalled them to reason and harmony. Thales of Gortynia, the preceptor of Lycurgus, was one of their most celebrated philosophers. Being both a poet and legislator, he made a happy use of his abilities and knowledge to extinguish among his

his countrymen the kindling ſparks of diſcord. "His poems were moral diſcourſes in verſe, which recalled the people to concord and ſubmiſſion to the laws. Uſing a regular meaſure, he recommended the auſterity of his ſubject by the inſinuating and powerful charm of ſentiment. So powerful were the effects of his verſes, which addreſſed at once the ears, the heart, and the underſtanding of his hearers, that their rage was gradually ſoftened. Next, opening their hearts to the love of peace, the advantages of which he deſcribed in glowing colours, they forgot their inteſtine diſſenſions, and ranged themſelves around the ſtandard of concord." That ſage is ſaid to have invented tunes for the military dances and for the Cretan Pyrrhic. Men who felt ſo ſtrongly the influence of poetry and muſic could ſcarcely be enemies to pleaſure. Accordingly they had a cuſtom of diſtinguiſhing their fortunate days with white flint ſtones, their unfortunate days with black. At the end of the year they counted the number of their white ſtones, and reckoned that they had lived only ſo many days as were diſtinguiſhed for having been fortunate. They did not think mere exiſtence, without the enjoyment of pleaſure, worthy of the name of *life*. For this reaſon, they cauſed to be inſcribed on their tombs: "He lived ſo many days; he continued in exiſtence ſo long."

A paſſion for glory is eaſily awaked in a feeling and generous breaſt. The Cretans eagerly repaired to the famous ſolemnities of Greece, and were often crowned at the Olympic, Nemæan, and Pythian games; others of them were favourites of the muſes, and verſified the predictions of prophets, or celebrated the glorious deeds of their heroes. Several of them diſtinguiſhed themſelves by hiſtorical compoſition. At the moſt ancient games, a prize is ſaid to have been beſtowed on the poet who ſung the nobleſt hymn in honour of Apollo: Chryſothemis of Crete ſung and gained the prize.

The ravages of time have deprived us of almoſt all their works; and if Pindar had not preſerved the memory of ſome of their crowns, we ſhould not know even the names of the conquerors who wore them. The temple of Diana at Epheſus, built by the Cretan Cteſiphon and his ſon Metagenes, was not proof againſt the frantic hand of the incendiary. Thoſe ingenious architects had built it on the principles of the Ionic order: to the coſtlineſs of the materials, the elegance of the architecture, the ſymmetry of the parts, and the majeſty and perfection of the whole, they had added ſolidity and ſtrength, without which the reſt muſt have been of ſmall value Their names have deſcended to poſterity, but the pillars of that monument which has perpetuated their memory have been diſperſed or deſtroyed. Scarce a veſtige remains of that building which was eſteemed one of the ſeven wonders of the world.

Nations are effaced from the earth like the monuments of their power, and after the revolution of ſeveral ages we can ſcarcely trace in their poſterity any remains of their ancient character. Some of them exiſt longer, others ſhorter; but we may almoſt always calculate the period of their duration by the excellence of their laws, and the fidelity with which they ſupport and obey them. The republic of Crete, being eſtabliſhed on a ſolid baſis, knew no foreign maſter for a period of ten centuries. She bravely repelled the attacks of thoſe princes who attempted to enſlave her. At length the time arrived when the warlike and victorious Romans aſpired to the empire of the world, and would ſuffer none but their ſubjects or ſlaves to inhabit within the reach of their arms. Florus does not ſcruple to acknowledge, that the Romans had no other motives for invading Crete but the ambitious deſire of ſubduing the renowned native country of Jupiter. "If any perſon wiſh to know the reaſon which induced us to attack Crete (ſays he), the true reaſon was our deſire to ſubdue ſo celebrated an iſland. The Cretans had appeared to favour Mithridates, and the Romans thought proper to declare war againſt them on that pretext. Mark Antony, father of the triumvir, attacked them with ſtrong hopes of ſucceſs; but was ſeverely puniſhed for his preſumption and imprudence. The Cretans took a great part of his fleet, hung up his ſoldiers and ſailors on the maſts amid the ſails and cordage, and returned in triumph into their harbours."

The Romans never forgot nor forgave a defeat. As ſoon as the Macedonian war was brought to a happy concluſion, they again took arms againſt the Cretans to revenge their ignominy and loſs. Quintus Metellus was ſent to Crete with a powerful armament. He met with an obſtinate and vigorous reſiſtance. Panarus and Laſthenes, two experienced leaders, collecting a body of 20,000 young warriors, all eager for battle, and of determined courage, employed their arms and arrows ſucceſsfully againſt the Romans, and protracted the fate of Crete for three years. Thoſe conquerors could not make themſelves maſters of the iſland before deſtroying its braveſt warriors. They loſt a great number of troops, and bought a bloody victory at the price of many a danger and much fatigue. However, their uſual good fortune at length prevailed. The firſt care of the conqueror was to aboliſh the laws of Minos, and to eſtabliſh in their room thoſe of Numa. Strabo, that enlightened philoſopher, complains of this act of ſeverity; and informs us, that in his days the original laws of Crete were no longer in force, becauſe the Romans compelled the conquered provinces to adopt their civil code. To ſecure themſelves ſtill more fully in the poſſeſſion of the iſland, they ſent a powerful colony to Gnoſſus.

From that era to the preſent time, that is, for a period of 1900 years, the Cretans have no longer formed a ſeparate nation, or made any figure among the ſtates and kingdoms of the world: their noble and ingenious manners, their arts and ſciences, their valour and their virtues, are no more. They have loſt theſe with the loſs of liberty. So true it is that man is not born for himſelf; and that, when deprived of that aid which Nature has deſigned to ſtrengthen and ſupport his weakneſs, the flame of genius and the ardent glow of valour are extinguiſhed in his breaſt; he becomes incapable of vigorous reſolution, and ſinks below the natural virtue and dignity of the ſpecies.

The iſland of Crete, joined with the ſmall kingdom of Cyrene, on the Libyan coaſt, formed a Roman province. It was at firſt governed by a proconſul; a queſtor and an aſſiſtant were afterwards ſent there; at laſt, as Suetonius informs us, it was put under the government of a conſul. This iſland was one of the firſt places in the world that were favoured with the light of

of the gofpel. St Paul introduced the Chriftian faith into Crete; and his difciple Titus, whom he left there to cherifh and cultivate that precious plant, became the firft bifhop of the ifland. In the reign of the emperor Leo, it had twelve bifhops, who were all fubject to the patriarch of Conftantinople. Conftantine feparated Crete from Cyrene in the new divifion which he made of the provinces of the empire. Leaving three fons, Conftantius, Conftantine, and Conftans, he affigned Thrace and the eaftern provinces to the firft; to the fecond, the empire of the weft; the ifland of Crete, Africa, and Illyria, to the third.

When Michael Balbus fat on the throne of Conftantinople, the rebellion of Thomas, which lafted three years, caufed him to neglect the other parts of the empire. The Agarenians (a people of Arabia), who had conquered the fineft provinces of Spain, feized that opportunity. They fitted out a confiderable fleet, plundered the Cyclades, attacked the ifland of Crete, and made themfelves mafters of it without oppofition. In order to fecure their conqueft, they built a fortrefs which they named *Khandak*, "intrenchment." From that citadel the barbarians made inroads into the interior parts of the ifland, carrying havock and devaftation wherever they appeared. By repeated attacks, they fubdued all the cities in Crete except Cydon. Michael made fome ineffectual efforts to expel them from Crete. The emperor Bafilius, the Macedonian, was not more fuccefsful. They defeated him in a bloody battle; but being vanquifhed by one of his generals, they were fubjected to the payment of an annual tribute. At the end of ten years, the Arabians refufed the tribute. It was referved for Nicephorus Phocas, who was afterwards emperor, to deliver this fine ifland from the yoke of the infidels. He landed on the ifland with a numerous army, boldly attacked them, and routed them in various engagements. The Saracens, no longer daring to meet fo formidable a general in the field, fled for protection to their fortreffes. Phocas being plentifully fupplied with all the warlike machines neceffary for a fiege, levelled their walls, and alarmed their hearts with terror. He took their cities and fortreffes, and drove them into Khandak, their metropolis and laft refource. In the courfe of nine months he fubdued the whole ifland, took their king Curup and his lieutenant Aremas prifoners, and reunited to the empire a province which had been 127 years in the hands of the infidels. It remained under the dominion of the Romans till the time when Baldwin, count of Flanders, being raifed to the throne, liberally rewarded the fervices of Boniface, marquis of Montferrat, by making him king of Theffalonica, and adding the ifland of Crete to his kingdom. That lord, being more covetous of gold than glory, fold it to the Venetians in the year 1194; under whom it affumed the name of Candia. See the fequel of its hiftory under that article.

CRETIO, in antiquity, a certain number of days allowed the heir to confider whether he would act as heir to the deceafed or not; after which time, if he did not act, he was excluded from the ftate.

CREUX, a term in fculpture, much ufed by the French; though not yet, that we know of, naturalized among us: but the want of a word of equal import in Englifh, as it has frequently put us under a neceffity of ufing this in the courfe of the prefent work; fo it pleads ftrongly for its admiffion into our language.

Creux originally fignifies a *hollow*, *cavity*, or *pit*, out of which fomething has been fcooped or dug: hence it is ufed to denote that kind of fculpture and graving where the lines and figures are cut and formed within the face or plane of the plate or matter engraven on. In which fenfe it ftands oppofed to relievo; where the lines and figures are emboffed, and appear prominent above the face of the matter.

CREW, the company of failors belonging to a fhip, boat, or other veffel.

The failors that are to work and manage a fhip are regulated by the number of lafts it may carry; each laft making two tons. The crew of a Dutch fhip, from 40 to 50 lafts, is feven failors and a fwabber; from 50 to 60 lafts, the crew confifts of eight men and a fwabber; and thus increafes at the rate of one man for every ten lafts; fo that a fhip of 100 lafts has 12 men, &c. Englifh and French crews are ufually ftronger than Dutch; but always in about the fame proportion. In a fhip of war there are feveral particular crews, or gangs, as the boatfwain's crew, the carpenter's crew, the gunner's crew, &c.

CREVIER, JOHN BAPTIST LEWIS, a Parifian, was trained under the celebrated Rollin, and afterwards became profeffor of rhetoric. Upon the death of his mafter, in 1741, he took upon him to finifh his Roman Hiftory. He publifhed other works, and was greatly ferviceable to the caufe of virtue and religion as well as letters. His death happened in 1765, at a very advanced age. Befides the continuation juft mentioned, he publifhed, 1. An edition of *Livius*, *cum Notis*, in 6 vols 4to, 1748; and afterwards another edition, better adapted to the ufe of his pupils, in 6 vols fmall 8vo. 2. *La Hiftoire des Empereurs des Romains jufqu'à Conftantin*, 1749, 12 tom. 12mo. 3. *Hiftoire de l'Univerfité de Paris*, 7 tom. 12mo. 4. *Rhetorique Francoife*, a juft and ufeful work. 5. *Obfervations fur l'Efprit des Loix*. Here he ventured out of his depth; he fhould have kept within the precincts of the belles lettres.

CREUSA, in fabulous hiftory, daughter of Creon king of Corinth. As fhe was going to marry Jafon, who had divorced Medea, fhe put on a poifoned garment, which immediately fet her body on fire, and fhe expired in the moft excruciating torments. She had received this gown as a gift from Medea, who wifhed to take that revenge upon the infidelity of Jafon. Some call her *Glauce*. (*Ovid. de Art. Am.* i. 335.). A daughter of Priam, king of Troy, by Hecuba. She married Æneas, by whom fhe had, among other children, Afcanius. When Troy was taken, fhe fled in the night with her hufband; but they were feparated in the midft of the confufion and tumult, and Æneas could not recover her, nor hear where fhe was. Some fay that Cybele faved her, and carried her to her temple, of which fhe became prieftefs. *Pauf.* x. 25.—*Virg. Æn.* iii. 592.

CREX, a fpecies of RALLUS. See ORNITHOLOGY *Index*.

CRIB, the rack or manger of a ſtable, or the ſtall or cabin of an ox. It is alſo uſed for any ſmall habitation, as a cottage, &c.

Crib, in the Engliſh ſalt-works, a name given to a ſort of caſe uſed in ſome places inſtead of the *drab*, to put the ſalt into as it is taken out of the boiling pan.

CRIBBAGE, a game at cards, to be learnt only by practice.

CRIBRATION, in *Pharmacy*, the paſſing any ſubſtance through a ſieve or ſearce, in order to ſeparate the finer particles from the groſſer.

CRIBROSUM os, in *Anatomy*, called alſo *os ethmoides*. See Anatomy *Index*.

CRICELASIA, the driving a ring or hoop. Driving a hoop was one of the ancient gymnaſtics: this hoop was as high as the breaſt of the perſon who uſed it. It was commended for rendering the limbs pliable, and for ſtrengthening the nerves.

CRICETUS. See Mus, Mammalia *Index*.

CRICHTON, James, a Scots gentleman, who lived in the 16th century, and who, on account of his extraordinary endowments both of body and mind, obtained the appellation of the "admirable Crichton;" by which title he has been diſtinguiſhed to the preſent day. The time of this celebrated perſon's birth is ſaid, by the generality of writers, to have been in 1551: but according to ſome he was born in Auguſt 1560. There is a difference likewiſe between the biographers of this extraordinary man, with regard to his family, and the rank and ſituation of his father. By ſome it is aſſerted, that James Crichton's father was Robert Crichton of Clunie, in the county of Perth; and that this Robert Crichton commanded Queen Mary's army at the battle of Langſide in the year 1568. But it is ſaid by others, that this gentleman was of Elliock in the ſame county, and that he was lord advocate of Scotland in Queen Mary's reign from 1561 to 1573; part of which time he held that office in conjunction with Spens of Condie. The mother of James Crichton was Elizabeth Stuart, the only daughter of Sir James Stuart of Beath, who was a deſcendant of Robert duke of Albany the third ſon of King Robert the ſecond, by Elizabeth Muir or More, as ſhe is commonly called; ſo that when the admirable Crichton boaſted (as he did abroad), that he was ſprung from Scottiſh kings, he ſaid nothing but what was agreeable to truth.

James Crichton is ſaid to have received his grammatical education at Perth, and to have ſtudied philoſophy in the univerſity of St Andrew's. His tutor in that univerſity was Mr John Rutherford, a profeſſor at that time famous for his learning, and who diſtinguiſhed himſelf by writing four books on Ariſtotle's logic and a commentary on his poetics. According to Aldus Manutius, who calls Crichton firſt couſin to the king, he was alſo inſtructed, along with his majeſty, by Buchanan, Hepburn, and Robertſon, as well as by Rutherford; and he had ſcarcely arrived at the 20th year of his age, when he had run through the whole circle of the ſciences, and could ſpeak and write to perfection in ten different languages. Nor was this all; for he had likewiſe improved himſelf to the higheſt degree in riding, dancing, and ſinging, and in playing upon all ſorts of inſtruments.

Crichton, being thus accompliſhed, went abroad upon his travels, and is ſaid to have gone to Paris; of his tranſactions at which place the following account is given. He cauſed placards to be fixed on all the gates of the ſchools, halls, and colleges belonging to the univerſity, and on all the pillars and poſts before the houſes of the moſt renowned men for literature in the city, inviting all thoſe who were well verſed in any art or ſcience, to diſpute with him in the college of Navarre, that day ſix weeks, by nine of the clock in the morning, where he would attend them, and be ready to anſwer to whatever ſhould be propoſed to him in any art or ſcience, and in any of theſe 12 languages, Hebrew, Syriac, Arabic, Greek, Latin, Spaniſh, French, Italian, Engliſh, Dutch, Flemiſh, and Sclavonian; and this either in verſe or proſe at the diſcretion of the diſputant. During this whole time, inſtead of cloſely applying to his ſtudies, he regarded nothing but hunting, hawking, tilting, vaulting, riding of a well managed horſe, toſſing the pike, handling the muſket, and other military feats; or elſe he employed himſelf in domeſtic games, ſuch as balls, concerts of muſic vocal and inſtrumental, cards, dice, tennis, and ſuch like diverſions of youth. This conduct ſo provoked the ſtudents of the univerſity, that, beneath the placard which was fixed on the Navarre gate, they cauſed the following words to be written: "If you would meet with this monſter of perfection, to make ſearch for him either in the tavern or bawdy-houſe is the readieſt way to find him." Nevertheleſs, when the day appointed arrived, Crichton appeared in the college of Navarre, and acquitted himſelf beyond expreſſion in the diſputation, which laſted from nine o'clock in the morning till ſix at night. At length, the preſident, after extolling him highly for the many rare and excellent endowments which God and nature had beſtowed upon him, roſe from his chair, and accompanied by four of the moſt eminent profeſſors of the univerſity, gave him a diamond ring and a purſe full of gold, as a teſtimony of their love and favour. The whole ended with the repeated acclamations and huzzas of the ſpectators; and henceforward our young diſputant was called "the admirable Crichton." It is added, that he ſo was little fatigued with the diſpute, that he went on the very next day to the Louvre, where he had a match of tilting (an exerciſe then in much requeſt), and in the preſence of ſome of the princes of the court of France, and a great many ladies, carried away the ring 15 times ſucceſſively.

About two years after this we find him at Rome, where he affixed a placard upon all the eminent places of the city, in the following terms: *Nos Jacobus Crichtonus Scotus; cuicumque rei propoſitæ ex improviſo reſpondebimus.* In a city which abounded in wit, this bold challenge, to anſwer to any queſtion that could be propoſed to him without his being previouſly advertiſed of it, could not eſcape the ridicule of a paſquinade. It is ſaid, however, that being nowiſe diſcouraged, he appeared at the time and place appointed; and that, in the preſence of the pope, many cardinals, biſhops, doctors of divinity, and profeſſors in all the ſciences, he diſplayed ſuch wonderful proofs of his univerſal knowledge, that he excited no leſs ſurpriſe than he had done at Paris. Boccalini, who was then at Rome, gives ſomething of a different relation

relation of the matter. According to this author, the pafquinade againft Crichton, which was to the following effect, "*And he that will fee* it, *let him go to the fign of the Falcon and* it *fhall be fhown*," made fuch an impreffion upon him, that he left a place where he had been fo grofsly affronted as to be put upon a level with jugglers and mountebanks.

From Rome he went to Venice; where he contracted an intimate friendfhip with Aldus Manutius, Laurentius Maffa, Speron Speronius, Johannes Donatus, and various other learned perfons, to whom he prefented feveral poems in commendation of the city and univerfity. At length he was introduced to the doge and fenate, in whofe prefence he made a fpeech, which was accompanied with fuch beauty of eloquence, and fuch grace of perfon and manner, that he received the thanks of that illuftrious body, and nothing was talked of through the whole city but this *rara in terris avis*, this prodigy of nature. He held, likewife, difputations on the fubjects of theology, philofophy, and mathematics, before the moft eminent profeffors, and large multitudes of people. His reputation was fo great, that the defire of feeing and hearing him brought together a vaft concourfe of perfons from different quarters to Venice. It may be collected from Manutius, that the time in which Crichton exhibited thefe demonftrations of his abilities was in the year 1580.

During his refidence at Venice, he fell into a bad ftate of health, which continued for the fpace of four months. However, before he was perfectly recovered, he went, by the advice of his friends, to Padua, the univerfity of which city was at that time in great reputation. The next day after his arrival, there was a meeting of all the learned men of the place, at the houfe of Jacobus Aloyfius Cornelius; when Crichton opened the affembly with an extemporary poem in praife of the city, the univerfity, and the company who had honoured him with their prefence. After this, he difputed for fix hours with the moft celebrated profeffors on various fubjects of learning; and he expofed, in particular, the errors of Ariftotle and his commentators, with fo much folidity and acutenefs, and at the fame time with fo much modefty, that he excited univerfal admiration. In conclufion, he delivered extempore an oration in praife of ignorance, which was conducted with fuch ingenuity and elegance, that his hearers were aftonifhed. This exhibition of Crichton's talents was on the 14th of March 1581. Soon after he appointed a day for another difputation to be held at the palace of the bifhop of Padua; not for the purpofe of affording higher proofs of his abilities, for that could not poffibly be done, but in compliance with the earneft folicitations of fome perfons who were not prefent at the former affembly. However, feveral circumftances occurred which prevented this meeting from taking place. Such is the account of Manutius: but Imperialis relates, that he was informed by his father, who was prefent upon the occafion, that Crichton was oppofed by Archangelus Mercenarius, a famous philofopher; and that he acquitted himfelf fo well as to obtain the approbation of a very honourable company, and even of his antagonift himfelf.

Amidft the difcourfes which were occafioned by our young Scotfman's exploits, and the high applaufes that were beftowed upon his genius and attainments, there were not wanting fome who endeavoured to detract from his merit. For ever, therefore, to confound thefe invidious impugners of his talents, he caufed a paper to be fixed on the gates of St John and St Paul's church, wherein he offered to prove before the univerfity, that the errors of Ariftotle, and of all his followers, were almoft innumerable; and that the latter had failed both in explaining their mafter's meaning, and in treating on theological fubjects. He promifed likewife to refute the dreams of certain mathematical profeffors; to difpute in all the fciences, and to anfwer to whatever fhould be propofed to him or objected againft him. All this he engaged to do, either in the common logical way, or by numbers and mathematical figures, or in 100 forts of verfes, at the pleafure of his opponents. According to Manutius, Crichton fuftained this conteft, without fatigue, for three days; during which time he fupported his credit, and maintained his propofitions, with fuch fpirit and energy, that from an unufual concourfe of people, he obtained acclamations and praifes, than which none more magnificent were ever heard by men.

From Padua, Crichton fet out for Mantua; where there happened to be at the time a gladiator, who had foiled in his travels the moft famous fencers in Europe, and had lately killed three who had entered the lifts with him in this city. The duke of Mantua was much grieved at having granted this man his protection, as he found it to be attended with fuch fatal confequences. Crichton being informed of his highnefs's concern, offered his fervice, not only to drive the murderer from Mantua, but from Italy; and to fight him for 1500 piftoles. Though the duke was unwilling to expofe fuch an accomplifhed gentleman to fo great a hazard; yet relying upon the report he had heard of his warlike atchievements, he agreed to the propofal; and the time and place being appointed, the whole court attended to behold the performance. At the beginning of the combat Crichton ftood only upon his defence; while the Italian made his attack with fuch eagernefs and fury, that, having overacted himfelf, he began to grow weary. Crichton now feized the opportunity of attacking his antagonift in return; which he did with fo much dexterity and vigour, that he ran him through the body in three different places, of which wounds he immediately died. The acclamations of the fpectators were loud and extraordinary upon this occafion; and it was acknowledged by all of them, that they had never feen Art grace Nature, or Nature fecond the precepts of Art, in fo lively a manner as they had beheld thefe two things accomplifhed on that day. To crown the glory of the action, Crichton beftowed the prize of his victory upon the widows of the three perfons who had loft their lives in fighting with the gladiator.

It is afferted, that in confequence of this and his other wonderful performances, the duke of Mantua made choice of him for preceptor to his fon Vincentio di Gonzaga, who is reprefented as being of a riotous temper and a diffolute life. The appointment was highly pleafing to the court. Crichton, to teftify his gratitude to his friends and benefactors, and to contribute to their diverfion, framed, we are told, a comedy wherein he expofed and

and ridiculed all the weakneſſes and failures of the ſeveral employments in which men are engaged. This compoſition was regarded as one of the moſt ingenious ſatires that ever was made upon mankind. But the moſt aſtoniſhing part of the ſtory is that Crichton ſuſtained 15 characters in the repreſentation of his own play. Among the reſt, he acted the divine, the philoſopher, the lawyer, the mathematician, the phyſician, and the ſoldier, with ſuch inimitable grace, that every time he appeared on the theatre he ſeemed to be a different perſon.

From being the principal actor in a comedy, Crichton ſoon became the ſubject of a dreadful tragedy. One night, during the time of carnival, as he was walking along the ſtreets of Mantua, and playing upon his guitar, he was attacked by half a dozen people in maſks. The aſſailants found that they had no ordinary perſon to deal with, for they were not able to maintain their ground againſt him. In the iſſue, the leader of the company being diſarmed, pulled off his maſk, and begged his life, telling him that he was the prince his pupil. Crichton immediately fell upon his knees and expreſſed his concern for his miſtake; alleging, that what he had done was only in his own defence, and that if Gonzaga had any deſign upon his life, he might always be maſter of it. Then taken his own ſword by the point, he preſented it to the prince, who immediately received it, and was ſo irritated by the affront which he thought he had ſuſtained in being foiled with all his attendants, that he inſtantly ran Crichton through the heart.

Various have been the conjectures concerning the motives which could induce Vincentio di Gonzaga to be guilty of ſo ungenerous and brutal an action. Some have aſcribed it to jealouſy, aſſerting that he ſuſpected Crichton to be more in favour than himſelf with a lady whom he paſſionately loved; and Sir Thomas Urquhart has told a ſtory upon this head which is extravagant and ridiculous in the higheſt degree. Others, with great probability, repreſent the whole tranſaction as the reſult of a drunken frolic: and it is uncertain, according to Imperialis, whether the meeting of the prince and Crichton was by accident or deſign. However, it is agreed on all hands that Crichton loſt his life in this rencounter. The time of his deceaſe is ſaid, by the generality of his biographers, to have been in the beginning of July 1583; but others fix it to the ſame month in the preceding year. There is a difference, likewiſe, with regard to the period of life at which Crichton died. The common accounts declare that he was killed in the 32d year of his age: but Imperialis aſſerts that he was only in his 22d year when that calamitous event took place; and this fact is confirmed by other writers.

Crichton's tragical end excited a very great and general lamentation. If Sir Thomas Urquhart is to be credited, the whole court of Mantua went three quarters of a year into mourning for him; the epitaphs and elegies that were compoſed upon his death and ſtuck upon his hearſe, would exceed, if collected, the bulk of Homer's works; and, for a long time afterwards, his picture was to be ſeen in moſt of the bedchambers and galleries of the Italian nobility, repreſenting him on horſeback, with a lance in the one hand and a book in the other. The ſame author tells us, that Crichton gained the eſteem of kings and princes, by his magnanimity and knowledge; of noblemen and gentlemen, by his courtlineſs and breeding; of knights, by his honourable deportment and pregnancy of wit; of the rich, by his affability and good fellowſhip; of the poor, by his munificence and liberality; of the old, by his conſtancy and wiſdom; of the young by his mirth and gallantry; of the learned, by his univerſal knowledge; of the ſoldiers, by his undaunted valour and courage; of the merchants and artificers by his upright dealing and honeſty; and of the fair ſex, by his beauty and handſomeneſs, in which reſpect he was a maſterpiece of nature.

Joannes Imperialis, in his life of Crichton, ſays, that he was the wonder of the laſt age; the prodigious production of nature; the glory and ornament of Parnaſſus, in a ſtupendous and unuſual manner; and that, in the judgment of the learned world, he was the phœnix of literature, and rather a ſhining particle of the Divine Mind and Majeſty than a model of what could be attained by human induſtry. The ſame author, after highly celebrating the beauty of his perſon, aſſerts, that his extraordinary eloquence and his admirable knowledge of things teſtified that he poſſeſſed a ſtrength of genius wholly divine. "What (adds this writer) can more exceed our comprehenſion, than that Crichton, in the 21ſt year of his age, ſhould be maſter of ten different languages, and perfectly well verſed in philoſophy, mathematics, theology, polite literature, and all other ſciences? Beſides was it ever heard in the whole compaſs of the globe, that to theſe extraordinary endowments of the mind, ſhould be added a ſingular ſkill in fencing, dancing, ſinging, riding, and in every exerciſe of the gymnaſtic art?" Nay, Imperialis, in his account of Crichton's death, declares, that the report of ſo ſad a cataſtrophe was ſpread to the remoteſt parts of the earth; that it diſturbed univerſal nature; and that in her grief for the loſs of the wonder ſhe had produced, ſhe threatened never more to confer ſuch honour upon mankind. Compared with theſe extravagancies, the aſſertion of Bayle that Crichton was one of the greateſt prodigies of wit that ever lived, and the teſtimony of Felix Aſtolfus concerning his wonderful memory, may be conſidered as modeſt encomiums.

Such are the accounts which, by a ſucceſſion of writers, and particularly ſince the time of Mackenzie, have been given of the admirable Crichton. Theſe accounts are indeed ſo wonderful, that many perſons have been diſpoſed to conſider them as in a great meaſure, if not entirely, fabulous. We ſhall therefore ſubjoin from the *Biographia Britannica* the following obſervations of Dr Kippis, with a view to aſcertain what portion of faith is due to the different parts of the preceding narrative, or at leaſt to aſſiſt the reader in forming a proper judgment concerning them.

The doctor begins with obſerving, "That no credit can be granted to any facts that depend upon the ſole authority of Sir Thomas Urquhart. Mr Pennant indeed ſpeaks of him with approbation; and Dr Samuel Johnſon laid a ſtreſs on his veracity, in the account of Crichton which he dedicated to Dr Hawkeſworth, and is inſerted in the 81ſt number of the Adventurer; of which account it may be obſerved, that it is only

an elegant ſummary of the life written by Mackenzie. But with all deference to theſe reſpectable names, I muſt declare my full perſuaſion that Sir Thomas Urquhart is an author whoſe teſtimony to facts is totally unworthy of regard; and it is ſurpriſing that a peruſal of his works does not ſtrike every mind with this conviction. His productions are ſo inexpreſſibly abſurd and extravagant, that the only rational judgment which can be pronounced concerning him is, that he was little, if at all, better than a madman. To the character of his having been a madman muſt be added that of his being a liar. Severe as this term may be thought, I apprehend that a diligent examination of the treatiſe which contains the memorials concerning Crichton would ſhow that it is ſtrictly true. But of his total diſregard to truth there is inconteſtable evidence in another work of his, entitled, The true Pedigree and Lineal Deſcent of the moſt ancient and honourable Family of the Urquharts in the Houſe of Cromarty, from the Creation of the World until the year of God 1652. In this work it is almoſt incredible what a number of falſities he has invented both with reſpect to names and facts. Perhaps a more flagrant inſtance of impoſture and fiction was never exhibited; and the abſurdity of the whole pedigree is beyond the power of words to expreſs. It can only be felt by thoſe who have peruſed the tract itſelf. Such a man therefore can juſtly be entitled to no degree of credit, eſpecially when he has a purpoſe to ſerve, as was the caſe with Sir Thomas Urquhart. His deſign was to exalt his own family and his own nation at any rate. With reſpect to his own nation, there was no occaſion for having recourſe to fiction, in order to diſplay the luſtre of Scotland, in the eminent men whom it has produced in arms and literature. The pencil of truth alone would have been amply ſufficient for that purpoſe (A).

"So far therefore as Sir Thomas Urquhart's authority is concerned, the wonderful exhibitions of Crichton at Paris, his triumph at Rome, his combat with the gladiator, his writing an Italian comedy, his ſuſtaining fifteen characters in the repreſentation of that comedy, the extraordinary ſtory of the amour which is deſcribed as the cauſe of his death, the nine months mourning for him at Mantua, and the poems hung round his hearſe to the quantity of Homer's works, muſt be regarded as in the higheſt degree doubtful, or rather abſolutely falſe. I cannot forbear mentioning two circumſtances, which ſhow how much Sir Thomas Urquhart was deſtitute of prudence, as well as of ſcrupuloſity, in his violations of truth. He ſays that the duke of Mantua was pleaſed to confer upon the young lady that was Crichton's miſtreſs and future wife, a penſion of five hundred ducats a year; and that the prince alſo beſtowed as much upon her during all the days of his life, 'which was (adds Sir Thomas) but ſhort; for he did not long enjoy himſelf after the croſs fate of ſo miſerable an accident.' Now it is well known that Vincenzo di Gonzaga ſucceeded his father in the dukedom of Mantua in 1587, and that he did not die till the year 1612; which was almoſt, if not entirely, thirty years after Crichton's deceaſe. The other inſtance of the imprudence of Sir Thomas Urquhart in the contrivance of his fictions, occurs at the concluſion of his narrative, where he aſſerts that the verity of the ſtory which he hath related concerning the incomparable Crichton, 'may be certified by two thouſand men yet living who have known him.' *Two thouſand men yet living!* that is, in 1652, ſixty-nine or ſeventy years after Crichton's death, for ſuch was the time of Sir Thomas's publication. Our author would have been ſadly puzzled to collect together theſe two thouſand living witneſſes who could certify the verity of his ſtory.

"With regard, however, to the account which is given of the prodigious exertions of Crichton, both corporeal and mental, at Paris, Mackenzie imagines that he has found a full confirmation of them in a paſſage produced by him from the *Diſquiſitiones* of Stephen Paſquier, and which he conſiders as the teſtimony of an eye-witneſs. But the whole of what has been built upon it by Mackenzie, and ſucceeding biographers, is founded on a miſtake. In the quotation from the *Diſquiſitiones*, the name of Crichton is not mentioned, and the author doth not appear to have been perſonally preſent at the exhibitions of the extraordinary youth there deſcribed. The expreſſions which are ſuppoſed to carry that meaning may well be referred not to the writer himſelf, but to his countrymen the French, before whom the young man is ſaid to have diſplayed his ſurpriſing talents. But the diſcuſſion of this point is totally needleſs, becauſe the paſſage in queſtion is not an original authority. The book entitled *Stephani Paſchieri Diſquiſitiones* is only an abridgement in Latin of Paſquier's *Des Recherches de la France*. Now, in this laſt work there is indeed an account of a wonderful youth, ſuch as is related in Mackenzie's quotation, and from which that paſſage was formed. But this wonderful youth, whoever he might be, was not the admirable Crichton: for Paſquier, who does not tell his name, expreſsly ſays that he appeared in the year 1445 (B). The evidence therefore, produced by Mackenzie falls entirely to the ground. Indeed, if the ſtory of Crichton's exploits at Paris

(A) This was probably meant as a ſatire, and not as a ſerious production.

(B) This matter has been ſet in a clear light by the writer of the following letter.

"SIR,

"We are informed by Sir John Hawkins, that Dr Johnſon dictated from memory that account of the perſon vulgarly named *the Admirable Crichton*, which is to be found in one of the papers of the Adventurer.

"That account is plainly an abridgment of the life of Crichton by Dr George Mackenzie. Dr Mackenzie ſuppoſes that Paſquier, the French lawyer and antiquary, was an eye-witneſs of the feats performed in arts as well as in arms by Crichton. This is one of the groſſeſt errors in biography which has occurred to me in the courſe of my reading; and it is an error which I perceive is gaining ground daily, and bids fair in a ſhort time to be received as an indiſputable truth.

"The

Crichton.

Paris had been true, no man was more likely to be acquainted with them than Stephen Pasquier, who lived at the time, and who would be fond enough of recording transactions so extraordinary. It may farther be observed, that Thuanus, who was likewise a contemporary, and who in his own life is very particular in what relates to learned men, makes no mention of Crichton. The only authority for his having ever resided in France at all (Sir Thomas Urquhart excepted) is that of Dr John Johnston, who says *Gallia pectus excolit*. But this amounts to no proof of the truth of the transactions related by Urquhart. The whole which can be deduced from it is, that Crichton, in the course of his travels, might make some stay in France for the purpose of improvement. Even this, however, doth not agree with the narration of Imperialis, who informs us, that when troubles arose in Scotland on account of religion, and Queen Mary fell into so many calamities, Crichton was sent by his father directly from that country to Venice as a place of security.

"It is acknowledged by Sir John Hawkins, that Sir Thomas Urquhart has produced no authorities in support of his surprising narrations. But this defect, Sir John thinks, is supplied in the Life of Crichton which is given in Mr Pennant's Tour. I am under the necessity of saying, that this is by no means the case. The article in Pennant was not drawn up by that ingenious and learned gentleman, but is the transcript of a pamphlet, that was printed some years ago at Aberdeen; and which pamphlet is nothing more than a republication, with a few verbal alterations, of the Life of Crichton written by Mackenzie. It doth not, therefore, furnish a single additional testimony in confirmation of Sir Thomas Urquhart's stories, excepting in the mistaken instance from Pasquier. In other respects it only borrows facts from Sir Thomas Urquhart, without establishing them upon fresh proofs. It is observable, that the earlier biographers of Crichton had no knowledge of most of the transactions enlarged upon by this extravagant writer; for if they had known them, they would have been eagerly disposed to relate them, and to do it with every circumstance of exaggeration. How much this was the character of Thomas Dempster, with regard to his own countrymen, is sufficiently understood, and hath frequently been remarked; and yet his account of Crichton is uncommonly modest, compared with those of succeeding authors. The extravagance of Imperialis in respect to Crichton has already appeared. There seems indeed to have been an universal tendency in the writers of this young Scotsman's life to produce wonder and astonishment. Mackenzie remarks, that Imperialis could not but know the truth of all, or at least of most of, the things he has related concerning Crichton, since he lived upon the places in which they were transacted, and had them from an eye and ear witness, even his own father. It is, however, to be remembered, that Imperialis's *Museum Historicum* was not published till 1640, nearly sixty years after the events recorded by him happened; to which may be added, that the information he derived from his father was probably very imperfect. Imperialis the elder was not born till 1568, and consequently was only thirteen years old when Crichton displayed his talents at Padua. What real dependence, therefore, could there be on the accuracy of the account given by a youth of that age? He could only relate, and perhaps from inadequate intelligence, the things which were talked of when he was a boy. Besides, his authority is appealed to for no more than a single fact, and that a doubtful one, since it does not accord with Manutius's narrative; and who ever heard of the famous philosopher Archangelus Mercenarius?

"The

"The error seems to have arisen from the following circumstance: Dr Mackenzie had never read the original work of Pasquier, entitled *Recherches de la France*; what he quotes concerning *the wonderful young man* is taken from a Latin abridgement of that work; he refers to *Steph. Pasch.* Disquis. lib. v. cap. 23. and he gives his quotation in Latin; indeed it does not appear that Dr Mackenzie had ever heard of the original work. Now Pasquier, instead of saying that he was an eye-witness of the wonders exhibited by Crichton, says in the most unequivocal terms, that what he relates was taken 'from a manuscript which was occasionally used by him,' (*d'un livre ecrit à la main, dont je m' aide selon les occurrences*). And he adds, 'I will represent the story in its own simple garb, without any artificial colouring, so that my readers may be the more inclined to give credit to it,' (*vous representant cette histoire en sa simplicitè, sans y apporter aucun fard pour ce que vous y adjousteres plus de foy*). He then transcribes the narrative from the MS. which places the appearance of this phenomenon in the year 1445, a full century before the birth of our Crichton. See *Recherches de la France*, lib. vi. c. 38. 39.

"Dr Mackenzie, although he had not read the original of Pasquier, appears to have read an author who quotes the same story: 'The learned M. du Launoy (says he), in his History of the College of Navarre, finding the history of this dispute recorded in a MS. History of the College of Navarre, and the like account of a Spaniard in Trithemius, confounds the two together, and *robs* our author of the glory of this action, and places it in the year 1445; whereas it should be in the year 1571.' This charge of *robbery* is singular enough.

"Let me only add, that Pasquier transcribes some verses written by George Chastelain, a French poet in the reign of Charles VII. king of France, which allude to the same story; and that Pasquier himself was born at Paris in 1528, passed his life in that city, and was an eminent lawyer and pleader in 1571; so that it is impossible the feats of Crichton, had they been really performed at Paris, could have been unknown to him, and most improbable that, knowing them, he would have omitted to mention them; for, in the same lib. vi. c. 39. he is at pains to produce examples of great proficiency, displayed by men in a much humbler rank of life than that of philosophers and public disputants. I am, &c. *"

* *Edin. Mag.* 1787.

"The truth of the matter is, that ſome ſlight circumſtances excepted, neither Dempſter nor Imperialis have produced any evidences of Crichton's extraordinary abilities beſides thoſe which are recorded by the younger Aldus Manutius. He therefore is to be regarded as the only living authority upon the ſubject. Manutius was contemporary with Crichton; he was cloſely connected with him in friendſhip; and he relates ſeveral things on his own perſonal knowledge. He is a poſitive and undoubted witneſs with reſpect to our young Scotſman's intellectual and literary exertions at Venice and at Padua; and from him it is that our account of them is given above. Nevertheleſs, even Aldus Manutius is to be read with ſome degree of caution. Dedications are apt to aſſume the ſtyle of exaggeration, and this is the caſe with Manutius's dedication of the *Paradoxa Ciceronis* to Crichton. In addition to the general language of ſuch addreſſes, he might be carried too far by his affection for his friend, which appears to have been very great: nor was the younger Aldus eminent for ſteadineſs and conſiſtency of character. It is even ſaid that by his imprudencies he fell into contempt and miſery. But independently of any conſiderations of this kind, it may be obſerved, that Manutius's narrative, previous to Crichton's arrival at Venice, could not be derived from perſonal knowledge. For that part of it (which is ſufficiently erroneous) he was probably indebted to Crichton himſelf. Neither does he appear to have been an eye-witneſs of the whole of the diſputations which were held at Padua; for ſpeaking of his young friend's praiſe of ignorance, he relates, that thoſe who were preſent told him afterwards how much they were ſtruck with that oration. However, at the other diſputation, which laſted three days, Manutius ſeems certainly to have attended; for he concludes his accounts of it with ſaying, that he was not only the adviſer but the ſpectator of Crichton's wonderful conteſts. It is evident, however, from the dedication, that his extraordinary abilities were not univerſally acknowledged and admired. Some there were who detracted from them, and were diſpleaſed with Manutius for ſo warmly ſupporting his reputation.

"As to the real cauſe and manner of our young Scotſman's death, both of them ſtill remain in ſome degree of obſcurity. That he was killed in a rencounter at the carnival at Mantua, is teſtified by too many authors to be reaſonably doubted. But whether there was that particular malignity on the part of Vincenzo di Gonzaga, which is commonly aſcribed to him, may be conſidered as uncertain.

"One important method yet remains by which we may be enabled to form a judgment of Crichton's genius, and that is from a peruſal of the four poems of his which are ſtill preſerved. It is, however, to be feared, that theſe will not exhibit him in a very high point of view. Some fancy, perhaps, may be thought to be diſplayed in the longeſt of his poems, which was written on occaſion of his approach to the city of Venice. He there repreſents a Naiad as riſing up before him; and, by the order of the Muſes and of Minerva, directing him how to proceed. But this is a ſentiment which ſo eaſily preſents itſelf to a claſſical reader, that it can ſcarcely be conſidered as deſerving the name of a poetical invention. The three other poems of Crichton have ſtill leſs to recommend them. Indeed his verſes will not ſtand the teſt of a rigid examination even with regard to quantity.

"What then is the opinion which on the whole we are to form of the admirable Crichton? It is evident that he was a youth of ſuch lively parts as excited great preſent admiration, and high expectation with regard to his future attainments. He appears to have had a fine perſon, to have been adroit in his bodily exerciſes, to have poſſeſſed a peculiar facility in learning languages, to have enjoyed a remarkably quick and retentive memory, and to have excelled in a power of declamation, a fluency of ſpeech, and a readineſs of reply. His knowledge, likewiſe, was probably very uncommon for his years; and this, in conjunction with his other qualities, enabled him to ſhine in public diſputation. But whether his knowledge and learning were accurate or profound, may juſtly be queſtioned; and it may equally be doubted whether he would have ariſen to any extraordinary degree of eminence in the literary world. It will always be reflected upon with regret, that his early and untimely death prevented this matter from being brought to the teſt of experiment."

From the portraits which remain of Crichton, it appears that in his face and form he was beautiful and elegant, and that his body and limbs, though not muſcular or athletic, were well proportioned and fitted for feats of agility. The following catalogue of Crichton's works is given by Dempſter: 1. *Odæ ad Laurentium Maſſam plures.* 2. *Laudes Patavinæ, Carmen extempore effuſum, cum in Jacobi Moyſii Cornelii domo experimentum ingenii coram tota Academiæ frequentia, non ſine multorum ſtupore, faceret.* 3. *Ignorationis Laudatio, extemporale Thema ibidem redditum, poſt ſex horarum diſputationes, ut præſentes ſomnia potius fovere quam rem ſe veram videre affirmarint, ait Manutius.* 4. *De Appulſu ſuo Venetias.* 5. *Odæ ad Aldum Manutium.* 6. *Epiſtolæ ad Diverſos.* 7. *Præfationes ſolemnes in omnes Scientias ſacras et profanas.* 8. *Judicium de Philoſophis.* 9. *Errores Ariſtotelis.* 10. *Arma an Literæ Præſtant, Controverſia oratoria.* 11. *Refutatio Mathematicorum.* 12. A Comedy in the Italian language.

CRICK, among farriers, is when a horſe cannot turn his neck any manner of way, but holds it ſore right, inſomuch that he cannot take his meat from the ground without great pain.

CRICKET. See GRYLLUS, ENTOMOLOGY *Index*.

CRICKET is alſo the name of an exerciſe or game, with bats and a ball.

Mole-CRICKET. See GRYLLOTALPA, ENTOMOLOGY *Index*.

CRICKLADE, a borough-town of Wiltſhire, ſituated on the river Iſis, about 26 miles ſouth-weſt of Oxford. It ſends two members to parliament. W. Long. 1. 55. N. Lat. 51. 35.

CRICOARYTENOIDÆUS, in *Anatomy*, a name given to two muſcles of the larynx. See ANATOMY, *Table of the Muſcles*.

CRICOIDES, in *Anatomy*, a cartilage of the larynx, called alſo the *annular cartilage*. It occupies the loweſt part by way of baſe to the reſt of the cartilages, and to the lower part of it the aſpera arteria adheres. See ANATOMY, *Table of the Muſcles*.

CRICOTHYROIDÆUS, in *Anatomy*, one of the five proper muscles of the larynx. See ANATOMY, *Table of the Muscles*.

CRIM-TARTARS, a people of Asia, so called because they originally came from Crimea. They rove from place to place in search of pastures, their houses being drawn on carts. There are a great number of them about Astrachan, to which place they flock in the winter-time; but they are not permitted to enter the city: for this reason, they erect huts up and down in the open fields: which are made either of bulrushes or reeds, being about 12 feet in diameter, of a round form, and with a hole at the top to let out the smoke. Their fuel is turf or cow-dung; and when the weather is very cold, they cover the hut with a coarse cloth, and sometimes pass several days without stirring out. They are generally of small stature, with large faces, little eyes, and of an olive complexion. The men are generally so wrinkled in their faces, that they look like old women. Their common food is fish dried in the sun, which serves them instead of bread; and they eat the flesh of horses as well as camels. Their drink is water and milk, especially mares milk, which they carry about in nasty leathern bags. Their garments are of coarse gray cloth, with a loose mantle made of a black sheep's skin, and a cap of the same. The women are clothed in white linen, with which likewise they dress their heads, hanging a great many Moscovian pence about them; and there is likewise a hole left to stick feathers in. As for their religion, they are a sort of Mahometans; but do not coop up their women like the Turks.

Crim-Tartary, or *Crimea*. See CRIMEA.

CRIME *and* PUNISHMENT. The discussion and admeasurement of crimes and punishments forms in every country the code of criminal law; or, as it is more usually denominated in England, the doctrine of the *pleas of the crown;* so called, because the king, in whom centres the majesty of the whole community, is supposed by the law to be the person injured by every infraction of the public rights belonging to that community; and is therefore in all cases the proper prosecutor for every public offence.

The knowledge of this branch of jurisprudence, which teaches the nature, extent, and degrees of every crime, and adjusts to it its adequate and necessary penalty, is of the utmost importance to every individual in the state. For no rank or elevation in life, no uprightness of heart, no prudence or circumspection of conduct, should tempt a man to conclude, that he may not at some time or other be deeply interested in these researches. The infirmities of the best among us, the vices and ungovernable passions of others, the instability of all human affairs, and the numberless unforeseen events which the compass of a day may bring forth, will teach us (upon a moment's reflection), that to know with precision what the laws of our country have forbidden, and the deplorable consequences to which a wilful disobedience may expose us, is a matter of universal concern.

In proportion to the importance of the criminal law, ought also to be the care and attention of the legislature in properly forming and enforcing it. It should be founded upon principles that are permanent, uniform, and universal; and always comformable to the dictates of truth and justice, the feelings of humanity, and the indelible rights of mankind: though it sometimes (provided there be no transgression of these eternal boundaries) may be modified, narrowed, or enlarged, according to the local or occasional necessities of the state which it is meant to govern. And yet, either from a want of attention to those principles in the first concoction of the laws, and adopting in their stead the impetuous dictates of avarice, ambition, and revenge; from retaining the discordant political regulations, which successive conquerors or factions have established, in the various revolutions of government; from giving a lasting efficacy to sanctions that were intended to be temporary, and made (as Lord Bacon expresses it) merely upon the spur of the occasion; or lastly, from too hastily employing such means as are greatly disproportionate to their ends, in order to check the progress of some very prevalent offence;—from some, or from all, of these causes, it hath happened, that the criminal law is in every country of Europe more rude and imperfect than the civil. We shall not here enter into any minute inquiries concerning the local constitutions of other nations; the inhumanity and mistaken policy of which have been sufficiently pointed out by ingenious writers of their own *. But even with us in Britain, where our crown-law is with justice supposed to be more nearly advanced to perfection; where crimes are more accurately defined, and penalties less uncertain and arbitrary; where all our accusations are public, and our trials in the face of the world; where torture is unknown, and every delinquent is judged by such of his equals, against whom he can form no exception, or even a personal dislike:—even here we shall occasionally find room to remark some particulars that seem to want revision and amendment. These have chiefly arisen from too scrupulous an adherence to some rules of the ancient common law, when the reasons have ceased upon which those rules were founded; from not repealing such of the old penal laws as are either obsolete or absurd; and from too little care and attention in framing and passing new ones. The enacting of penalties to which a whole nation shall be subject, ought not to be left, as a matter of indifference to the passions or interests of a few, who upon temporary motives may prefer or support such a bill; but be calmly and maturely considered by persons who know what provisions the laws have already made to remedy the mischief complained of, who can from experience foresee the probable consequences of those which are now proposed, and who will judge without passion or prejudice how adequate they are to the evil. It is never usual in the house of peers even to read a private bill which may affect the property of an individual, without first referring it to some of the learned judges, and hearing their report thereon. And surely equal precaution is necessary, when laws are to be established which may affect the property, the liberty, and perhaps even the lives of thousands. Had such a reference taken place, it is impossible that in the 16th century it could ever have been made a capital crime, to break down (however maliciously) the mound of a fishpond, whereby any fish shall escape; or to cut down a cherry-tree in an orchard. Were even a committee appointed

* As Baron Montesquieu, Marquis of Beccaria, &c.

Blackst. Comment.

pointed but once in 100 years to revise the criminal law, it could not have continued to this hour a felony without benefit of clergy, to be seen for one month in the company of persons who call themselves, or are called, *Egyptians*.

It is true, that these outrageous penalties, being seldom or never inflicted, are hardly known to be the law by the public; but that rather aggravates the mischief, by laying a snare for the unwary. Yet they cannot but occur to the observation of any one, who hath undertaken the task of examining the great outlines of our law, and tracing them up to their principles: and it is the duty of such a one to hint them with decency to those whose abilities and stations enable them to apply the remedy. We now proceed to consider (in the first place) the general nature of *crimes*.

I. A crime, or misdemeanour, is an act committed, or omitted, in violation of a public law, either forbidding or commanding it. This general definition comprehends both crimes and misdemeanours; which, properly speaking, are mere synonymous terms; though, in common usage, the word "crimes" is made to denote such offences as are of a deeper and more atrocious dye; while smaller faults, and omissions of less consequence, are comprised under the gentler name of "misdemeanours" only.

The distinction of public wrongs from private, of crimes and misdemeanours from civil injuries, seems principally to consist in this: that private wrongs, or civil injuries, are an infringement or privation of the civil rights which belong to individuals, considered merely as individuals; public wrongs, or crimes and misdemeanours, are a breach and violation of the public rights and duties, due to the whole community, considered as a community, in its social aggregate capacity. As if I detain a field from another man, to which the law has given him a right, this is a civil injury, and not a crime; for here only the right of an individual is concerned, and it is immaterial to the public which of us is in possession of the land; but treason, murder, and robbery, are properly ranked among crimes; since, besides the injury done to individuals, they strike at the very being of society; which cannot possibly subsist, where actions of this sort are suffered to escape with impunity.

In all cases the crime includes an injury; every public offence is also a private wrong, and somewhat more; it affects the individual, and it likewise affects the community. Thus treason in imagining the king's death, involves in it conspiracy against an individual, which is also a civil injury; but as this species of treason in its consequences principally tends to the dissolution of government, and the destruction thereby of the order and peace of society, this denominates it a crime of the highest magnitude. Murder is an injury to the life of an individual; but the law of society considers principally the loss which the state sustains by being deprived of a member, and the pernicious example thereby set for others to do the like. Robbery may be considered in the same view: it is an injury to private property; but, were that all, a civil satisfaction in damages might atone for it; the public mischief is the thing, for the prevention of which our laws have made it a capital offence. In these gross and atrocious injuries the private wrong is swallowed up in the public; we seldom hear any mention made of satisfaction to the individual; the satisfaction to the community being so very great. And indeed, as the public crime is not otherwise avenged than by forfeiture of life and property, it is impossible afterwards to make any reparation for the private wrong; which can only be had from the body or goods of the aggressor. But there are crimes of an inferior nature, in which the public punishment is not so severe, but it affords room for a private compensation also; and herein the distinction of crimes from civil injuries is very apparent. For instance, in the case of battery, or beating another, the aggressor may be indicted for this at the suit of the king, for disturbing the public peace, and be punished criminally by fine and imprisonment; and the party beaten may also have his private remedy by action of trespass for the injury, which he in particular sustains, and recover a civil satisfaction in damages. So also, in case of a public nuisance, as digging a ditch across a highway, this is punishable by indictment, as a common offence to the whole kingdom, and all his majesty's subjects: but if any individual sustains any special damage thereby, as laming his horse, breaking his carriage, or the like, the offender may be compelled to make ample satisfaction, as well for the private injury as for the public wrong.

II. The nature of crimes and misdemeanours in general being thus ascertained and distinguished, we proceed in the next place to consider the general nature of punishments: Which are evils or inconveniences consequent upon crimes and misdemeanours; being devised, denounced, and inflicted by human laws, in consequence of disobedience or misbehaviour in those to regulate whose conduct such laws were respectively made. And herein we will briefly consider the *power*, the *end*, and the *measure*, of human punishment.

1. As to the power of human punishment, or the right of the temporal legislator to inflict discretionary penalties for crimes and misdemeanours. It is clear, that the right of punishing crimes against the law of nature, as murder and the like, is, in a state of mere nature, vested in every individual. For it must be vested in somebody; otherwise the laws of nature would be vain and fruitless, if none were empowered to put them in execution; and if that power is vested in any one, it must also be vested in all mankind; since all are by nature equal. Whereof the first murderer Cain was so sensible, that we find him expressing his apprehensions, that whoever should find him would slay him. In a state of society this right is transferred from individuals to the sovereign power; whereby men are prevented from being judges in their own causes, which is one of the evils that civil government was intended to remedy. Whatever power therefore individuals had of punishing offences against the law of nature, that is now vested in the magistrate alone; who bears the sword of justice by the consent of the whole community. And to this precedent natural power of individuals must be referred that right, which some have argued to belong to every state (though, in fact, never exercised by any), of punishing not only their own subjects, but also foreign ambassadors,

Crime and Punishment.

ambassadors, even with death itself; in case they have offended, not indeed against the municipal laws of the country, but against the divine laws of nature, and become liable thereby to forfeit their lives for their guilt.

As to offences merely against the laws of society, which are only *mala prohibita*, and not *mala in se*; the temporal magistrate is also impowered to inflict coercive penalties for such transgression: and this by the consent of individuals; who, in forming societies, did either tacitly or expressly invest the sovereign power with a right of making laws, and of enforcing obedience to them when made, by exercising, upon their non-observance, severities adequate to the evil. The lawfulness, therefore, of punishing such criminals is founded upon this principle, that the law by which they suffer was made by their own consent; it is a part of the original contract into which they entered, when first they engaged in society; it was calculated for, and has long contributed to, their own security.

This right therefore, being thus conferred by universal consent, gives to the state exactly the same power, and no more, over all its members, as each individual member had naturally over himself or others; which has occasioned some to doubt, how far a human legislature ought to inflict capital punishments for positive offences; offences against the municipal law only, and not against the law of nature; since no individual has naturally a power of inflicting death upon himself or others for actions in themselves indifferent. With regard to offences *mala in se*, capital punishments are in some instances inflicted by the immediate command of God himself to all mankind; as, in the case of murder, by the precept delivered to Noah, their common ancestor and representative, "Whoso sheddeth man's blood, by man shall his blood be shed." In other instances they are inflicted after the example of the Creator, in his positive code of laws for the regulation of the Jewish republic; as in the case of the crime against nature. But they are sometimes inflicted without such express warrant or example, at the will and discretion of the human legislature; as for forgery, for theft, and sometimes for offences of a lighter kind. The practice is thus justified by that great and good man Sir Matthew Hale: "When offences grow enormous, frequent, and dangerous to a kingdom, or state, destructive or highly pernicious to civil societies, and to the great insecurity and danger of the kingdom or its inhabitants, severe punishment and even death itself is necessary to be annexed to laws in many cases by the prudence of lawgivers." It is therefore the enormity, or dangerous tendency, of the crime, that alone can warrant any earthly legislature in putting him to death that commits it. It is not its frequency only, or the difficulty of otherwise preventing it, that will excuse our attempting to prevent it by a wanton effusion of human blood. For though the end of punishment is to deter men from offending, it never can follow from thence, that it is lawful to deter them at any rate and by any means; since there may be unlawful methods of enforcing obedience even to the justest laws. Every humane legislator will be therefore extremely cautious of establishing laws that inflict the penalty of death, especially for slight offences, or such as are merely positive. He will expect a better reason for his so doing than that loose one which generally is given; that it is found by former experience that no lighter penalty will be effectual. For is it found upon farther experience, that capital punishments are more effectual? Was the vast territory of all the Russias worse regulated under the late empress Elizabeth, than under her more sanguinary predecessors? Is it now, under Catherine II. less civilized, less social, less secure? And yet we are assured, that neither of these illustrious princesses have, throughout their whole administration, inflicted the penalty of death: and the latter has, upon full persuasion of its being useless, nay even pernicious, given orders for abolishing it entirely throughout her extensive dominions. But indeed, were capital punishments proved by experience to be a sure and effectual remedy, that would not prove the necessity (upon which the justice and propriety depend) of inflicting them upon all occasions when other expedients fail. It is feared this reasoning would extend a great deal too far. For instance, the damage done to our public roads by loaded waggons is universally allowed, and many laws have been made to prevent it, none of which have hitherto proved effectual. But it does not therefore follow, that it would be just for the legislature to inflict death upon every obstinate carrier, who defeats or eludes the provisions of former statutes. Where the evil to be prevented is not adequate to the violence of the preventive, a sovereign that thinks seriously can never justify such a law to the dictates of conscience and humanity. To shed the blood of our fellow creature is a matter that requires the greatest deliberation, and the fullest conviction of our own authority; for life is the immediate gift of God to man; which neither he can resign, nor can it be taken from him, unless by the command or permission of Him who gave it, either expressly revealed, or collected from the laws of nature or society by clear and indisputable demonstration.

We would not be understood to deny the right of the legislature in any country to enforce its own laws by the death of the transgressor, though persons of some abilities have doubted it; but only to suggest a few hints for the consideration of such as are, or may hereafter become, legislators. When a question arises, whether death may be lawfully inflicted for this or that transgression, the wisdom of the laws must decide it: and to this public judgment or decision all private judgments must submit; else there is an end of the first principle of all society and government. The guilt of blood, if any, must lie at their doors, who misinterpret the extent of their warrant; and not at the doors of the subject, who is bound to receive the interpretations that are given by the sovereign power.

2. As to the end, or final cause, of human punishments. This is not by way of atonement or expiation for the crime committed; for that must be left to the just determination of the Supreme Being; but as a precaution against future offences of the same kind. This is effected three ways: either by the amendment of the offender himself: for which purpose all corporeal punishments, fines, and temporary exile or imprisonment, are inflicted; or, by deterring others by the dread of his example from offending in the like way, "*ut pœna* (as Tully expresses it), *ad paucos, me-*

"*tus*

" *tus ad omnes, perveniat;*" which gives rise to all ignominious punishments, and to such executions of justice as are open and public: or, lastly, by depriving the party injuring of the power to do future mischief; which is effected by either putting him to death, or condemning him to perpetual confinement, slavery, or exile. The same one end, of preventing future crimes, is endeavoured to be answered by each of these three species of punishment. The public gains equal security, whether the offender himself be amended by wholesome correction, or whether he be disabled from doing any farther harm: and if the penalty fails of both these effects, as it may do, still the terror of his example remains as a warning to other citizens. The method, however, of inflicting punishment ought always to be proportioned to the particular purpose it is meant to serve, and by no means to exceed it; therefore the pains of death, and perpetual disability by exile, slavery, or imprisonment, ought never to be inflicted, but when the offender appears incorrigible: which may be collected either from a repetition of minuter offences; or from the perpetration of some one crime of deep malignity, which of itself demonstrates a disposition without hope or probability of amendment: and in such cases it would be cruelty to the public to defer the punishment of such a criminal till he had an opportunity of repeating perhaps the worst of villanies.

3. As to the *measure* of human punishments. From what has been observed in the former articles, we may collect, that the quantity of punishment can never be absolutely determined by any standing invariable rule; but it must be left to the arbitration of the legislature to inflict such penalties as are warranted by the laws of nature and society, and such as appear to be the best calculated to answer the end of precaution against future offences.

Hence it will be evident, that what some have so highly extolled for its equity, the *lex talionis*, or " law of retaliation," can never be in all cases an adequate or permanent rule of punishment. In some cases indeed it seems to be dictated by natural reason; as in the case of conspiracies to do an injury, or false accusations of the innocent; to which we may add that law of the Jews and Egyptians, mentioned by Josephus and Diodorus Siculus, that whoever without sufficient cause was found with any mortal poison in his custody, should himself be obliged to take it. But, in general, the difference of persons, place, time, provocation, or other circumstances, may enhance or mitigate the offence; and in such cases retaliation can never be a proper measure of justice. If a nobleman strikes a peasant, all mankind will see, that if a court of justice awards a return of the blow, it is more than a just compensation. On the other hand, retaliation may sometimes be too easy a sentence; as, if a man maliciously should put out the remaining eye of him who had lost one before, it is too slight a punishment for the maimer to lose only one of his: and therefore the law of the Locrians, which demanded an eye for an eye, was in this instance judiciously altered; by decreeing, in imitation of Solon's laws, that he who struck out the eye of a one-eyed man, should lose both his own in return. Besides, there are very many crimes, that will in no shape admit of these penalties, without manifest absurdity and wickedness. Theft cannot be punished by theft, defamation by defamation, forgery by forgery, adultery by adultery, and the like. And we may add, that those instances, wherein retaliation appears to be used, even by the divine authority, do not really proceed upon the rule of exact retribution, by doing to the criminal the same hurt he has done to his neighbour, and no more; but this correspondence between the crime and punishment is barely a consequence from some other principle. Death is ordered to be punished with death; not because one is equivalent to the other, for that would be expiation, and not punishment. Nor is death always an equivalent for death: the execution of a needy decrepid assassin is a poor satisfaction for the death of a nobleman in the bloom of his youth, and full enjoyment of his friends, his honours, and his fortune. But the reason upon which this sentence is grounded seems to be, that this is the highest penalty that man can inflict, and tends most to the security of the world: by removing one murderer from the earth, and setting a dreadful example to deter others: so that even this grand instance proceeds upon other principles than those of retaliation. And truly, if any measure of punishment is to be taken from the damage sustained by the sufferer, the punishment ought rather to exceed than equal the injury; since it seems contrary to reason and equity, that the guilty (if convicted) should suffer no more than the innocent has done before him; especially as the suffering of the innocent is past and irrevocable, that of the guilty is future, contingent, and liable to be escaped or evaded. With regard indeed to crimes that are incomplete, which consist merely in the intention, and are not yet carried into act, as conspiracies and the like; the innocent has a chance to frustrate or avoid the villany, as the conspirator has also a chance to escape his punishment: and this may be one reason why the *lex talionis* is more proper to be inflicted, if at all, for crimes that consist in intention, than for such as are carried into act. It seems indeed consonant to natural reason, and has therefore been adopted as a maxim by several theoretical writers, that the punishment due to the crime of which one falsely accuses another, should be inflicted on the perjured informer. Accordingly, when it was once attempted to introduce into England the law of retaliation, it was intended as a punishment for such only as preferred malicious accusations against others; it being enacted by statute 37 Edw. III. c. 18. that such as preferred any suggestions to the king's great council should put in sureties of taliation; that is, to incur the same pain that the other should have had, in case the suggestion were found untrue. But, after one year's experience, this punishment of taliation was rejected, and imprisonment adopted in its stead.

But though from what has been said it appears, that there cannot be any regular determinate method of rating the quantity of punishments for crimes, by any one uniform rule; but they must be referred to the will and discretion of the legislative power: yet there are some general principles, drawn from the nature and circumstances of the crime, that may be of some assistance in allotting it an adequate punishment.

As, first, with regard to the object of it: for the greater and more exalted the object of an injury is, the

the more care ſhould be taken to prevent that injury, and of courſe under this aggravation the puniſhment ſhould be more ſevere. Therefore treaſon in conſpiring the king's death is (in Britain) puniſhed with greater rigour than even actually killing any private ſubject. And yet, generally, a deſign to tranſgreſs is not ſo flagrant an enormity as the actual completion of that deſign. For evil, the nearer we approach it, is the more diſagreeable and ſhocking; ſo that it requires more obſtinacy in wickedneſs to perpetrate an unlawful action, than barely to entertain the thought of it; and it is an encouragement to repentance and remorſe, even till the laſt ſtage of any crime, that it never is too late to retract; and that if a man ſtops even here, it is better for him than if he proceeds; for which reaſon an attempt to rob, to raviſh, or to kill, is far leſs penal than the actual robbery, rape, or murder. But in the caſe of a treaſonable conſpiracy, the object whereof is the king's majeſty, the bare intention will deſerve the higheſt degree of ſeverity; not becauſe the intention is equivalent to the act itſelf; but becauſe the greateſt rigour is no more than adequate to a treaſonable purpoſe of the heart, and there is no greater left to inflict upon the actual execution itſelf.

Again, The violence of paſſion, or temptation, may ſometimes alleviate a crime; as theft, in caſe of hunger, is far more worthy of compaſſion, than when committed through avarice, or to ſupply one in luxurious exceſſes. To kill a man upon ſudden and violent reſentment is leſs penal than upon cool deliberate malice. The age, education, and character, of the offender; the repetition (or otherwiſe) of the offence; the time, the place, the company wherein it was committed; all theſe, and a thouſand other incidents, may aggravate or extenuate the crime (A).

Farther, As puniſhments are chiefly intended for the prevention of future crimes, it is but reaſonable that among crimes of different natures thoſe ſhould be moſt ſeverely puniſhed, which are the moſt deſtructive of the public ſafety and happineſs; and, among crimes of an equal malignity, thoſe which a man has the moſt frequent and eaſy opportunities of committing, which cannot be ſo eaſily guarded againſt as others, and which therefore the offender has the ſtrongeſt inducement to commit: according to what Cicero obſerves, *Ea ſunt animadvertenda peccata maxime, quæ difficillime præcaventur.* Hence it is, that for a ſervant to rob his maſter is in more caſes capital than for a ſtranger. If a ſervant kills his maſter, it is a ſpecies of treaſon; in another it is only murder. To ſteal a handkerchief, or other trifle of above the value of twelvepence, privately from one's perſon, is made capital; but to carry off a load of corn from an open field, though of fifty times greater value, is puniſhed with tranſportation only. And in the iſland of Man this rule was formerly carried ſo far, that to take away a horſe or an ox was there no felony; but a treſpaſs, becauſe of the difficulty in that little territory to conceal them or carry them off: but to ſteal a pig or a fowl, which is eaſily done, was a capital miſdemeanour, and the offender was puniſhed with death.

Laſtly, As a concluſion to the whole, we may obſerve, that puniſhments of unreaſonable ſeverity, eſpecially when indiſcriminately inflicted, have leſs effect in preventing crimes, and amending the manners of a people, than ſuch as are more merciful in general, yet properly intermixed with due diſtinctions of ſeverity. It is the ſentiment of an ingenious writer, who ſeems to have well ſtudied the ſprings of human action, that crimes are more effectually prevented by the certainty than by the ſeverity of puniſhment; for the exceſſive ſeverity of the laws (ſays Monteſquieu) hinders their execution. When the puniſhment ſurpaſſes all meaſure, the public will frequently prefer impunity to it. Thus alſo the ſtatute 1 Mar. ſt. 1. c. 1. recites in its preamble, "that the ſtate of every king conſiſts more aſſuredly in the love of the ſubjects towards their prince, than in the dread of laws made with rigorous pains: and that laws made for the preſervation of the commonwealth without great penalties, are more often obeyed and kept than laws made with extreme puniſhments." Happy had it been for the nation if the ſubſequent practice of that deluded princeſs in matters of religion, had been correſpondent to theſe ſentiments of herſelf and parliament in matters of ſtate and government! We may further obſerve, that ſanguinary laws are a bad ſymptom of the diſtemper of any ſtate, or at leaſt of its weak conſtitution. The laws of the Roman kings, and the twelve tables of the *decemviri*, were full of cruel puniſhments: the Porcian law, which exempted all citizens from ſentence of death, ſilently abrogated them all. In this period the republic flouriſhed: under the emperors ſevere puniſhments were revived, and then the empire fell.

It is, moreover, abſurd and impolitic to apply the ſame puniſhment to crimes of different malignity. A multitude of ſanguinary laws, (beſides the doubt that may be entertained concerning the right of making them) do likewiſe prove a manifeſt defect either in the wiſdom of the legiſlative, or the ſtrength of the executive, power. It is a kind of quackery in government, and argues a want of ſolid ſkill, to apply the ſame univerſal remedy, the *ultimum ſupplicium*, to every caſe of difficulty. It is, it muſt be owned, much eaſier to extirpate than to amend mankind; yet that magiſtrate muſt be eſteemed both a weak and a cruel ſurgeon, who cuts off every limb which through ignorance or indolence he will not attempt to cure. It has been therefore ingeniouſly propoſed, that in every ſtate a ſcale of crimes ſhould be formed, with a correſponding ſcale of puniſhments, deſcending from the greateſt to the leaſt. But if that be too romantic an idea, yet at leaſt a wiſe legiſlator will mark the principal diviſions, and not aſſign penalties of the firſt degree to offences of an inferior rank. Where man ſee no diſtinction,

(A) Thus Demoſthenes (in his oration againſt Midas) finely works up the aggravations of the inſults he had received. "I was abuſed (ſays he) by my enemy, in cold blood, out of malice, not by heat of wine, in "the morning, publicly, before ſtrangers as well as citizens; and that in the temple, whither the duty of my "office called me."

tion made in the nature and gradations of punishment, the generality will be led to conclude there is no distinction in the guilt. Thus in France the punishment of robbery, either with or without murder, is the same: hence it is, that though perhaps they are therefore subject to fewer robberies, yet they never rob but they also murder. In China murderers are cut to pieces, and robbers not: hence in that country they never murder on the highway, though they often rob. And in Britain, besides the additional terrors of a speedy execution, and a subsequent exposure or dissection, robbers have a hope of transportation, which seldom is extended to murderers. This has the same effect here as in China, in preventing frequent assassination and slaughter.

Yet though in this instance we may glory in the wisdom of our law, we shall find it more difficult to justify the frequency of capital punishment to be found therein; inflicted (perhaps inattentively) by a multitude of successive independent statutes, upon crimes very different in their natures. It is a melancholy truth, that among the variety of actions which men are daily liable to commit, no less than 160 have been declared by act of parliament to be felonies without benefit of clergy; or, in other words, to be worthy of instant death. So dreadful a list, instead of diminishing, increases the number of offenders. The injured, through compassion, will often forbear to prosecute; juries, through compassion, will sometimes forget their oaths, and either acquit the guilty or mitigate the nature of the offence; and judges, through compassion, will respite one half of the convicts, and recommend them to the royal mercy. Among so many chances of escaping, the needy and hardened offender overlooks the multitude that suffer: he boldly engages in some desperate attempt to relieve his wants or supply his vices; and if, unexpectedly, the hand of justice overtakes him, he deems himself peculiarly unfortunate in falling at last a sacrifice to those laws which long impunity has taught him to contemn.

As to the trials and mode of punishment, see ARRAIGNMENT; TRIAL, and the references therefrom; CONVICTION; JUDGMENT, ATTAINDER; *CORRUPTION of Blood*; FORFEITURE; EXECUTION; the several *Crimes* under their respective names. See LAW *Index*.

Persons capable or incapable of committing CRIMES; or (which is all one) of suffering the censures of the law upon the commission of forbidden acts.

All the several pleas and excuses which protect the committer of a forbidden act from the punishment which is otherwise annexed thereto, may be reduced to this single consideration, the want or defect of *will*. An involuntary act, as it has no claim to merit, so neither can it induce any guilt: the concurrence of the will, when it has its choice either to do or to avoid the fact in question, being the only thing that renders human actions either praiseworthy or culpable. Indeed, to make a complete crime, cognizable by human laws, there must be both a will and an act. For though, *in foro conscientiæ*, a fixed design or will to do an unlawful act is almost as heinous as the commission of it; yet as no temporal tribunal can search the heart, or fathom the intentions of the mind, otherwise than as they are demonstrated by outward actions, it therefore cannot punish for what it cannot know. For which reason, in all temporal jurisdictions, an *overt* act, or some open evidence of an intended crime, is necessary in order to demonstrate the depravity of the will, before the man is liable to punishment. And as a vicious will without a vicious act is no civil crime; so, on the other hand, an unwarrantable act without a vicious will is no crime at all. So that to constitute a crime against human laws, there must be, first, a vicious will; and, secondly, an unlawful act consequent upon such vicious will.

Now there are three cases in which the will does not join with the act: 1. When there is a defect of understanding. For where there is no discernment, there is no choice; and, where there is no choice, there can be no act of the will, which is nothing else but a determination of one's choice to do or abstain from a particular action; he, therefore, that has no understanding, can have no will to guide his conduct. 2. Where there is understanding and will sufficient residing in the party, but not called forth and exerted at the time of the action done; which is the case of all offences committed by chance or ignorance. Here the will sits neuter, and neither concurs with the act nor disagrees to it. 3. Where the action is constrained by some outward force and violence. Here the will counteracts the deed; and is so far from concurring with, that it loaths and disagrees to what the man is obliged to perform. Infancy, idiocy, lunacy, and intoxication, fall under the first class; misfortune and ignorance may be referred to the second; and compulsion or necessity may properly rank in the third. See INFANCY, IDIOCY, DRUNKENNESS, MISFORTUNE, IGNORANCE, NECESSITY.

CRIMEA, or CRIM TARTARY, anciently the *Chersonesus Taurica*, a peninsula situated directly to the south of St Petersburg, between the 51st and 55th degrees of latitude, and in 46 longitude. Its southern and western coasts lie on the Euxine, its northern and eastern on the Rotten sea and the Palus Mæotis. It is joined, however, to the continent on the north by a small neck of land not more than six miles broad. This peninsula has been known more than 3000 years since the first naval expedition of the Argonauts; a story, though mixed with fable, yet well founded in its principal facts. The mountainous parts were inhabited by the Tauri, probably a colony of Scythians; and its coasts on the west, the east, and the south, by Greeks. The Scythians were driven out by Mithridates; the Greeks by the Sarmatians; and these again by the Alani and Goths, a northern horde of Scythians. The Hungarians, the Cossacks and Tartars, succeeded in their turn; while the Genoese, in the 12th century, held a temporary and precarious possession of the seaports, which they were obliged to yield to the Turks in 1475. At the peace of 1774, the Tartars of the Crimea were declared independent; and in 1783, this peninsula was united to the Russian empire.

From the above-mentioned isthmus, on which is built the fortress of Or-kapi or Perekop, to the first rising of the hill at Karasubasar, the country is one continued flat: elevating itself, by an easy gradation, to the summit of the hill, which forms the south side of the peninsula and the shore of the Euxine sea. The surface of the soil is almost all of one kind, a reddish-gray loam; on digging, you find it more or less

Crimea. mixed with a black earth, and the hills abound with marle. The whole flat from Perekop to the river Salgir, which may be an extent of 80 miles, is full of ſalt marſhes and lakes; from whence the neighbouring Ruſſian governments, as well as the Crim itſelf, Anatolia, and Beſſarabia, are ſupplied with ſalt. The moſt remarkable of theſe lakes are five in number; Koſlof and Keffa, ſo called after the towns near which they lie, are very large; the Tuſla, about 15 verſts from Perekop, on the road from Keffa; the Red lake, nor far from the laſt mentioned; and the Black lake. Beſides theſe, there are many other ſwamps and lakes, from whence the inhabitants get ſalt for their own conſumption.

The greateſt part of the peninſula is ſo level that a man may travel over the half of it without meeting with a river, or even the ſmalleſt brook. The inhabitants of the villages, therefore, make a pit in the yard of every houſe for receiving the rain or the water that runs from the hills. The whole tract is bare of every kind of tree. Not a buſh or a bramble is to be ſeen, and the herbage is extremely ſcanty. This, however, does not proceed ſo much from the unfruitfulneſs of the place, as from the vaſt herds of cattle which rove the whole year long from place to place; by which means all the graſs in ſpring, ſummer, or autumn, no ſooner appears through the long drought which ſucceeds the rainy ſeaſon, but it is immediately devoured or trodden down. The univerſal prevalence of this cuſtom of keeping cattle to wander up and down, joined to the ſlothfulneſs of the Tartars, with their inaptitude and averſion to agriculture, is the reaſon of the total neglect of that ſcience here. Otherwiſe, were the land divided into portions and properly managed, there would be a ſufficiency for the cattle, and the reſt would be fruitful in corn and grain. By this means alone the Crim would become a fertile country, and no natural defect would be found in oppoſition to the welfare of its inhabitants. The truth of this is well known by their neighbours; where, of a hundred Tartars, one perhaps follows huſbandry, who finds it to anſwer to ſo much profit, that he has not only enough for his own uſe, but wherewith to ſell to the ninety-nine.

This peninſula, which is indeed but a little diſtrict, yet, from the many advantages conferred upon it by nature, may be eſteemed peculiarly rich, is divided into the hill country and the flat. The latter, which extends from Perekop to Koſlof and the river Bulganap, to Karaſubaſar, Keffa, and Yenicali, is ſtrewn there and there with little Tartar villages, maintained by cattle and the produce of the ſalt lakes. The highlands, or hilly country, form the ſouthern part of the Crim, along the ſtraight coaſt of the Black ſea, and ſtretching weſtward in a right line from Keffa to the vicinity of Belbek. Theſe hills are compoſed of layers of chalk; which, in the headlands and promontories, is ſoft, but more inland quite hard. The ſtrata of the high hills are like thoſe of the promontories, and take a direction from north to ſouth. Theſe qualities of the ſtrata prevail not throughout the whole hills, but only in the large and lofty ones; ſuch as the two that riſe near Karaſubaſar, and one very high by Achmetſched, which bears the name of Aktau. The other ſmaller hills lie ſcattered and diſperſed, but take the names of the greater ones, to which they ſeem to belong; as the great ridge of Caucaſus does, which extends beyond the Donau, through Bulgaria, and are named *Palkans*.

All accounts agree in this, that nature has favoured thoſe highland countries with great advantages, and bleſſed them with abundance of all things. A number of ſprings that flow from the mountains form the two conſiderable rivers Salgir and Karaſu, which run into the Rotten ſea. The former, which takes its riſe from a cavern in a high hill near Achmetſched, falls ſtraight into the plain below, and waters a great part of the Crim; the other commencing behind Karaſubaſar, falls likewiſe into the plain, and mingles with the Salgir. There are many other little rivers and ſtreams, which run eaſtward, and either join the two fore-mentioned or fall immediately into the Rotten ſea. All the ſtreams, for the whole length of the hills, which begin at Keffa, and proceed in a chain of the ſame height, flow to the north or the north-eaſt, excepting the one behind Achmetſched, where the great mountain Aktau is, which falls on the other ſide; this river, riſing on the northern ſide of this mountain, flows, as was before obſerved, towards the north-eaſt, to the Salgir and the Rotten ſea; as likewiſe thoſe which ſpring on the weſtern ſide take their courſe weſtward to the Bulganak, and thence ſtraight to the Black ſea; which alſo receives all the other little rivers that ariſe from theſe hills, as the Amma, the Katſcha, the Belbek, the Kaſulkioi, &c.

The mountains are well covered with wood fit for the purpoſe of ſhip-building, and contain plenty of will beaſts. The valleys conſiſt of fine arable land; on the ſides of the hills grow corn and vines in great abundance, and the earth is rich in mines. But theſe mountaineers are as careleſs and negligent as the inhabitants of the deſerts; ſlighting all theſe advantages; and, like their brethren of the lowlands, are ſufficiently happy if they are in poſſeſſion of a fat ſheep and as much bread as ſerves them to eat.

About 20 years ago this peninſula was uncommonly full of inhabitants and wealth. They reckoned at that time at leaſt 1200 villages; but, from the late troubles in the Crim, it has loſt more than a third part of its inhabitants, and now, wherever we turn, we meet with the ruins of large villages and dwellings. The people were compoſed of various nations, who lived together under the Tartars in the moſt unbounded freedom; but in the late Turkiſh war they either put themſelves under the Ruſſian government, and were transferred to that empire, or fled to Abcaſia and the Tſchirkaſſian hills.

The houſes in the towns, as well as the villages, are for the moſt part of ſquare timbers, having the interſtices filled with brick work, if the poſſeſſor can afford it, and thoſe of the poorer ſort with turf. The chinks and crannies are made tight with clay, and then plaſtered within and without. The covering is commonly either of bricks or of turfs. Only the medſcheds, minarets, and baths, are of ſtone, and a few extremely handſome of marble. They have chimneys in the chambers, at which they likewiſe dreſs their victuals; but ſtoves in the Ruſſia manner none. In extreme froſts a great iron pan of charcoal is brought into the room, for making it comfortable. Their cuſtom is, to

to ſit upon low ſofas, with Turkiſh coverings and cuſhions, or upon a clay ſeat, ſomewhat raiſed above the earth and ſpread with a carpet. In theſe rooms are cupboards and cheſts, often covered with cuſhions, to ſerve as ſeats; in which they keep their gold, ſilver, and valuables. Such are the inner apartments or harams, in which the women generally live; the others are not ſo fine. Theſe contain only a ſofa, or a bank of clay covered with a carpet, as in the chimney rooms.

The rich Tartars, and their nobility or murzas (excepting only ſuch as are about the perſon of the khan), commonly dwell all the year round in the country, coming only to town when they have buſineſs there. There are but few towns in the Crim, at leaſt in compariſon of its former population. The Krimſkoi Tartars have no tribunal of juſtice, controverſies and quarrels being ſeldom heard of among them; and if a diſpute ſhould ariſe, it is immediately ſettled by an appeal to the Koran. Little differences in the villages inevitably happening about property, or other matters not taken notice of in that code, are amicably adjuſted by the elderman or abeſes; but in the towns all weighty concerns, excepting the ſingle caſe of murder or homicide, are brought before the kaimakan, or commandant, who ſettles them abſolutely without appeal.

The reſidence of the khans of the Crimea was formerly Bachtſchiſarai, in which city they held their ſeat for upwards of 200 years. They went thither from Eſki-Crim, or Old Crim, the capital city of the Genoeſe, upon Bengli Ghirei Khan's plundering the ſeaports, and driving all the Genoeſe from their ſtations. Before Eſki-Crim, and indeed upon the firſt coming of the Tartars into this peninſula, the ſovereign reſidence was at Koſlof; but here they remained not long. Under the late khan Shagin Ghirei it was held at Keffa, the ancient Theodoſia; which is ten miles diſtant from Eſki-Crim, ſaid to be the Cimmerium of the ancients.

The principal cities or towns of the Crimea are: 1. *Bachtſchiſarai*, an extenſive and wealthy city, lying in a vale between two high mountains, and ſurrounded by a number of gardens. From this circumſtance it has its name; *bachtſchi*, ſignifying in the Tartarian language "a garden," and *ſarai*, "a palace." It formerly contained 3000 houſes, and many ſumptuous medſcheds. The palace of the khans, with its gardens and ponds, was much improved under the government of Khan Kerim Ghirei, under whoſe government the laſt Turkiſh war took its riſe. In this palace is the burial-place of all the khans of Crimea, wherein all the khans that have reigned here lie interred. The fine Krimſkoi vines, with their large cluſters of grapes, grow in great plenty all about this town, and a profuſion of other delicious fruits, from whence the neighbouring parts of Ruſſia are ſupplied. 2. *Keffa*, the preſent reſidence of the khans, ſtands on the ſhore of a large harbour in the Black ſea. Its ſite is on the declivity of a long ridge of mountains; and is mantled by a ſtone wall, fortified by ſeveral towers, and encompaſſed by a deep ditch. On both ſides of the city formerly ſtood caſtles, and in the middle of them a lofty turret for the purpoſe of giving ſignals by fire. Before the wall were wide extended ſuburbs; containing among other conſiderable buildings, medſcheds, churches for the Greek and Armenian worſhip; of all which now only the veſtiges remain. The caſtles and towers lie alſo in ruins; and not one-third part of the houſes of the city itſelf are now remaining, and thoſe chiefly built of materials taken from the aforeſaid ruins. They formerly reckoned Keffa to contain 4000 houſes, including the ſuburbs, with a number of medſcheds and Chriſtian churches; but this number has been much diminiſhed by the laſt Turkiſh war. The preſent inhabitants conſiſt moſtly of Tartars; who carry on a trade by no means inconſiderable, in commodities brought from Turkey. The late khan, an intelligent and enlightened perſonage, made this city the place of his reſidence, and brought hither the mint from Bachtſchiſarai, built himſelf a palace, and erected a divan, which aſſembled three times a-week, and the fourth time was held in the palace of the khan, in which he always perſonally aſſiſted. Here is alſo a cuſtomhouſe, the management of which is farmed out. 3. *Karaſubaſar*, likewiſe a very rich city in former times, ſtands at the beginning of the mountains, about half-way between Keffa and Bachtſchiſarai. It is a large trading town; contains a conſiderable number of dwelling-houſes and medſcheds, but the greateſt part of them in decay, and many fine gardens. This place is the moſt famous in all the Crim for its trade in horſes, and has a market once a-week for that article of traffic; to which are likewiſe brought great numbers of buffaloes, oxen, cows, camels, and ſheep for ſale. Near this city flows one of the principal rivers of the Crim, called the *Karaſu*, that is, the Black Water. Of this river they have an opinion in Ruſſia, that one part of it flows upwards for ſeveral verſts together. But this is in ſome ſort true, not only of the Karaſu, but of all the rivers of the Crim that have a ſtrong current. The Tartars, who dwell either in the valleys or on the ſides of the mountains (frequently without conſidering whether the place is ſupplied with water or not), dig canals either from the ſource of the next river, or from that part of it which lies neareſt to their particular habitation, about an arſhine in breadth, for their gardens and domeſtic uſe. From theſe they cut ſmaller ones through the villages, to ſupply them with water, and not unfrequently to drive a mill. Theſe canals appear, to the imagination of the common people, to run in a contrary direction to the current of the river; and in fact theſe canals do lie, in many places for a verſt in length, ſome fathoms higher than the level of the ſtream from whence they are ſupplied. 4. *Achmetſled*, a pretty large city not far from Bachtſchiſarai; now made the capital of all the Crimea by the regulations of Prince Potemkin in the ſummer of 1785. 5. *Koſlof*, formerly a very conſiderable trading town, lies on the weſtern ſide of the peninſula, in a bay of the Black ſea; which, as well as the ſound at Keffa, might rather be called a road than a haven. This was the firſt town the Tartars poſſeſſed themſelves of on their firſt entrance into the Crim, and eſtabliſhed a cuſtomhouſe therein, after the example of the Genoeſe, which is now farmed out.

The other remarkable places are, *Sudak*, which is built on the hills upon the ſhore of the Black ſea, at the ſouth ſide of the peninſula, and is famous for its excellent wine, reſembling Champagne both in colour and ſtrength; *Aluſchti*, on the ſame ſide, among the hills

hills on the ſea ſhore; *Baluklava*, where there is a fine harbour, and perhaps the only one on the Black ſea, containing ample room for a very good fleet; *Inkerman* may be noticed for its commodious though not very large haven, called *Achtiar;* and *Mangup*, the old Cherſoneſus: which were all formerly very flouriſhing towns; but are now either in ruins, or dwindled into ſmall villages.

All theſe places, ſo long as the Genoeſe remained maſters of the Crim, were well fortified; but the Tartars, in taking them, demoliſhed all the works. While they were under the Turks, they left the fortreſſes of Keſſa, Kertſch, and Koſlof, and built the fort Arabat on the neck of land between the ſea of Azof (or Palus Mæotis) and the Rotten ſea, where Perekop alſo is.

In *Arabat* are but few houſes; but here the warlike ſtores of the khans were kept.—*Perekop*, called by the Turks *Or-capi*, is a fortreſs of moderate ſtrength; ſtanding about the middle of the neck of land that joins the peninſula with the continent. This iſthmus, which is at leaſt ſix miles broad, is cut through with a wide and deep ditch lined with ſtone, and reaches from the Black to the Rotten ſea. This was formerly kept without water, but now is filled from both ſeas. On the Crimean ſide a high wall of earth runs the whole length of it, ſtraight from one ſea to the other. The people paſs over the ditch by means of a drawbridge, and through the wall by a gateway. The walls of the fortreſs are ſome fathoms from the road ſide; of which the ruins are only now diſcernible, namely, large brick houſes, with a number of bomb-ſhells and cannon-balls about them, which were formerly kept in the fortreſs. At leaſt two miles from this is a pretty populous but miſerable place, which was probably the town to which this fort belonged. Near the gate is a cuſtomhouſe, where all imports and exports pay duty.

This peninſula was formerly extremely populous; the number of its inhabitants, in Tartars, Turks, Greeks, Armenians, Jews, and others, amounted to above 200,000 men. Since that, however, the greateſt part of the Chriſtians have betaken themſelves to the other parts of the Ruſſian empire, particularly the government of Azof; and many other inhabitants, particularly Tartars, have gone to Taman and Abchaſia; ſo that the preſent population of the Crim cannot now be reckoned at more than 70,000 men at moſt.

The Crim was heretofore divided into 24 kaduliks or diſtricts; namely, Yenikali, Kertſch, Arabat, Eſki-krim, Keffa, Karaſubaſar, Sudak, Achmetſched, Yalof, Bachtſchiſarai, Balaklava, Mangup, Inkerman, Koſlof, Or, Manſur, Tarkan, Sivaſch, Tiſchongar, Sarubulat, Barun, Argun, Sidſchugut, and Schirin. Several of theſe diſtricts are named after the town or village wherein the murza, their governor, dwells; and many of them are at preſent in a ſtate of total decay.

CRIMEN FALSI. See *Falsi Crimen*.

CRIMSON, one of the ſeven red colours of the dyers. See Dyeing.

CRINGLE, a ſmall hole made in the bolt-rope of a ſail, by intertwiſting one of the diviſions of a rope, called a *ſtrand*, alternately round itſelf and through the *ſtrands* of the bolt-rope, till it becomes threefold, and aſſumes the ſhape of a wreath or ring. The uſe of the cringle is generally to contain the end of ſome rope, which is faſtened thereto for the purpoſe of drawing up the ſail to its yard, or of extending the ſkirts by the means of *bridles*, to ſtand upon a ſide wind. The word ſeems to be derived from *krinckelen* (Belg.) "to run into twiſts."

CRINUM, Asphodel-lily; a genus of plants belonging to the hexandria claſs; and in the natural method ranking under the 9th order, *Spathaceæ*. See Botany *Index*.

CRISIS, in *Medicine*, is uſed in different ſenſes, both by the ancient and modern phyſicians. With ſome it means frequently no more than the excretion of any noxious ſubſtance from the body. Others take the word for a ſecretion of the noxious humours made in a fever. Others uſe it for the critical motion itſelf; and Galen defines a criſis in fevers, a ſudden and inſtantaneous change, either for the better or the worſe, productive of recovery or death.

CRISPIN *and* Crispianus, two legendary ſaints, whoſe feſtival, as marked in the kalendar, is on the 25th of October. According to the legend, they were brethren, born at Rome; from whence they travelled to Soiſſons in France, about the year 303, to propagate the Chriſtian religion; and becauſe they would not be chargeable to others for their maintenance, they exerciſed the trade of ſhoemakers: but the governor of the town diſcovering them to be Chriſtians, ordered them to be beheaded. From which time the ſhoemakers made choice of them for their tutelar ſaints.

CRISTÆ, in *Surgery*, a term for certain excreſcences about the anus and pudenda. See Medicine *Index*.

CRISTA galli, in *Anatomy*, an eminence in the middle of the *os ethmoides*, advancing within the cavity of the cranium; and to which is faſtened that part of the dura mater which divides the brain, called *falx*. It has its name from its figure, which reſembles that of a cock's comb. In adults, this proceſs appears of a piece with the *ſeptum narium*. See Anatomy *Index*.

CRITERION, or Criterium, a ſtandard by which propoſitions and opinions are compared, in order to diſcover their truth or falſehood.

CRITHE, in *Surgery*, commonly called the *ſtye*, is a ſort of tubercle that grows on the eyelids. When ſmall, it is ſeated on the edge of the eyelid; but when large, it ſpreads further. When they do not ſuppurate they become wens. They are apt to diſappear and return. If there is inflammation, endeavour to ſuppurate it with the white bread poultice: if it is hard, deſtroy it with a mixture of equal parts of hog's lard and quickſilver. If the lower eyelid is affected, the tumor is more frequently on its inſide; and then it is beſt to diſſect it, or to make way for it outwardly by applying a cauſtic on the ſkin juſt upon it.

CRITHUM, Samphire; a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 45th order, *Umbellatæ*. See Botany *Index*.—Its leaves are an excellent pickle uſed for ſauces, and are by many eaten raw in ſalads. It is of a ſaltiſh reliſh, palatable, and comfortable to the ſtomach. It is not very eaſily preſerved in gardens. It muſt be ſown on gravelly or rocky ground, half an inch deep; in which ſituation the plants will come up, and laſt ſome years.

CRITHOMANCY,

CRITHOMANCY, a kind of divination, performed by considering the dough or matter of the cakes offered in sacrifice, and the meal strewed over the victims to be killed. Hence, in regard they ordinarily used barley-meal in these ceremonies, this kind of divination was called *crithomancy*, from κριθη, *barley*, and μαντεια, *divination*.

CRITIAS, one of the 30 tyrants set over Athens by the Spartans. He was eloquent and well bred, but of dangerous principles. He cruelly persecuted his enemies, and put them to death. He was killed about 400 years before the Augustan age, in a battle against those citizens whom his oppression had banished. He had been among the disciples of Socrates, and had written elegies and other compositions, of which some fragments remain.

CRITICAL DAYS and SYMPTOMS, among physicians, are certain days and symptoms in the course of acute diseases, which indicate the patient's state, and determine him either to recover or grow worse. See MEDICINE *Index*.

CRITICISM, the art of judging with propriety concerning any object or combination of objects. But, in a more limited sense, the science of criticism is confined to the fine arts. The principles of the fine arts are best unfolded by studying the sensitive part of our nature, and by learning what objects are naturally agreeable and what are naturally disagreeable. The man who aspires to be a critic in these arts, must pierce still deeper: he must clearly perceive what objects are lofty, what low, what are proper or improper, what are manly, and what are mean or trivial. Hence a foundation for judging of taste, and for reasoning upon it: where it is conformable to principles, we can pronounce with certainty that it is correct; otherwise, that it is incorrect, and perhaps whimsical. Thus the fine arts, like morals, become a rational science; and, like morals, may be cultivated to a high degree of refinement.

Manifold are the advantages of criticism, when thus studied as a rational science. In the first place, a thorough acquaintance with the principles of the fine arts redoubles the entertainments those arts afford. To the man who resigns himself entirely to sentiment or feeling, without interposing any sort of judgment, poetry, music, painting, are mere pastime; in the prime of life, indeed, they are delightful, being supported by the force of novelty and the heat of imagination: but they lose their relish gradually with their novelty; and are generally neglected in the maturity of life, which disposes to more serious and more important occupations. To those who deal in criticism as a regular science, governed by just principles, and giving scope to judgment as well as to fancy, the fine arts are a favourite entertainment; and in old age maintain that relish which they produce in the morning of life.

In the next place, a philosophical inquiry into the principles of the fine arts, inures the reflecting mind to the most enticing sort of logic: the practice of reasoning upon subjects so agreeable tends to a habit; and a habit strengthening the reasoning faculties, prepares the mind for entering into subjects more difficult and abstract. To have, in this respect, a just conception of the importance of criticism, we need but reflect upon the common method of education; which, after some years spent in acquiring languages, hurries us, without the least preparatory discipline, into the most profound philosophy: a more effectual method to alienate the tender mind from abstract science, is beyond the reach of invention: and accordingly, with respect to such speculations, the bulk of our youth contract a sort of hobgoblin terror, which is seldom, if ever, subdued. Those who apply to the arts are trained in a very different manner: they are led, step by step, from the easier parts of the operation to what are more difficult; and are not permitted to make a new motion till they be perfected in those which regularly precede it. The science of criticism appears then to be a middle link, connecting the different parts of education into a regular chain. This science furnisheth an inviting opportunity to exercise the judgment: we delight to reason upon subjects that are equally pleasant and familiar; we proceed gradually from the simpler to the more involved cases: and in a due course of discipline, custom, which improves all our faculties, bestows acuteness upon those of reason, sufficient to unravel all the intricacies of philosophy.

Nor ought it to be overlooked, that the reasonings employed upon the fine arts are of the same kind with those which regulate our conduct. Mathematical and metaphysical reasons have no tendency to improve social intercourse; nor are they applicable to the common affairs of life: but a just taste in the fine arts, derived from rational principles, furnishes elegant subjects for conversation, and prepares us finely for acting in the social state with dignity and propriety.

The science of rational criticism tends to improve the heart not less than the understanding. It tends, in the first place, to moderate the selfish affections: by sweetening and harmonizing the temper, it is a strong antidote to the turbulence of passion and violence of pursuit; it procures to a man so much mental enjoyment, that, in order to be occupied, he is not tempted in youth to precipitate into hunting, gaming, drinking; nor in middle age, to deliver himself over to ambition; nor in old age, to avarice. Pride and envy, two disgustful passions, find in the constitution no enemy more formidable than a delicate and discerning taste: the man upon whom nature and culture have bestowed this blessing, feels great delight in the virtuous dispositions and actions of others; he loves to cherish them, and to publish them to the world: faults and failings, it is true, are to him not less obvious; but these he avoids, or removes out of sight, because they give him pain. On the other hand, a man void of taste, upon whom the most striking beauties make but a faint impression, has no joy but in gratifying his pride or envy by the discovery of errors and blemishes. In a word, there may be other passions, which, for a season, disturb the peace of society more than those mentioned: but no other passion is so unwearied an antagonist to the sweets of social intercourse: these passions, tending assiduously to their gratification, put a man perpetually in opposition to others; and dispose him more to relish bad than good qualities, even in a companion. How different that disposition of mind, where every virtue in a companion or neighbour, is, by refinement of taste, set in its strongest light; and

defects or blemishes, natural to all, are suppressed, or kept out of view!

In the next place, delicacy of taste tends not less to invigorate the social affections than to moderate those that are selfish. To be convinced of this tendency, we need only reflect, that delicacy of taste necessarily heightens our sensibility, of pain and pleasure, and of course our sympathy which is the capital branch of every social passion. Sympathy, in particular, invites a communication of joys and sorrows, hopes and fears: such exercise, soothing and satisfactory in itself, is necessarily productive of mutual good-will and affection.

One other advantage of rational criticism is reserved to the last place, being of all the most important; which is, that it is a great support to morality. No occupation attaches a man more to his duty than that of cultivating a taste in the fine arts: a just relish of what is beautiful, proper, elegant, and ornamental, in writing or painting, in architecture or gardening, is a fine preparation for the same just relish of those qualities in character and behaviour. To the man who has acquired a taste so acute and accomplished, every action wrong or improper must be highly disgustful: if, in any instance, the overbearing power of passion sway him from his duty, he returns to it upon the first reflection with redoubled resolution never to be swayed a second time: he has now an additional motive to virtue, a conviction derived from experience, that happiness depends on regularity and order, and that a disregard to justice or propriety never fails to be punished with shame and remorse.

For this rule of criticism applicable to the fine arts, and derived from human nature, see ARCHITECTURE, BEAUTY, CONGRUITY, COMPARISON, GRANDEUR, &c.

CRITO, an Athenian philosopher, flourished 400 years before Christ. He was one of the most zealous disciples of Socrates, and supplied him with whatever he wanted. He had several scholars who proved great men, and he composed some dialogues which are lost.

CRITOLAUS, a citizen of Tegea in Arcadia. He with two brothers fought against the three sons of Demonstratus of Pheneus, to put an end to a long war between their respective nations. These brothers of Critolaus were both killed, and he alone remained to withstand his three bold antagonists. He conquered them; and when at his return his sister deplored the death of one of his antagonists, to whom she was betrothed, he killed her in a fit of resentment. The offence deserved capital punishment; but he was pardoned on account of the services he had rendered his country. He was afterwards general of the Achæans; and it is said that he poisoned himself because he had been conquered at Thermopylæ by the Romans, about 146 years before the Augustan age.

CRIZZELLING, in the glass trade, a kind of roughness arising on the surface of some kinds of glass. This was the fault of a peculiar sort of glass made in Oxfordshire and some other places, of black flints, a crystallized sand, and a large quantity of nitre, tartar, and borax. The glass thus made is very beautiful, but, from the too great quantities of the salts in the mixture, is subject to crizzel; that is, the salts in the mixture, from their too great proportion, are subject, either from the adventitious nitre of the air from without, or from warm liquors put in them, to be either increased in quantity or dissolved, and thereby induce a scabrities or roughness irrecoverably clouding the transparence of the glass. This is what was called *crizzelling;* but by using an Italian white pebble, and abating the proportions of the salts, the manufacture is now carried on with advantage, and the glass made with these salts is whiter than the finest Venetian, and is subject to no faults.

CROATIA, a part of the ancient Illyricum, is bounded on the east by Sclavonia and Bosnia, on the south and south-west by Morlachia, and on the north by the Drave, which separates it from a part of Sclavonia. It is about 80 miles in length and 70 in breadth, and was once divided between the Hungarians and Turks; but now the greatest part of it is subject to the house of Austria. The Croats derive their origin from the Sclavi; and their language is a dialect of the Sclavonian, approaching very near to that of the Poles. The country is divided into two parts, viz. that under, and that beyond, the Save. In the late wars between the empress queen and the king of Prussia, no less than 50,000 men were raised out of this small territory. Both horse and foot are good soldiers, especially the former. The soil, where cultivated, is fruitful in wine and oil, &c. but being a frontier country, and much exposed to inroads, it is not so well cultivated as it otherwise might be.

CROCODILE. See LACERTA, ERPETOLOGY *Index*.

Fossil CROCODILE, one of the remarkable discoveries in the fossil world which later times have produced. It is the skeleton of a large crocodile, almost entire, found at a great depth under ground, bedded in stone. This was in the possession of Linkius, who wrote many pieces of natural history, and particularly an accurate description of this curious fossil. It was found in the side of a large mountain in the interior of Germany, and in a stratum of black stone, somewhat like slate, (marl probably), but of a coarser texture, the same with that in which the fossil fishes in many parts of the world are found. This skeleton had the back and ribs very plain, and was of a much deeper black than the rest of the stone; as is also the case in the fossil fishes which are preserved in this manner. The part of the stone where the head lay was not found; this being broken off just at the shoulders, but that irregularly; so that in one place, a part of the back of the head was visible in its natural form. The two shoulder-bones were very fair, and three of the feet were well presefved: the legs were of their natural shape and size, and the feet preserved even to the extremities of the five toes of each.

CROCODILE (*crocodilus*), in *Rhetoric*, a captious and sophistical kind of argumentation, contrived to seduce the unwary, and draw them speciously into a snare. It has its name crocodile from the following occasion, invented by the poets. A poor woman, begging a crocodile that had caught her son walking by the riverside to spare and restore him, was answered, that he would restore him, provided she should give a true answer to a question he should propose: the question was, Will I restore thy son or not? To this the poor woman

man, suspecting a deceit, sorrowfully answered, Thou wilt not: and demanded to have him restored, because she had answered truly. Thou liest, says the crocodile; for if I restore him thou hast not answered truly: I cannot therefore restore him without making thy answer false. Under this head may be reduced the propositions called *mentientes* or *insolubiles;* which destroy themselves. Such is that of the Cretan poet: *Omnes ad unum Cretenses semper mentiuntur*: "all the Cretans, to a man, always lie." Either, then the poet lies when he asserts that the Cretans all lie, or the Cretans do not all lie.

CROCUS, SAFFRON; a genus of plants belonging to the triandria class; and in the natural method ranking under the 6th order *Ensatæ*. See BOTANY *Index*.

CROCUS, in *Chemistry*, denotes any metal calcined to a red or deep yellow colour.

Crocus Metallorum, an emetic preparation of antimony and nitre. See CHEMISTRY *Index*.

CROESUS, the last king of Lydia, remarkable for his riches, his conquests, his temporary prosperity, and the sad reverse of his fortune. He subdued the Phrygians, Mysians, Paphlagonians, Thracians, and Carians; amassed together immense riches; and became one of the most powerful and magnificent princes in the world. He drew the learned to his court, and took a pleasure in conversing with them. Thales of Miletus, Pittacus of Mitylene, Bias of Priené, Cleobulus of Lindus, and most of the other "wise men," as they are emphatically styled, who lived in that age, as well as Æsop the fabulist, and the elegant Greek poets of the times, were bountifully received at the court of Crœsus. There is still on record a memorable conversation between that prince and Solon, which seemed to predict the subsequent events of his reign, and which had a late but important influence on the character and fortune of the Lydian king. Crœsus having entertained his Athenian guest, according to the ancient fashion, for several days, before he asked him any questions, ostentatiously showed him the magnificence of his palace, and particularly the riches of his treasury. After all had been displayed to the best advantage, the king complimented Solon upon his curiosity and love of knowledge; and asked him, as a man who had seen many countries, and reflected with much judgment upon what he had seen, Whom of all men he esteemed most happy? By the particular occasion, as well as the triumphant air with which the question was proposed, the king made it evident that he expected flattery rather than information. But Solon's character had not been enervated by the debilitating air of a court; and he replied with a manly freedom, "Tellus, the Athenian." Crœsus, who had scarcely learned to distinguish, even in imagination, between wealth and happiness, inquired with a tone of surprise, why this preference to Tellus? "Tellus," rejoined Solon, "was not conspicuous for his riches or his grandeur, being only a simple citizen of Athens; but he was descended from parents who deserved the first honours of the republic. He was equally fortunate in his children, who obtained universal esteem by their probity, patriotism, and every useful quality of the mind or body: and as to himself, he died fighting gallantly in the service of his country, which his valour rendered victorious in a doubtful combat; on which account the Athenians buried him on the spot where he fell, and distinguished him by every honour which public gratitude can confer on illustrious merit."

Crœsus had little encouragement, after this answer, to ask Solon, in the second place, Whom, next to Tellus, he deemed most happy? Such, however, is the illusion of vanity, that he still ventured to make this demand; and still, as we are informed by the most circumstantial of historians, entertained hopes of being favourably answered. But Solon replied with the same freedom as before, "The brothers Cleobis and Biton, two youths of Argos, whose strength and address were crowned with repeated victory at the Olympic games; who deserved the affection of their parents, the gratitude of their country, the admiration of Greece; and who, having ended their lives with peculiar felicity, were commemorated by the most signal monuments of immortal fame." "And is the happiness of a king, then," said Crœsus, "so little regarded, O Grecian stranger, that you prefer to it the mean condition of an Athenian or Argive citizen?" The reply of Solon sufficiently justified his reputation for wisdom. "The life of man," said he, consists of 70 years, which make 25,550 days; an immense number: yet in the longest life, the events of any one day will not be found exactly alike to those of another. The affairs of men are liable to perpetual vicissitudes: the Divinity who presides over our fate is envious of too much prosperity; and all human life, if not condemned to calamity, is at least liable to accident. Whoever has uninterruptedly enjoyed a prosperous tide of success may justly be called *fortunate*: but he cannot before his death be entitled to the epithet of *happy*."

The events which soon followed this conversation, prove how little satisfaction is derived from the possession of a throne. Victorious in war, unrivalled in wealth, supreme in power, Crœsus felt and acknowledged his unhappiness. The warmest affections of his soul centered in his son Atys, a youth of the most promising hopes, who had often fought and conquered by his side. The strength of his attachment was accompanied with an excess of paternal care, and the anxiety of his waking hours disturbed the tranquillity of his rest. He dreamed that his beloved son was slain by a dart; and the solicitude with which he watched his safety, preventing the youth from his usual occupations and amusements, and thereby rendering him too eager to enjoy them, most probably exposed him to the much-dreaded misfortune. Reluctantly permitted to engage in a party of hunting, the juvenile ardour of Atys, increased by the impatience of long restraint, made him neglect the precautions necessary in that manly amusement. He was slain by a dart aimed at a wild boar of monstrous size, which had long spread terror over the country of the Mysians. The weapon came from the hand of Adrastus, a Phrygian prince and fugitive, whom Crœsus had purified from the involuntary guilt of a brother's blood, and long distinguished by peculiar remarks of bounty. To the grateful protection of the Phrygian, Crœsus recommended, at parting, the safety of his beloved son. A mournful procession of Lydians brought to Sardis the dead body of Atys. The ill-fated murderer followed behind,

behind. When they approached the royal presence, Adrastus stepped forward and entreated Crœsus to put him to death; thinking life no longer to be endured after killing, first his own brother, and then the son of his benefactor. But the Lydian king, notwithstanding the excess of his affliction, acknowledged the innocence of Adrastus, and the power of fate. "Stranger, your action is blameless, being committed without design. I know that my son was destined to a premature death." Adrastus, though pardoned by Crœsus, could not pardon himself. When the mourners were removed, he privately returned, and perished by his own hand on the tomb of Atys.

Two years Crœsus remained disconsolate for the loss of his son: and might have continued to indulge his unavailing affliction during the remainder of life, had not the growing greatness of Persia, which threatened the safety of his dominions, roused him from his dream of misery. (See LYDIA.)—He marched against Cyrus with a great army, but was defeated; and retreating to his capital Sardis, was there besieged. The city was taken by assault; and as a Persian soldier was going to kill Crœsus, that prince's only surviving son, who had hitherto been dumb, terrified at his danger, cried, *Stop soldier, and touch not Crœsus.* But though delivered by this extraordinary accident from the blind rage of the soldier, he seemed to be reserved for a harder fate. Dragged into the presence of his conqueror, he was loaded with irons; and the stern, unrelenting Cyrus, of whose humane temper of mind we have so beautiful, but so flattering, a picture in the philosophical romance of Xenophon, ordered him, with the melancholy train of his Lydian attendants, to be committed to the flames. An immense pile of wood and other combustibles was erected in the most spacious part of the city. The miserable victims, bound hand and foot, were placed on the top of the pyre. Cyrus, surrounded with his generals, witnessed the dreadful spectacle. Either from an abominable principle of superstition he had bound himself by a vow to sacrifice Crœsus as the first fruits of his Lydian victory, or from a motive of curiosity, equally cruel and impious, to try whether Crœsus, who had so magnificently adorned the temples and enriched the ministers of the gods, would be helped in time of need by the miraculous interposition of his much honoured protectors. Meanwhile the unfortunate Lydian, oppressed and confounded by the intolerable weight of his present calamity compared with the security and splendor of his former state, recollected his memorable conversation with the Athenian sage, and uttered with a deep groan the name of *Solon*. Cyrus asked by an interpreter, "Whose name he invoked?" "*His*," replied Crœsus, emboldened by the prospect of certain death, "whose words ought ever to speak to the heart of kings." This reply not being satisfactory, he was commanded to explain at full length the subject of his thoughts. Accordingly he related the important discourse which had passed between himself and the Athenian, of which it was the great moral, That no man could be called happy till his death.

The words of a dying man are fitted to make a strong impression on the heart. Those of Crœsus deeply affected the mind of Cyrus. The Persian considered the speech of Solon as addressed to himself. He repented of his intended cruelty towards the unfortunate prince, who had formerly enjoyed all the pomp of prosperity: and dreading the concealed vengeance that might lurk in the bosom of fate, gave orders that the pyre should be extinguished. But the workmen who had been employed to prepare it, had performed their task with so much care, that the order could not speedily be obeyed. At that moment, Crœsus calling on Apollo, whose favourite shrine of Delphi had experienced his generous munificence, and whose perfidious oracle had made him so ungrateful a return; the god, it is said, sent a plentiful shower to extinguish the pyre. This event, which saved the life, and which sufficiently attested the piety, of Crœsus, strongly recommended him to the credulity of his conqueror. It seemed impossible to pay too much respect to a man who was evidently the favourite of heaven. Cyrus gave orders that he should be seated by his side, and thenceforth treated as a king; a revolution of fortune equally sudden and unexpected. But the mind of Crœsus had undergone a still more important revolution: for, tutored in the useful school of adversity, he learned to think with patience and to act with prudence, to govern his own passions by the dictates of reason, and to repay by wholesome advice the generous behaviour of his Persian master.

The first advantage which he derived from the change in Cyrus's disposition towards him, was the permission of sending his fetters to the temple of the Delphian Apollo, whose flattering oracles had encouraged him to wage war with the Persians. "Behold," were his messengers instructed to say, "the trophies of our promised success! behold the monuments of the unerring veracity of the god!" The Pythia heard their reproach with a smile of contemptuous indignation, and answered it with that solemn gravity which she was so carefully taught to assume: "The gods themselves cannot avoid their own destiny, much less avert, however they may retard, the determined fates of men. Crœsus has suffered, and justly suffered, for the crime of his ancestor Gyges; who, entrusted as chief of the guards, with the person of Candaules, the last king of the race of Hercules, was seduced by an impious woman to murder his master, defile his bed, and to usurp his royal dignity. For this complicated guilt of Gyges the misfortunes of Crœsus have atoned; but know, that through the favour of Apollo, these misfortunes have happened three years later than the fates ordained." The Pythia then proceeded to explain her answers concerning the event of the war against Cyrus, and proved, to the conviction of the Lydians, that her words, if properly understood, portended the destruction, not of the Persian, but of the Lydian empire. Crœsus heard with resignation the report of his messengers, and acknowledged the justice of the Delphian oracle, which maintained and increased the lustre of its ancient fame. This fallen monarch survived Cyrus. The manner of his death is not known.

CROFT, a little close adjoining to a dwelling-house, and inclosed for pasture or arable land, or any other purpose.—In some ancient deeds, *crufta* occurs as the Latin word for a "croft;" but *cum toftis et croftis* is more frequent. Croft is translated in Abbo Floriacensis by *prædium*, a "farm."

CROISADE, or CRUSADE, a name given to the expeditions

oiſade.

expeditions of the Chriſtians againſt the infidels for the conqueſt of Paleſtine.

Theſe expeditions commenced in the year 1096. The foundation of them was a ſuperſtitious veneration for thoſe places where our Saviour performed his miracles, and accompliſhed the work of man's redemption. Jeruſalem had been taken, and Paleſtine conquered, by Omar the ſucceſſor of Abu Becr *, who ſucceeded Mahomet himſelf. This proved a conſiderable interruption to the pilgrims, who flocked from all quarters to perform their devotions at the holy ſepulchre. They had, however, ſtill been allowed this liberty, on paying a ſmall tribute to the Saracen caliphs, who were not much inclined to moleſt them. But, in 1065, this city changed its maſters. The Turks took it from the Saracens; and being much more fierce and barbarous than the former, the pilgrims now found they could no longer perform their devotions with the ſame ſafety they did before. An opinion was about this time alſo prevalent in Europe, which made theſe pilgrimages much more frequent than formerly. It was ſomehow or other imagined, that the thouſand years mentioned in the 20th chapter of the Revelations, were fulfilled; that Chriſt was ſoon to make his appearance in Paleſtine, to judge the world; and conſequently that journeys to that country were in the higheſt degree meritorious, and even abſolutely neceſſary. The multitudes of pilgrims which now flocked to Paleſtine meeting with a very rough reception from the Turks, filled all Europe with complaints againſt thoſe infidels, who profaned the holy city by their preſence, and derided the ſacred myſteries of Chriſtianity even in the place where they were fulfilled. Pope Gregory VII. had formed a deſign of uniting all the princes of Chriſtendom againſt the Mahometans; but his exorbitant encroachments upon the civil power of princes had created him ſo many enemies, and rendered his ſchemes ſo ſuſpicious, that he was not able to make great progreſs in the undertaking. The work was reſerved for a meaner inſtrument.

* [See] Ara-[bia,] N° 76.

Peter, commonly called the *hermit*, a native of Amiens in Picardy, had made the pilgrimage to Jeruſalem; and being deeply affected with the dangers to which that act of piety now expoſed the pilgrims, as well as with the oppreſſion under which the eaſtern Chriſtians now laboured, formed the bold, and, in all appearance, impracticable deſign of leading into Aſia, from the fartheſt extremities of the weſt, armies ſufficient to ſubdue thoſe potent and warlike nations that now held the Holy Land in ſlavery. He propoſed his ſcheme to Martin II. who then filled the papal chair; but he, though ſenſible enough of the advantages which muſt acrue to himſelf from ſuch an undertaking, reſolved not to interpoſe his authority till he ſaw a greater probability of ſucceſs. He ſummoned, at Placentia, a council conſiſting of 4000 eccleſiaſtics and 30,000 ſeculars. As no hall could be found large enough to contain ſuch a multitude, the aſſembly was held in a plain. Here the Pope himſelf, as well as Peter, harangued the people, repreſenting the diſmal ſituation of their brethren in the eaſt, and the indignity offered to the Chriſtian name in allowing the holy city to remain in the hands of the infidels. Theſe ſpeeches were ſo agreeable to thoſe who heard them, that the whole multitude ſuddenly and violently declared for the war, and ſolemnly devoted themſelves to perform this ſervice, which they believed to be ſo meritorious in the ſight of God.

Croiſade.

But though Italy ſeemed to have embraced the deſign with ardour, Martin yet thought it neceſſary, in order to inſure perfect ſucceſs, to engage the greater and more warlike nations in the ſame enterpriſe. Having therefore exhorted Peter to viſit the chief cities and ſovereigns of Chriſtendom, he ſummoned another council at Clermont in Auvergne. The fame of this great and pious deſign being now univerſally diffuſed, procured the attendance of the greateſt prelates, nobles, and princes; and when the Pope and the hermit renewed their pathetic exhortations, the whole aſſembly, as if impelled by an immediate inſpiration, exclaimed with one voice, "It is the will of God! it is the will of God!" Theſe words were deemed ſo memorable, and ſo much the effect of a divine impulſe, that they were employed as the ſignal of rendezvous and battle in all future exploits of theſe adventurers. Men of all ranks now flew to arms with the utmoſt ardour, and a croſs was affixed to their right ſhoulder by all who inliſted in this holy enterpriſe.

At this time Europe was ſunk in the moſt profound ignorance and ſuperſtition. The eccleſiaſtics had gained the greateſt aſcendant over the human mind; and the people who committed the moſt horrid crimes and diſorders, knew of no other expiation than the obſervances impoſed on them by their ſpiritual paſtors.

But amidſt the abject ſuperſtition which now prevailed, the military ſpirit had alſo univerſally diffuſed itſelf; and, though not ſupported by art and diſcipline, was become the general paſſion of the nations governed by the feudal law. All the great lords poſſeſſed the right of peace and war. They were engaged in continual hoſtilities with one another: the open country was become a ſcene of outrage and diſorder: the cities, ſtill mean and poor, were neither guarded by walls nor protected by privileges. Every man was obliged to depend for ſafety on his own force, or his private alliances; and valour was the only excellence which was held in eſteem, or gave one man the pre-eminence above another. When all the particular ſuperſtitions, therefore, were here united in one great object, the ardour for private hoſtilities took the ſame direction; "and all Europe (as the princeſs Anna Comnena expreſſes herſelf) torn from its foundations, ſeemed ready to precipitate itſelf in one united body upon Aſia."

All orders of men, now deeming the croiſades the only road to heaven, were impatient to open the way with their ſwords to the holy city. Nobles, artiſans, peaſants, even prieſts, inrolled their names; and to decline this ſervice was branded with the reproach of impiety or cowardice. The nobles who inliſted themſelves were moved, by the romantic ſpirit of the age, to hope for opulent eſtabliſhments in the eaſt, the chief ſeat of arts and commerce at that time. In purſuit of theſe chimerical projects, they ſold at the loweſt price their ancient caſtles and inheritances, which had now loſt all value in their eyes. The infirm and aged contributed to the expedition by preſents and money; and many of them, not ſatisfied with this, attended

tended it in person, being determined, if possible, to breathe their last in sight of that city where their Saviour had died for them. Women themselves, concealing their sex under the disguise of armour, attended the camp; and commonly forgot their duty still more, by prostituting themselves to the army. The greatest criminals were forward in a service which they considered as an expiation for all crimes; and the most enormous disorders were, during the course of these expeditions, committed by men inured to wickedness, encouraged by example, and impelled by necessity. The multitude of adventurers soon became so great, that their more sagacious leaders became apprehensive lest the greatness of the armament would be the cause of its own disappointment. For this reason they permitted an undisciplined multitude, computed at 300,000 men, to go before them under the command of Peter the hermit, and Gautier or Walter, surnamed the *moneyless*, from his being a soldier of fortune. These took the road towards Constantinople through Hungary and Bulgaria; and, trusting that heaven, by supernatural assistance, would supply all their necessities, they made no provision for subsistence in their march. They soon found themselves obliged to obtain by plunder what they vainly expected from miracles; and the enraged inhabitants of the countries through which they passed, attacked the disorderly multitude, and slaughtered them without resistance. The more disciplined armies followed after; and, passing the straits of Constantinople, they were mustered in the plains of Asia, and amounted in the whole to 700,000.

The rage for conquering the Holy Land did not cease with this expedition. It continued for very near two centuries, and eight different croisades were set on foot, one after another. The first was in the year 1069, as already observed. The princes engaged in it were, Hugo, count of Vermandois, brother to Philip I. king of France; Robert, duke of Normandy; Robert, earl of Flanders; Raimond, earl of Toulouse and St Giles; Godfrey of Bouillon, duke of Lorrain, with his brothers Baldwin and Eustace; Stephen, earl of Charters and Blois; Hugo, count of St Paul; with a great number of other lords. The general rendezvous was at Constantinople. In this expedition, the famous Godfrey besieged and took the city of Nice. The city of Jerusalem was taken by the confederated army, and Godfrey chosen king. The Christians gained the famous battle of Ascalon against the soldan of Egypt; which put an end to the first croisade.

The second croisade, in the year 1144, was headed by the emperor Conrad III. and Louis VII. king of France. The emperor's army was either destroyed by the enemy, or perished through the treachery of Manuel the Greek emperor; and the second army, through the unfaithfulness of the Christians of Syria, was forced to break up the siege of Damascus.

The third croisade, in the year 1188, immediately followed the taking of Jerusalem by Saladin the soldan of Egypt. The princes engaged in this expedition were, the emperor Frederic Barbarossa; Frederic duke of Suabia, his second son; Leopold duke of Austria; Berthold duke of Moravia; Herman marquis of Baden; the counts of Nassau, Thuringia, Misser, and Holland; and above 60 other princes of the empire; with the bishops of Besançon, Cambray, Munster, Osnaburgh, Missen, Passau, Visburg, and several others. In this expedition, the emperor Frederic defeated the soldan of Iconium: his son Frederic, joined by Guy Lusignan king of Jerusalem, in vain endeavoured to take Acre or Ptolemais. During which transactions, Philip Augustus king of France, and Richard I. king of England, joined the croisade; by which means the Christian army consisted of 300,000 fighting men: but great disputes happening between the kings of France and England, the former quitted the Holy Land, and Richard concluded a peace with Saladin.

The fourth croisade was undertaken, in the year 1195, by the emperor Henry VI. after Saladin's death. In this expedition the Christians gained several battles against the infidels, took a great many towns, and were in the way of success, when the death of the emperor obliged them to quit the Holy Land, and return into Germany.

The fifth croisade was published, by order of Pope Innocent III. in 1198. Those engaged in it made fruitless efforts for the recovery of the Holy Land; for, though John de Neule, who commanded the fleet equipped in Flanders, arrived at Ptolemais a little after Simon of Montfort, Reynard of Dampierre, and others; yet the plague destroying many of them, and the rest either returning, or engaging in the petty quarrels of the Christian princes, there was nothing done; so that the soldan of Aleppo easily defeated their troops in 1204.

The sixth croisade began in 1228; in which the Christians took the town of Damietta, but were forced to surrender it again. The next year the emperor Frederic made peace with the soldan for 10 years. About 1240, Richard earl of Cornwall, and brother to Henry III. king of England, arrived in Palestine at the head of the English croisade: but finding it most advantageous to conclude a peace, he re-embarked, and steered towards Italy. In 1244, the Karasinians being driven out of Persia by the Tartars, broke into Palestine, and gave the Christians a general defeat near Gaza.

The seventh croisade was headed by St Lewis, in the year 1249, who took the town of Damietta: but a sickness happening in the Christian army, the king endeavoured to retreat; in which being pursued by the infidels, most of his army were miserably butchered, and himself and the nobility taken prisoners. Then a truce was agreed upon for 10 years, and the king and lords set at liberty.

The eighth croisade, in 1270, was headed by the same prince, who made himself master of the port and castle of Carthage in Africa; but dying in a short time, he left his army in a very ill condition. Soon after, the king of Sicily coming up with a good fleet, and joining Philip the Bold, son and successor of Lewis, the king of Tunis, after several engagements with the Christians, in which he was always worsted, desired peace, which was granted upon conditions advantageous to the Christians; after which both princes embarked for their own kingdoms. Prince Edward of England, who arrived at Tunis at the time of this treaty, sailed towards Ptolemais, where he landed with a small body of

of 300 English and French, and hindered Bendocdar from laying siege to Ptolemais: but being obliged to quit the Holy Land to take possession of the crown of England, this croisade ended without contributing any thing to the recovery of the Holy Land. In 1291, the town of Acre, or Ptolemais, was taken and plundered by the soldan of Egypt, and the Christians quite driven out of Syria. There has been no croisade since that time, though several popes have attempted to stir up the Christians to such an undertaking; particularly Nicholas IV. in 1292, and Clement V. in 1311.

Though these croisades were effects of the most absurd superstition, they tended greatly to promote the good of Europe. Multitudes indeed were destroyed. M. Voltaire computes the people who perished in the different expeditions at upwards of two millions. Many there were, however, who returned; and these having conversed so long with people who lived in a much more magnificent way than themselves, began to entertain some taste for a refined and polished way of life. Thus the barbarism in which Europe had been so long immersed, began to wear off soon after this time. The princes also who remained at home, found means to avail themselves of the frenzy of the people. By the absence of such numbers of restless and martial adventurers, peace was established in their dominions. They also took the opportunity of annexing to their crown many considerable fiefs, either by purchase, or by the extinction of the heirs; and thus the mischiefs which must always attend feudal governments were considerably lessened.

With regard to the bad success of the croisaders, it was scarce possible that any other thing could happen them. The emperors of Constantinople, instead of assisting, did all in their power to disconcert their schemes. They were jealous, and not without reason, of such an inundation of barbarians. Yet, had they considered their true interest, they would rather have assisted them, or at least stood neuter, than entered into alliances with the Turks. They followed the latter method, however, and were often of very great disservice to the western adventurers, which at last occasioned the loss of their city*. But the worst enemies the croisaders had, were their own internal feuds and dissensions. They neither could agree while marching together in armies with a view to conquest, nor could they unite their conquests under one government after they had made them. They set up three small states, one at Jerusalem, another at Antioch, and another at Edessa. These states, instead of assisting, made war upon each other, and on the Greek emperors; and thus became an easy prey to the common enemy. The horrid cruelties they committed also were such as must have inspired the Turks with the most invincible hatred against them, and made them resist with the greatest obstinacy. They were such as could have been committed only by barbarians inflamed with religious enthusiasm. When Jerusalem was taken, not only the numerous garrison were put to the sword, but the inhabitants were massacred without mercy and without distinction. No age or sex was spared, even children at the breast were barbarously murdered. According to Voltaire, some Christians, who had been suffered by the Turks to live in that city, led the conquerors into the most private caves where women had concealed themselves with their children, and not one of them was suffered to escape. What eminently shows the enthusiasm with which these conquerors were animated, is their behaviour after this terrible slaughter. They marched over heaps of dead bodies towards the holy sepulchre; and while their hands were yet polluted with the blood of so many innocent persons, sung anthems to the common Saviour of mankind. Nay, so far did their religious enthusiasm overcome their fury, that these ferocious conquerors now burst into tears. If the absurdity and wickedness of this conduct can be exceeded by any thing, it must be by what follows. In the year 1204, the frenzy of croisading seized the children, who are ever ready to imitate what they see their parents engage themselves in. Their childish folly was encouraged by the monks and schoolmasters; and thousands of those innocents were conducted from the houses of their parents on the faith of these words, "Out of the mouth of babes and sucklings hast thou perfected praise." Their base conductors sold a part of them to the Turks, and the rest perished miserably.

* See Constantinople, N° 144.

CROISERS, a religious order founded in honour of the invention or discovery of the cross by the empress Helena. They are dispersed in several parts of Europe, particularly in the Low Countries, France, and Bohemia, those in Italy being at present suppressed. These religious follow the rule of St Augustine. They had in England the name of *crouched friars*.

CROISES, or CROIZES, in English antiquity, pilgrims bound for the Holy Land, or such as had been there; so called from a badge they wore in imitation of a cross. The knights of St John of Jerusalem, created for the defence and protection of pilgrims, were particularly called *croises*.

CROIX, FRANCIS PETIT DE LA, secretary and interpreter to the king of France, in the Turkish and Arabic languages, died November 4. 1695, in his 73d year; after having executed this employment for the space of 44 years. And it appears, that he executed it with as much integrity as abilities; for, when the Algerines sought for peace of Louis XIV. conditions were offered, by which they were required to reimburse to this monarch 600,000 franks. The terms being thought exorbitant, they had recourse to stratagem; and they offered a large sum to La Croix, who was the interpreter of all that passed, if he would put into the treaty "crowns of Tripoli," instead of "French crowns;" which would have made to the Algerines a difference of more than 100,000 livres. But the integrity of the interpreter triumphed over the temptation; which however was the greater, as it was next to impossible he should be discovered. Besides the Turkish and the Arabic, the Persian and the Tartarian, he also understood the Ethiopian and Armenian languages. He is well known to the learned world by many works. He translated the "History of France" into the Turkish language. He digested the three volumes of "Voyages into the East Indies" of M. Thevenot. He made an accurate catalogue of all the Turkish and Persian books which are in the king's library. He composed two complete Dictionaries for the French and Turkish languages; and, when he was dying, he was about to present the world with the history of Jenghis Khan. He undertook this

history

history by the order of M. Colbert: for this minister, altogether intent upon aggrandizing his master, was accustomed every week to call together, either in the king's library or his own, certain of the learned, whom, according as they excelled in their several departments in literature, he constantly set to work. This history, which cost La Croix more than ten years labour, is useful not only to the learned who are curious to know past events, or to geographers who had hitherto been greatly ignorant of Grand Tartary, but likewise to all who trade to China, Persia, or other eastern parts of the world. There is a good map of northern Asia drawn by M. de l'Isle, accompanying the work; which M. Petit de la Croix, the author's son, not only revised, but, to render it more curious, added to it an abridgement of the lives of all those authors from whom it was extracted. It was translated into English, and published at London, 1722, 8vo.

CROMARTY, a town of Scotland, capital of the county of the same name. The town is small, and situated upon a rock or point of land, which overhangs the sea in a romantic manner, and is much exposed to the east wind; it was formerly a royal borough, but was disfranchised by an act of the privy council of Scotland, in consequence of a petition for that purpose presented by Sir John Urquhart, proprietor of the estate of Cromarty; it is now under the baronial jurisdiction of the earl of Cromarty. The parish extends about seven miles in length, and from one to four in breadth, bounded by the frith of Cromarty on the north. On the banks of the frith the surface is level, and covered with verdure. A bank about two miles from the coast, extends the whole length of the parish, above which the ground is covered with heath and moss. The soil is everywhere wet and moorish, which makes the seasons late, and the crop uncertain. The coast towards the east is bold and rocky, some of the cliffs being nearly 250 feet perpendicular to the sea; the rest is flat and sandy. After every storm a great quantity of sea weed is thrown ashore, which is partly used as a manure, and partly burnt into kelp, of which there is annually made about 10 or 12 tons. The harbour of Cromarty, inferior, perhaps, to none in Britain for safety, and a commodious quay, was lately built at the joint expence of government and the proprietor of the estate of Cromarty, where vessels of 350 or 400 tons may lie in perfect security. A considerable trade in the hempen or sack-cloth line has been long established in Cromarty and the neighbourhood.

Cromarty, *County of*, in Scotland, forms a kind of peninsula, washed on three sides by the friths of Cromarty and Moray, and bounded on the south-west and south by the county of Ross. Its extreme extent in length is about 16 miles, and on an average about six and a half or seven in breadth. It was erected into a distinct county about the end of the 17th century, at the request of Sir James M'Kenzie, earl of Cromarty, to whom it almost entirely belonged. The face of the country is pleasant; a long ridge of hills extending the whole length in the middle of the county, having a fine declivity on either side towards the shores of the friths. The higher grounds are mostly covered with heath, but towards the shores the soils are light and early. A great many plantations have been lately made out, which will shortly be a great ornament and shelter to the country. The language is generally Gaelic, but many speak that broad Scotch, which is commonly called the Buchan or Aberdeenshire dialect. Freestone, granite, and reddish-coloured porphyry, are almost the only minerals, if we except *topazes*, similar to those of *Cairngorum*, found in the parish of Kincardine. Fisheries are very successfully carried on, and pearls of considerable value are sometimes found in the frith of Cromarty, where the river *Conal* falls into that bay.

Population of the County of Cromarty at two different periods.

Parishes.	Population in 1755.	Population in 1790—1798.
Cromarty	2096	2184
Fodderty	1483	1730
Tarbat	1584	1370
	5163	5284
		5163
	Increase	121

Cromarty, *Frith of*, is one of the finest bays in Great Britain; hence called by Buchanan *Portus Salutis*. It is divided from the Moray frith by the county of Cromarty, and washes the southern shore of the county of Ross. It is about 16 miles in length, and sometimes three in breadth. The entrance is between two promontories or headlands, called the *Sutors of Cromarty*, which are about a mile and a half distant: there is the finest anchorage ground after passing the *Sutors*, for several miles up the bay, with deep water on both sides, almost close to the shore, where in most places the coast is so smooth, that supposing a vessel to part her cables (a thing scarcely probable), she might run aground without sustaining much damage. Such is the extent of sea-room in the bay, and such is the capacity, that almost the whole British navy might lie here in safety.

CROMLECH, in British antiquities, are huge, broad, flat stones, raised upon other stones set up on end for that purpose. They are common in Anglesea; under which article a very large one is described. See Plate CLXIV.

These monuments are spoken of largely by Mr Rowland, by Dr Borlase, and by Wormius, under the name of *Ara* or altar. Mr Rowland, however, is divided in his opinion; for he partly inclines to the notion of their having been altars, partly to their having been sepulchres: he supposes them to have been originally tombs, but that in after times sacrifices were performed upon them to the heroes deposited within. Mr Keiller preserves an account of King Harold having been interred beneath a tomb of this kind in Denmark, and Mr Wright discovered in Ireland a skeleton deposited under one of them. The great similarity of the monuments throughout the north, Mr Pennant observes, evinces the same religion to have been spread in every part, perhaps with some slight deviations. Many of these monuments are both British and Danish; for we find them where the Danes never penetrated.

The cromlech, or cromleh, chiefly differs from the *Kist-vaen*, in not being closed up at the end and sides, that

that is, in not so much partaking of the chest-like figure; it is also generally of larger dimensions, and sometimes consists of a greater number of stones: the terms *cromleh* and *kist-vaen* are however indiscriminately used for the same monument. The term *cromlech* is by some derived from the Armoric word *crum*, "crooked or bowing," and *leh* "stone," alluding to the reverence which persons paid to them by bowing. Rowland derives it from the Hebrew words *carem-luach*, signifying a "devoted or consecrated stone." They are called by the vulgar *coetne Arthor*, or *Arthur's quoits*, it being a custom in Wales as well as Cornwall to ascribe all great or wonderful objects to Prince Arthur, the hero of those countries.

CROMWELL, Thomas, earl of Essex, was the son of a blacksmith at Putney, and born in 1498. Without a liberal education, but endowed with a strong natural genius, he considered travelling as the proper means of improving his understanding; and to this early token of his sound judgment he stood indebted for the high rank and distinguished honours he afterwards enjoyed. He became by degrees the confidential favourite and prime minister of Henry VIII.; and from the moment he acquired any authority in the cabinet, he employed it in promoting the reformation, to his zeal for which he became a victim; for, the more firmly to secure the Protestant cause, he contrived to marry the king to Ann of Cleves, whose friends were all Lutherans. Unfortunately Henry took a disgust at this lady, which brought on Cromwell's ruin; the king, with his usual cruelty and caprice, taking this opportunity to sacrifice this minister to the Roman Catholic party, to whom he seemed desirous of reconciling himself as soon as he had Catharine Howard in view. Cromwell was a great politician, and a good man; but, like most statesman, was guilty of great errors. In his zeal for the new religion, he had introduced the unjustifiable mode of attainder in cases of treason and heresy; and his enemies, who were numerous (consisting of two classes, the ancient nobility and gentry, who were enraged to see the highest honours bestowed on a man of mean extraction, and the Roman Catholics, who detested him), having preferred many complaints against him, availed themselves of his own law. He was attainted of treason and heresy, convicted unheard, and beheaded in 1540. He was the chief instrument of the suppression of the abbeys and monasteries, and of the destruction of images and relics; to him also we are indebted for the institution of parish-registers of births, marriages, and burials.

Cromwell, *Oliver*, stiled *Lord Protector* of the commonwealth of England, one of the most extraordinary personages mentioned in history, was the son of Mr Robert Cromwell of Hinchinbrooke in the county of Huntingdon. His ancestors were of very honourable extraction; but no ways related to Thomas Cromwell earl of Essex, the prime minister and favourite of Henry VIII. He was born in the parish of St John Huntingdon, where his father mostly lived, on the 25th or 26th of April 1599, and educated at the free school of that town. Little is known concerning him in his younger years, or indeed concerning his behaviour in private life. It is, however, related by authors of unsuspected veracity, that when at school he gave many signs of a very turbulent and restless disposition. He is also said from his early years to have been subject to the hypochondriac disorder, and to many deceptions of the imagination. He had a very remarkable one while at school. It happened in the day-time, when he was lying melancholy upon his back in bed. A spectre, as he thought, approached him, and told him that he should be the greatest man in the kingdom. His father, being informed of this, was very angry, and desired his master to correct him severely. This, however, produced no effect. Oliver persisted in the truth of his story, and would sometimes mention it, though his uncle told him "it was too traiterous to be repeated."—From this school Oliver was removed to Sidney college in Cambridge, where he was admitted in 1616. His progress in his studies is uncertain; but he spent much time in playing at foot-ball, cricket, and other robust exercises, at which he was very expert. His father dying after he had been about two years at college, Cromwell returned home; but the irregularity of his life gave such offence to his mother, that, by the advice of some friends, she sent him to London, and placed him in Lincoln's-inn. This expedient by no means answered the purpose; her son gave himself up to gaming, wine, and women, so that he quickly dissipated all that was left him by his father. This dissipation, however, could be but of very short continuance; for he was married, before he was 21 years of age, to Elizabeth, daughter of Sir James Bouchier of Essex. Soon after his marriage he returned to the country, where he led a very grave and sober life. This sudden reformation has been ascribed to his falling in with the Puritans; but it is certain, that Mr Cromwell continued then, and for some time after, a zealous member of the church of England, and formed a close friendship with several eminent divines. He continued at Huntingdon, where he settled after his marriage, till an estate of between 400l. and 500l. per annum devolved on him by the death of his uncle Sir Thomas Stuart. This induced him to remove to the isle of Ely where the estate lay, and here he embraced the puritanical doctrines. He was elected a member of the third parliament of Charles I. which met on the 10th of January 1628; and was a member of the committee for religion, where he distinguished himself by his zeal against popery. After the dissolution of that parliament, he returned again into the country, where he continued to express much concern for religion, to keep company with silenced ministers, and to invite them often to lectures and sermons at his house. Thus he brought his affairs again into a very indifferent situation: so that, by way of repairing the breaches he made in his fortune, he took a farm at St Ives, which he kept five years. But this scheme succeeded so ill, that he was obliged to give it up; and at last, chagrined with his disappointments, and made uneasy by the treatment his party at that time received, he formed a design of going over to New England. In this, however, he was disappointed; the king issued out a proclamation against all such emigrations, and Cromwell was obliged to remain in England against his will.

In 1638, Cromwell had first an opportunity of getting himself publicly taken notice of. The earl of

Bedford, and some other persons of high rank, who had estates in the fen country, were very desirous of having it better drained; and though one project of this sort had failed, they set on foot another, got it countenanced by royal authority, and settled a part of the profits upon the crown. This, though really intended for a public benefit, was opposed as injurious to private property: and at the head of the opposers was Mr Oliver Cromwell, who had considerable influence in these parts. The vigour he showed on this occasion recommended him to his friend and relation Mr Hampden; who afterwards characterized him in parliament, as a person capable of contriving and conducting great designs. But for all this he was not very successful in his opposition; and as his private affairs were still declining, he was in very necessitous circumstances at the approach of the long parliament. In this critical situation he got himself elected member of parliament in the following manner. In the puritanical meetings which he constantly frequented, Oliver had most eminently distinguished himself by his *gifts* of praying, preaching, and expounding. At one of these meetings he met with one Richard Tims, a tradesman of Cambridge. This man was so much taken with Oliver, that he took it into his head to attempt getting him chosen burgess for the approaching parliament. Being himself one of the common council, Tims imagined this design might be brought about; and with this view went to Mr Wildbore a relation of Cromwell's, to whom he communicated his intention. Wildbore agreed as to the fitness of the person; but told him the design was impracticable, because Oliver was not a freeman. Tims next addressed one Evett on the same subject, who also made the same objection. He recollected, however, that the mayor had a freedom to bestow, and a scheme was immediately laid for securing this freedom to Cromwell. On application to the mayor, however, he told them that the freedom was already disposed of to another; but this objection being obviated by promising that person a freedom from the town, the mayor being informed that Cromwell was a man of great fortune, signified his intention of bestowing the freedom upon him. Our hero being informed of the good offices of his friends, made his appearance in the court dressed in scarlet richly laced with gold, and having provided plenty of claret and sweetmeats, they were so freely circulated among the corporation, that Mr Mayor's freeman was unanimously declared to be a very civil worthy gentleman. When the election came on, the mayor discovered his mistake, but it was now too late; the party among the burgesses was strong enough to choose him, and accordingly did so at the election next year.

When Cromwell first came into parliament, he affected great plainness, and even carelessness in his dress. His attention to farming had entirely rusticated him, so that he made a very uncouth appearance. "Who (says Dr South) that had beheld such a bankrupt, beggarly fellow, as Cromwell, first entering the parliament house, with a thread-bare torn coat and greasy hat, and perhaps neither of them paid for, could have suspected, that, in the space of so few years, he should, by the murder of one king, and the banishment of another, ascend the throne, be invested with the royal robes, and want nothing of the state of a king but the changing his hat into a crown?" Cromwell was very active in promoting the famous *Remonstrance* *; which in reality laid the foundation of the civil war. He declared afterwards to Lord Falkland, that if the remonstrance had not been carried, he designed to have converted the small remains of his estate into ready money the next day, and to have left the kingdom by the first opportunity. His firmness on this occasion so effectually recommended him to Hampden, Pym, and the other leaders of the popular party, that they took him into all their councils; and here he acquired that clear insight into things, and that knowledge of men, of which he afterwards made such prodigious use. His exploits during the civil war, his murder of the king, and usurpation of the kingdom, are related under the article Britain, N° 127—188.

* See *Britain.*

With regard to the character of Cromwell, Mr Hume expresses himself as follows: "The writers attached to this wonderful person make his character, with regard to abilities, bear the air of the most extravagant panegyric: his enemies form such a representation of his moral qualities as resembles the most virulent invective. Both of them, it must be confessed, are supported by such striking circumstances in his fortune and conduct, as bestow on their representation, a great air of probability. 'What can be more extraordinary (it is said), than that a person of private birth and education, no fortune, no eminent qualities of body, which have sometimes, nor shining qualities of mind, which have often, raised men to the highest dignities, should have the courage to attempt, and the abilities to execute, so great a design as the subverting one of the most ancient as well as best established monarchies in the world? That he should have the power and boldness to put his prince and master to an open and infamous death? should banish that numerous and strongly allied family—cover all these temerities under a seeming obedience to a parliament, in whose service he pretended to be retained—trample too upon that parliament in their turn, and scornfully expel them as soon as they gave him ground of dissatisfaction—erect in their place the dominion of the saints, and give reality to the most visionary idea which the heated imagination of any fanatic was ever able to entertain—suppress again that monster in its infancy, and openly set himself up above all things that ever were called *sovereign* in England—overcome first all his enemies by arms, and all his friends afterwards by artifice—serve all parties patiently for a while, and afterwards command them victoriously at last—overrun each corner of the three nations, and subdue with equal facility both the riches of the south, and the poverty of the north—be feared and courted by all princes, and adopted a brother to the gods of the earth—call together parliaments with a word of his pen, and scatter them again by the breath of his mouth—reduce to subjection a warlike and discontented nation by means of a mutinous army—command a mutinous army by means of seditious and factious officers—be humbly and daily petitioned, that he would be pleased, at the rate of millions a-year, to be hired as master of those who had formerly hired him for their servant—have the estates and

and lives of three nations as much at his difpofal as was once the little inheritance of his father, and be as noble and liberal in the fpending of them? And, laftly, (for there is no end of enumerating every particular of his glory), with one word bequeath all this power and fplendour to his pofterity—die poffeffed of peace at home, and triumph abroad—be buried among kings, and with more than regal folemnity, and leave a name behind him not to be extinguifhed but with the whole world; which, as it was too little for his praife, fo it might have been for his conquefts, if the fhort line of his mortal life could have ftretched out to the extent of his immortal defigns?

"My intention is not to disfigure this picture drawn by fo mafterly a hand; I fhall only endeavour to remove from it fomewhat of the marvellous; a circumftance which, on all occafions, gives much ground for doubt and fufpicion. It feems to me that the circumftance of Cromwell's life in which his abilities are principally difcovered, is his rifing, from a private ftation, in oppofition to fo many rivals, fo much advanced before him, to a high command and authority in the army. His great courage, his fignal military talents, his eminent dexterity and addrefs, were all requifite for this important acquifition. Yet will not this promotion appear the effect of fupernatural abilities, when we confider that Fairfax himfelf, a private gentleman, who had not the advantage of a feat in parliament, had through the fame fteps attained even to a fuperior rank; and, if endued with common capacity and penetration, had been able to retain it. To incite fuch an army to rebellion againft the parliament, required no uncommon art or induftry: to have kept them in obedience had been the more difficult enterprife. When the breach is once formed between the military and civil powers, a fupreme and abfolute authority, from that moment, is devolved on the general; and if he is afterwards pleafed to employ artifice or policy, it may be regarded on moft occafions as great condefcenfion, if not as fuperfluous caution. That Cromwell was ever able really to blind or overreach either the king or the republicans, does not appear: as they poffeffed no means of refifting the force under his command, they were glad to temporize with him; and, by feeming to be deceived, to wait for an opportunity of freeing themfelves from his dominion. If he feduced the military fanatics, it is to be confidered that their intereft and his evidently concurred; that their ignorance and low education expofed them to the groffeft impofition; and that he himfelf was at bottom as frantic an enthufiaft as the worft of them; and in order to obtain their confidence, needed but to difplay thofe vulgar and ridiculous habits which he had early acquired, and on which he fet fo high a value. An army is fo forcible, and at the fame time fo coarfe a weapon, that any hand which wields it, may, without much dexterity, perform any operation, and attain any afcendant in human fociety.

"The domeftic adminiftration of Cromwell, though it difcovers great ability, was conducted without any plan either of liberty or arbitrary power: perhaps his difficult fituation admitted of neither. His foreign enterprifes, though full of intrepidity, were pernicious to national intereft; and feem more the refult of impetuous fury or narrow prejudices, than of cool forefight and deliberation. An eminent perfonage, however, he was in many refpects, and even a fuperior genius; but unequal and irregular in his operations: and, though not defective in any talent except that of elocution, the abilities which in him were moft admirable, and which contributed moft to his marvellous fuccefs, were the magnanimous refolution of his enterprifes, and his peculiar dexterity in difcovering the characters and practifing on the weakneffes of mankind.

"If we furvey the moral character of Cromwell, with that indulgence which is due to the blindnefs and infirmities of the human fpecies, we fhall not be inclined to load his memory with fuch violent reproaches as thofe which his enemies ufually throw upon it. Amidft the paffions and prejudices of that time, that he fhould prefer the parliamentary to the royal caufe, will not appear extraordinary; fince even at prefent many men of fenfe and knowledge are difpofed to think, that the queftion, with regard to the juftice of the quarrel, may be regarded as doubtful and ambiguous. The murder of the king, the moft atrocious of all his actions, was to him covered under a mighty cloud of republican and fanatical illufions; and it is not impoffible but he might believe it, as many others did, the moft meritorious action which he could perform. His fubfequent ufurpation was the effect of neceffity, as well as of ambition; nor is it eafy to fee how the various factions could at that time have been reftrained without a mixture of military and arbitrary authority. The private deportment of Cromwell as a fon, a hufband, a father, a friend, is expofed to no confiderable cenfure, if it does not rather merit praife. And, upon the whole, his character does not appear more extraordinary and unufual by the mixture of fo much abfurdity with fo much penetration, than by his tempering fuch violent ambition and fuch enraged fanaticifm with fo much regard to juftice and humanity."

That Cromwell continued a moft complete and bigotted enthufiaft to the very laft, appears from his behaviour in his laft ficknefs. His difeafe, which at firft was a kind of flow fever, brought on by the cares and anxiety of his mind, foon degenerated into a tertian ague. For about a week the diforder continued without any dangerous fymptoms, infomuch that every other day he walked abroad; but one day after dinner his five phyficians coming to wait upon him, one of them having felt his pulfe, faid that it intermitted. At this Cromwell was furprifed, turned pale, fell into a cold fweat, and, when he was almoft fainting, ordered himfelf to be carried to bed; where, by the affiftance of cordials, being brought a little to himfelf, he made his will with refpect to his private affairs. The next morning, when one of his phyficians came to vifit him, Cromwell afked him, why he looked fo fad? and when anfwer was made that fo it became every one who had the weighty charge of his life and health upon him, "Ye phyficians (fays Cromwell), think I fhall die: I tell you I fhall not die this bout, I am fure of it. Do not you think (faid he to the phyfician, looking more attentively at him), do not think that I am mad: I fpeak the words of truth upon furer grounds than your Hippocrates or Galen can furnifh you with. God almighty himfelf hath given that anfwer, not to my

Cromwell.

my prayers alone, but alſo to the prayers of thoſe who entertain a ſtricter commerce and greater intereſt with him. Go on cheerfully, baniſhing all ſadneſs from your looks; and deal with me as you would do with a ſerving man. Ye may have a ſkill in the nature of things, yet nature can do more than all phyſicians, put together, and God is far more above nature." As this phyſician was coming out of the chamber, he accidentally met with another, to whom he expreſſed his fear that the protector was turning light-headed. But the other informed him that the chaplains, being diſperſed the preceding night into different parts of the houſe, had prayed for the protector's recovery, and unanimouſly received for anſwer that he ſhould recover. Nay, to ſuch a degree of madneſs did they at laſt arrive, that, a public faſt being kept at Hampton court, they did not ſo much pray to God for the protector's health, as return thanks for the undoubted pledges they had of his recovery. On this account, though the phyſicians perceived his diſtemper increaſing every hour, they took no notice of his danger, till it became neceſſary for him to appoint a ſucceſſor while he had any breath remaining. But being then in a lethargic fit, he anſwered from the purpoſe; upon which he was again aſked whether he did not name his eldeſt ſon Richard? and to this queſtion he anſwered, Yes. Being then aſked where his will was which he had formerly made concerning the heirs of the kingdom: he ſent to look for it in his cloſet and other places, but in vain; for ſomebody had either ſtolen it, or he himſelf had burnt it. Soon after, he expired, on the 3d of September 1658, aged ſomewhat more than 59 years and four months. This day of September he had always reckoned to be the moſt fortunate for him in the whole year. A violent tempeſt, which immediately ſucceeded his death, ſerved as a ſubject of diſcourſe to the vulgar. His partizans, as well as his opponents, were fond of remarking this event; and each of them endeavoured, by forced inferences, to interpret it as beſt ſuited their particular prejudices.

It has been imagined by ſome, that Oliver Cromwell was poiſoned: but for this there ſeems to be no reaſonable foundation. His body was opened by Dr Bates. He found the brain ſomewhat overcharged with blood, and the lungs a little inflamed; but what he reckoned to have been the principal cauſe of his diſorder was a total degeneracy of the ſubſtance of his ſpleen into a matter reſembling the lees of oil. This, he thought, alſo accounted for the hypochondriac diſpoſitions to which Cromwell had from his infancy been ſubject. Though the bowels were taken out, and the body filled with ſpices wrapped in a fourfold cere cloth, put firſt into a coffin of lead, and then into one of wood, yet the corruption was ſo great that the humour wrought itſelf through the whole, and there was a neceſſity of interring the body before the ſolemnity of the funeral. A very pompous funeral was ordered at the public expence, and performed from Somerſet-houſe, with a ſplendour not only equal but ſuperior to that beſtowed upon crowned heads. Some have related that his body was depoſited in Naſeby-field; others, that it was wrapped in lead, and ſunk in the deepeſt part of the Thames, to prevent any inſult that might afterwards be offered to it. But it ſeems beyond doubt that his body was interred at Weſtminſter: as we are informed, that on the order to diſinter him after the Reſtoration, his corpſe was found in a vault in the middle aiſle of Henry VII.'s chapel. In the inſide of the coffin, and on the breaſt of the corpſe, was laid a copper plate finely gilt, encloſed in a thin caſe of lead. On one ſide of this plate were engraven the arms of England impaled with thoſe of Oliver, and on the reverſe the following legend: *Oliverius Protector Reipublicæ Angliæ, Scotiæ, et Hiberniæ, natus* 25. *Aprilis* 1599, *inauguratus* 16. *Decembris* 1653, *mortuus* 3. *Septembris ann.* 1658, *hic ſitus eſt.*

Cromwell

||

Cronius.

Cromwell was of a robuſt frame of body, and of a manly though not agreeable aſpect. His noſe being remarkably red and ſhining, was often made the ſubject of ridicule. He left only two ſons, Richard and Henry: and three daughters; one married to General Fleetwood, another to Lord Fauconberg, and a third to Lord Rich. His mother lived till after he was protector; and contrary to her orders he buried her with great pomp in Weſtminſter abbey. She could not be perſuaded that ever his power or his perſon was in ſafety. At every noiſe ſhe heard ſhe would exclaim that her ſon was murdered; and was never ſatisfied that he was alive if ſhe did not receive frequent viſits from him. She was a decent woman; and by her frugality and induſtry had raiſed and educated a numerous family upon a ſmall fortune. She had even been obliged to ſet up a brewery at Huntingdon, which ſhe managed to good advantage. Hence Cromwell, in the invectives of that age, is often ſtigmatized with the name of brewer. Ludlow, by way of inſult, mentions the great acceſſion which he would receive to his royal revenues upon his mother's death, who poſſeſſed a jointure of 60 pounds a-year upon his eſtate. She was of a good family, of the name of Stuart; and is by ſome ſuppoſed to have been remotely allied to the royal family.

CROMWELL, *Richard*, eldeſt ſon of Oliver Cromwell, was by his father appointed ſucceſſor to the protectorſhip, but very ſoon depoſed by the army *. They diſcharged his debts, took all the houſehold ſtuff, plate, &c. gave him a protection for ſix months, and ſo he retired. He was by no means qualified to ſupport the ſtation gained by the aſpiring talents of his father. He was of a moderate temper, and untainted with that fanatical ſpirit which his father had ſo ſucceſsfully cultivated. On the Reſtoration he went abroad; but returned in 1680 under the aſſumed name of Clark, and ſettled at Cheſhunt in Hertfordſhire, where he lived privately, and died in 1712, aged 86.

* See Britain, No 189, 190.

CRONENBURG, a town of Germany, in the circle of the Upper Rhine, and in the landgraviate of Heſſe Caſſel, with a ſtrong caſtle. It is ſeated at the foot of a high mountain, on a fertile ſoil, and is ſurrounded with a double wall. E. Long. 8. 15. N. Lat. 50. 15.

CRONENBURG, a ſtrong fortreſs of Denmark, in the iſle of Zealand, at the entrance of the Sound, where the Danes take toll of ſuch ſhips as are bound for the Baltic. It was very richly furniſhed, but pillaged by the Swedes in 1658, who took away the furniture, among which were ſome ſtatues of maſſy ſilver. It is built upon piles. E. Long. 12. 50. N. Lat. 56. 0.

CRONIUS, in *Chronology*, the ancient name of the Athenian month Hecatombæon; which was the

firſt

first of their year, and answered to the latter part of our June and beginning of July.—There were feasts called *Cronienes* celebrated at Athens in this month, in honour of Saturn, answering to the Saturnalia of the Romans.

CRONSLOT. See CRONSTADT.

CRONSTADT, a sea-port town of Russia, where the greatest part of the navy is stationed. It stands upon the island of Retusari in the gulf of Finland; and was founded by Peter I. as being provided with the safest harbour in these parts, and as forming a strong bulwark by sea for the defence of the new metropolis. The only passage by which ships of burden can approach Petersburgh lies on the south side of Retusari, through a narrow channel; one side whereof is commanded by Cronstadt, and the opposite by Cronslot and the citadel. Cronslot, which stands upon a small island of sand, is a circular wooden building, and surrounded with fortifications of wood that jut into the water. It contains a garrison of 100 men. The citadel is another small wooden fortress, constructed also upon an adjacent sand-bank, and capable of holding about 30 soldiers. All large vessels must sail between Cronstadt and these two fortresses, exposed to the fire of the opposite batteries; for the other parts of the gulf are only from one to eleven feet in depth. All these fortifications were, at the time of their construction, esteemed places of considerable strength; but now they derive their consequence more from their past importance than from any resistance they could make against the attack of a powerful fleet.

Cronstadt is built upon the south-eastern extremity of the island, and is defended towards the sea by wooden piers projecting into the water, and towards the land by ramparts and bastions. It is a very straggling place; and occupies, like all the Russian towns, a larger space of ground than the number of habitations seems to require; the houses are mostly of wood, excepting a few fronting the harbour, which are of brick stuccoed white. Among the latter are the imperial hospital for sailors, the barracks, and the academy for marines and officers of the navy. That seminary usually contains between three and four hundred cadets, who are clothed, maintained, and taught at the expence of the crown. They are admitted at the age of five, and are suffered to remain until they reach their seventeenth year. They learn accounts, mathematics, drawing, fortification, and navigation; and have masters in the French, German, English, and Swedish languages. They are trained to naval affairs, and make an annual cruise in the Baltic as far as Revel. Cronstadt has a separate haven appropriated to the men of war, and another to merchant ships. Close to the haven for merchant ships is a canal and several dry docks, begun in 1719 by Peter I. for the purpose of refitting the men of war. This useful work was neglected under his successor, and was not completed until the reign of his daughter Elizabeth. It has been still further beautified and improved by the present empress; and is now applied for building as well as careening ships of the line. At the extremity of these docks is a great reservoir 568 feet in length, which contains water sufficient, and half the quantity over, to supply all the docks; which is pumped into it by means of a fire engine, the diameter of whose cylinder is six feet. The length of this work, from the beginning of the canal to the end of the last dock, is 4221 feet. The sides of the docks are faced with stone, and the bottom is paved with granite. They are 40 feet deep and 150 broad; and are capable of containing nine men of war upon the stocks.

CRONSTAT, a town of Transylvania, near the frontiers of Moldavia, subject to the house of Austria. E. Long. 25. 0. N. Lat. 47. 0.

CROP, the high part or end of any thing cut off. It is particularly used for the corn gathered off a field in harvest. See AGRICULTURE *Index*.

CROSIER, or CROZIER, a shepherd's crook; a symbol of pastoral authority, consisting of a gold or silver staff, crooked at the top, carried occasionally before bishops and abbots, and held in the hand when they give the solemn benedictions. The custom of bearing a pastoral staff before bishops is very ancient, as appears from the life of St Cæsarea of Arles, who lived about the year 500. Among the Greeks none but the patriarchs had a right to the crosier. The crosiers were at first no more than simple wooden staves in form of a T, used to rest and lean upon. By degrees they were made longer; and at length arrived at the form we now see them of. Regular abbots are allowed to officiate with a mitre and crosier.

CROSIER, in *Astronomy*, four stars in the southern hemisphere in the form of a cross, serving those who sail in south latitudes to find the antarctic pole.

CROSLET, in *Heraldry*, is when a cross is crossed again at a small distance from each of the ends. Upton says it is not so often borne by itself in arms as other crosses are, but often in diminutives, that is, in small croslets scattered about the field. See HERALDRY.

CROSS, a gibbet made with two pieces of wood placed crosswise, whether they cross with right angles at the top like a T, or in the middle of their length like an X. The cross to which our Saviour was fastened, and on which he died, was of the former kind; being thus represented by old monuments, coins, and crosses; and St Jerome compares it to a bird flying, a man swimming, or praying with his arms extended. The punishment of the cross was common among the Syrians, Egyptians, Persians, Africans, Greeks, Romans, and Jews.

The death of the cross was the most dreadful of all others, both for the shame and pain of it; and so scandalous, that it was inflicted as the last mark of detestation upon the vilest of people. It was the punishment of robbers and murderers, provided that they were slaves too; but otherwise, if they were free, and had the privileges of the city of Rome, this was then thought a prostitution of that honour, and too infamous a punishment for such a one, let his crimes be what they would.

The Mosaic law ordained, that the persons executed should not be left upon the tree after sunset, because he that is hanged in this manner is accursed of God, Deut. xxi. 22. The Jews believe, that the souls of those who remain upon the gibbet, and without burial, enjoy no peace, and receive no benefit from the prayers of other people; but wander up and down till their bodies are buried: which agrees with the notions that the Greeks and Romans had of this matter, as may be seen in *Hom. Iliad* 4. and *Virg. Æneid* 6.

The form of a crofs being fuch as has been already defcribed, the body of the criminal was faftened to the upright piece by nailing the feet to it, and on the other tranfverfe piece generally by nailing the hands on each fide. Now, becaufe thefe parts of the body, being the inftruments of action and motion, are provided by nature with a much greater quantity of nerves than others have occafion for; and becaufe all fenfation is performed by the fpirit contained in thefe nerves; it will follow, as Stanhope obferves, that wherever they abound, the fenfe of pain muft needs in proportion be more quick and tender.

The Jews confefs, that indeed they crucified people in their nation, but deny that they inflicted this punifhment upon any one alive. They firft put them to death, and then faftened them to the crofs either by the hands or neck. But there are indifputable proofs of their crucifying men frequently alive. The worfhippers of Baal-peor and the king of Ai were hung up alive; as were alfo the defcendants of Saul, who were put into the hands of the Gibeonites, 2 Sam. xxi. 9.

Before crucifixion the criminal was generally fcourged with cords: fometimes little bones, or pieces of bones, were tied to thefe fcourges, fo that the condemned perfon might fuffer more feverely. It was alfo a cuftom that he who was to be crucified fhould bear his own crofs to the place of execution. After this manner we find Chrift was compelled to bear his own crofs; and, as he funk under the burden, Simon the Cyrenian was conftrained to bear it after him and with him. But whereas it is generally fuppofed that our Lord bore the whole crofs, i. e. the long and tranfverfe part both, this feems to be a thing impoffible; and therefore Lipfius (in his treatife *De Supplicio Crucis*) has fet the matter in a true light, when he tells us that Jefus only carried the tranverfe beam; becaufe the long beam, or the body of the crofs, was either fixed in the ground before, or made ready to be fet up as foon as the prifoner came: and from hence he obferves, that painters are very much miftaken in their defcription of our Saviour carrying the whole crofs.

There were feveral ways of crucifying; fometimes the criminal was faftened with cords to a tree, fometimes he was crucified with his head downwards. This way St Peter chofe out of refpect to his mafter Jefus Chrift, not thinking himfelf worthy to be crucified like him; though the common way of crucifying was by faftening the criminal with nails, one through each hand, and one through both feet, or one through each of them: for this was not always performed in the fame manner; the ancients fometimes reprefenting Jefus Chrift crucified with four nails, and fometimes with three. The criminal was fixed to the crofs quite naked; and in all probability the Saviour of the world was not ufed with any greater tendernefs than others upon whom the punifhment was inflicted. The foldiers divided his clothes among them, and caft lots for his tunic, which is an under garment worn over the flefh like a fhirt.

The text of the gofpel fhows clearly, that Jefus Chrift was faftened to the crofs with nails; and the Pfalmift (xxii. 16.) had foretold long before, that they fhould pierce his hands and his feet: but there are great difputes concerning the number of thefe nails. The Greeks reprefent our Saviour as faftened to the crofs with four nails; in which particular Gregory of Tours agrees with them, one at each hand and foot. But feveral are of opinion, that our Saviour's hands and feet were pierced with three nails only, viz. one at each hand, and one through both his feet: and one cuftom of the Latins is rather for this laft opinion; for the generality of the old crucifixes made in the Latin church have only three nails. Nonnus thinks that our Saviour's arms were befides bound faft to the crofs with chains; and St Hilary fpeaks of the cords wherewith he was tied to it.

Sometimes they who were faftened upon the crofs lived a good while in that condition. St Andrew is believed to have continued three days alive upon it. Eufebius fpeaks of certain martyrs in Egypt who were kept upon the crofs till they were ftarved to death. Pilate was amazed at Jefus Chrift dying fo foon; becaufe naturally he muft have lived long, if it had not been in his power to have laid down his life and to take it up again. The thighs of the two thieves who were crucified together with our Saviour were broken in order to haften their death, that their bodies might not remain upon the crofs on the Sabbath-day (John xix. 31, 32, 33.), and to comply with the law of Mofes, which forbids the bodies to be left there after funfet. But among other nations they were fuffered to remain upon the crofs a long time. Sometimes they were devoured alive by birds and beafts of prey. Guards were appointed to obferve that none of their friends or relations fhould take them down and bury them. The ftory of the Ephefian matron and the foldier who was fet to guard the crofs, is very well known. The Roman foldiers who had crucified Jefus Chrift and the two thieves continued near the croffes till the bodies were taken down and buried.

Croffes were ufually, in former times, erected on the tops of houfes, by which tenants pretended to claim the privileges of the Templars Hofpitallers, to defend themfelves againft their rightful lords. This was condemned by the ftatute Wil. II. c. 37. It was ufual alfo, in thofe days, to fet up croffes in places where the corpfe of any of the nobility refted as it was carried to be buried, that *à tranfeuntibus pro ejus animo deprecentur*. Croffes, &c. are forbidden to be brought into England by 13 Eliz. c. 2. on pain of a *præmunire*, &c.

Invention of the Cross, an ancient feaft folemnized on the third of May, in memory of St Helena's (the mother of Conftantine) finding the true crofs of Chrift deep in the ground on Mount Calvary; where fhe erected a church for the prefervation of part of it; the reft being brought to Rome and depofited in the church of the Holy Crofs of Jerufalem.

Theodoret mentions the finding of three croffes; that of Jefus Chrift and thofe of the two thieves; and that they diftinguifhed between them by means of a fick woman, who was immediately healed by touching the true crofs. The place is faid to have been pointed out to her by St Quiriacus, then a Jew, afterwards converted and canonized.

Exaltation of the Cross, an ancient feaft, held on the 14th of September, in memory of this, that Heraclitus reftored to Mount Calvary the true crofs in 642, which had been carried off 14 years before by Cofroes king of Perfia, upon his taking Jerufalem from the emperor Phocas.

The adoration of the crofs appears to have been practifed in the ancient church; inafmuch as the heathens, particularly Julian, reproached the primitive Chriftians with it. And we do not find that their apologifts difclaimed the charge. Mornay, indeed, afferted, that this had been done by St Cyril, but could not fupport his allegation at the conference of Fountainbleau. St Helena is faid to have reduced the adoration of the crofs to its juft principle, fince fhe adored in the wood, not the wood itfelf, which had been direct idolatry and heathenifm, but him who had been nailed to this wood. With fuch modifications fome Proteftants have been induced to admit the adoration of the crofs. John Hufs allowed of the phrafe, provided it were exprefsly added, that the adoration was relative to the perfon of Chrift. But however Roman Catholics may feem to triumph by virtue of fuch diftinction and mitigations, it is well known they have no great place in their own practice. Imbert, the good prior of Gafcony, was feverely profecuted in 1683 for telling the people, that in the ceremony of adoring the crofs, practifed in that church on Good Friday, they were not to adore the wood, but Chrift, who was crucified on it. The curate of the parifh told them the contrary: it was the wood! the wood! they were to adore. Imbert replied, it was Chrift, not the wood: for which he was cited before the archbifhop of Bourdeaux, fufpended from his functions, and threatened with chains and perpetual imprifonment. It little availed him to cite the bifhop of Meaux's diftinction; it was anfwered that the church allowed it not.

Cross-Bearer (*port-croix*, *cruciger*), in the Romifh church, the chaplain of an archbifhop or a primate, who bears a crofs before him on folemn occafions.

The pope has the crofs borne before him everywhere; a patriarch anywhere out of Rome; and primates, metropolitans, and thofe who have a right to the pallium, throughout their refpective jurifdictions.

Gregory XI. forbade all patriarchs and prelates to have it borne in prefence of cardinals. A prelate bears a fingle crofs, a patriarch a double crofs, and the pope a triple one on his arms.

Cross-Bearers alfo denote certain officers in the inquifition, who make a vow before the inquifitors or their vicars to defend the Catholic faith, though with the lofs of fortune and life. Their bufinefs is to provide the inquifitors with neceffaries. They were formerly of great ufe; but in procefs of time fome of their conftitutions were changed, and they were called of the penance of St Dominic.

Pectoral Cross, is a crofs of gold or filver, or other precious materials, often enriched with diamonds, which the bifhops, archbifhops, &c. and regular abbeffes, wear hanging from the neck.

Order of the Cross, or *Croifade*, an order of ladies inftituted in 1668 by the emprefs Eleonora de Gonzagua, wife of the emperor Leopold; on occafion of the miraculous recovery of a little golden crofs wherein were inclofed two pieces of the true crofs, out of the afhes of part of the palace. It feems the fire had burnt the cafe wherein it was inclofed, and melted the cryftal, yet the wood remained untouched.

Maids of the Cross, a community of young women inftituted in 1265 at Roye in Picardy, and fince difperfed to Paris and other towns. They inftruct young perfons of their own fex. Some take the three vows of poverty, chaftity, and obedience; others retain their liberty. They are under the direction of a fuperior.

Cross, in *Heraldry*, is defined by Guillim, an ordinary compofed of fourfold lines; whereof two are perpendicular, and the other two tranfverfe; for fo we muft conceive of them, though they be not drawn throughout, but meet by couples, in four right angles near the feffe point of the efcutcheon. See Heraldry.

This bearing was firft beftowed on fuch as had performed, or at leaft undertaken, fome fervice for Chrift, and the Chriftian profeffion; and is held by divers the moft honourable charge in all heraldry. What brought it into fuch frequent ufe, was the ancient expeditions into the Holy Land; and the holy war pilgrims, after their pilgrimage, taking the crofs for their cognizance; and the enfign of that war being the crofs. In thofe wars, fays Mackenzie, the Scots carried St Andrew's crofs; the French a crofs argent; the Englifh a crofs or; the Germans, fable; the Italians, azure; the Spaniards, gules.

St George's Cross, or the red crofs, in a field argent, is now the ftandard of England; that faint being the reputed patron of this nation.

Nor is it only in croffes that the variety is fo great; the like is found in many other bearings, and particularly in lions, and the parts of them; whereof Columbiere gives us no lefs than 96 varieties. Leigh mentions but 46 feveral croffes; Sylvanus Morgan, 26; Upton, 30; Johannes de Bado Aureo, 12; and fo others, whom it is needlefs to mention. Upton owns he dares not prefume to afcertain all the various croffes ufed in arms, for that they are at prefent almoft innumerable; and therefore he only takes notice of fuch as he had feen ufed in his own time.

Cross, in mining, two nicks cut on the fuperficies of the earth, thus +, which the miners make when they take the ground to dig for ore. This crofs gives the miners three days liberty to make and fet on ftones. As many of thefe croffes as the miner makes, fo many mears of ground he may have in the vein, provided he fet on ftones within three days after making his crofs or croffes. But if he make but one crofs, and a ftander by makes the fecond, and a ftranger makes the third, every one is ferved with the next mear, according as they have firft or laft, fooner or later, made their crofs or croffes upon the ground.

Cross, in coins, a name given to the right fide or face, the other being called the *pile* or *reverfe*. It has been a common error, that the reverfe was meant by the crofs; becaufe at this time, with us, it is marked with figures difpofed in that form: but the ftamping the head of the prince in thefe kingdoms on the right fide of the coin, was preceded by a general cuftom of ftriking on that part the figure of a crofs; while the other, called the *pile*, contained the arms, or fome other device.

Cross, inftead of a fignature to a deed, &c. is derived from the Saxon practice of affixing the fign of the crofs, whether they could write or not.

Cross, in furveying, is an inftrument which confifts of a brafs circle, divided into four equal parts by two lines croffing each other in the centre. At each extremity of the lines is fixed a perpendicular fight, with fmall

ſmall holes below each ſlit, for the better diſcovering of diſtant objects. The croſs is mounted on a ſtaff or ſtand, to fix it in the ground, and it is found to be a very uſeful inſtrument for meaſuring ſmall pieces of land, and taking offsets, &c.

Cross-Bar Shot, a bullet with an iron bar paſſing through it, and ſtanding ſix or eight inches out at both ſides. It is uſed at ſea for deſtroying the enemy's rigging.

Cross-Bill. See Loxia, Ornithology *Index*.

Cross-Bill, in chancery, is an original bill, by which the defendant prays relief againſt the plaintiff.

Cross-Bows. See Bows and Archery.

Cross-grained Stuff, in joinery. Wood is ſaid to be croſs-grained, when a bough or branch has ſhot out of it; for the grain of the branch ſhooting forward, runs athwart that of the trunk.

In wood well grown this defect is ſcarce perceivable, except in working; but in deal-boards theſe boughs make knots. If the bough grew up with the young trunk, inſtead of a knot is found a curling in the ſtuff, very ſenſible under the plane.

Cross-Jack, pronounced *cro-jeck*, a ſail extended on the lower yard of the mizen-maſt, which is hence called the *croſs-jack yard.* This ſail, however, has generally been found of little ſervice, and is therefore very ſeldom uſed.

Cross-Piece, a rail of timber extended over the windlaſs of a merchant ſhip from the knight-heads to the belfry. It is ſtuck full of wooden pins, which are uſed to faſten the running rigging as occaſion requires. See Windlass.

Cross-Staff, or *Fore ſtaff*, is a mathematical inſtrument of hard wood, conſiſting of a ſquare ſtaff of about three feet long, having each of its faces divided like a line of tangents, and having four croſs pieces of unequal lengths to fit on the ſtaff, the halves of theſe being as the radii to the tangent lines on the faces of the ſtaff.—The inſtrument was formerly uſed in taking the altitudes of the celeſtial bodies at ſea.

Cross-Tining, in *Huſbandry*, a method of harrowing land, conſiſting in drawing the harrow up the interval it went down before, and down that which it was drawn up.

Cross Trees, certain pieces of timber, ſupported by the cheeks and treſtle trees, at the upper ends of the lower maſts, athwart which they are laid to ſuſtain the frame of the top.

Cross-Tree Yard, is a yard ſtanding ſquare, juſt under the mizen-top, and to it the mizen-top is faſtened below. See *Cross-Jack*.

Cross-Wort. See Valantia, Botany *Index*.

Ordeal of the Cross, a ſpecies of trial frequently practiſed in the days of ſuperſtition. See Ordeal.

Cross, an Engliſh artiſt, famous only for copying, in the reigns of Charles I. and Charles II. Of this talent there is a ſtory current, more to the credit of his ſkill than of his probity. He is ſaid to have been employed by Charles I. to copy the celebrated Madona of Raphael in St Mark's church at Venice; and that, having obtained leave of the ſtate for that purpoſe, he executed his piece ſo well as to bring away the original and leave his copy in the place of it. The deception was not detected until it was too late to recover the loſs; and this piece was bought in Oliver Cromwell's time by the Spaniſh ambaſſador for his maſter, who placed it in the Eſcurial.

CROSSEN, a handſome town of Sileſia in Germany, and capital of a principality of the ſame name. It is ſituated at the confluence of the rivers Bobar and Oder, in a fertile country abounding in wine and fruits. There is a bridge over the Oder which is fortified. E. Long. 15. 20. N. Lat. 52. 5.

CROSSOSTYLUS, in *Botany*, a genus of plants belonging to the monadelphia claſs.

CROTALARIA, Rattle-wort; a genus of plants belonging to the diadelphia claſs; and in the natural method ranking under the 32d order, *Papilionaceæ*.

CROTALO, an inſtrument of military muſic, like that deſcribed in the next article. The Turks were the firſt, among the moderns, who introduced the uſe of it for their troops. It is now common in Flanders and Florence, and other territories on the continent. It has only one tone; but its effect in marking time may be diſtinctly heard through the noiſe of forty drums. This is the ſame inſtrument with the ancient cymbalum.

CROTALUM, an ancient kind of caſtagnetta, or muſical inſtrument, found on medals, in the hands of the prieſts of Cybele. The crotalum differed from the ſiſtrum; though authors frequently confound the two. It conſiſted of two little braſs plates or rods, which were ſhaken in the hand, and in ſtriking againſt each other made a noiſe.

It was ſometimes alſo made of a reed ſplit lengthwiſe; one part whereof they ſtruck againſt the other; and as this made a noiſe ſomewhat like that of a crane's bill, they called that bird *crotaliſtria*, a player on the crotala: and Ariſtophanes calls a great talker a *crotalum.*

Clemens Alexandrinus attributes the invention to the Sicilians; and forbids the uſe thereof to the Chriſtians, becauſe of the indecent motions and geſtures that accompany it.

CROTALUS, or Rattle-snake, in *Zoology*, a genus belonging to the order of amphibia ſerpentes. See Ophiology *Index*. The following is the account given by Mr Cateſby of the *crotalus horridus*, or American rattle-ſnake. This grows ſometimes to the length of eight feet, and weighs between eight and nine pounds. The colour of the head is brown; the eye red; the upper part of the body of a yellowiſh-brown colour, tranverſely marked with irregular broad black liſts. The rattle is of a brown colour, compoſed of ſeveral horny, membranous cells, of an undulated pyramidal figure. Theſe are articulated within one another in ſuch a manner that the point of the firſt cell reaches as far as the baſis of the protuberant ring of the third, and ſo on; which articulation, being very looſe, gives liberty to the parts of the cells that are incloſed within the outward rings to ſtrike againſt the ſides of them, and ſo to cauſe the rattling noiſe which is heard when the ſnake ſhakes its tail. This is the moſt inactive and ſlow-moving of all the ſnakes, and is never the aggreſſor except in what it preys upon. The above gentleman is of opinion that no remedy is yet diſcovered for the bite of this animal. He had frequently acceſs to ſee Indians bitten by it, and always thought that thoſe who recovered were cured more through

through the force of nature, or by reafon of the flightnefs of the bite, than by the remedies ufed. He tells us, that the Indians know their deftiny the moment they are bitten; and if the bite happens to be on any of the large veins, they apply no remedies, as knowing them to be entirely ufelefs. He believes the reports of the fafcinating power of this ferpent, though he never had an opportunity of feeing it. See the articles POISON and SERPENT.

CROTALYSTRIÆ, in antiquity, a kind of morice dancers, admitted to entertainments, in order to divert the company with their dancing and playing on an inftrument called *crotalum*, whence they had their name.

CROTCHET, in *Mufic*, one of the notes or characters of time, equal to half a minum, and double of a quaver.

CROTCHETS are alfo marks or characters, ferving to inclofe a word or fentence which is diftinguifhed from the reft, being generally in this form [ ].

CROTO, or CROTON, in *Ancient Geography*, a noble city of the Bruttii, built by the Acheans, 150 ftadia to the north of Lacinium, and in the neighbourhood of Metapontum. It was twelve miles in compafs before the arrival of Pyrrhus in Italy; but after the defolation produced by that war, fcarce half of it was inhabited. The citadel on one fide hung over the fea, on the other towards the land. It was naturally ftrong from its fituation, but afterwards walled round; on which fide it was taken by Dionyfius by ftratagem, by means of the rocks behind it.

Pythagoras, after his long peregrinations in fearch of knowledge, fixed his refidence in this place, which fome authors think his native one, at leaft that of his parents, fuppofing him to have been born in the ifle of Samos, and not at fome town of that name in Italy. This incomparable fage fpent the latter part of his life in training up difciples to the rigid exercife of fublime and moral virtue, and inftructing the Crotonites in the true arts of government, fuch as alone can infure happinefs, glory, and independence.

Under the influence of this philofophy, the Crotonites inured their bodies to frugality and hardfhips, and their minds to felf-denial and patriotic difintereftednefs. Their virtues were the admiration of Greece, where it was a current proverb, that the laft of the Crotonites was the firft of the Greeks. In one Olympiad, feven of the victors in the games were citizens of Croton; and the name of Milo is almoft as famous as that of Hercules. The vigour of the men and beauty of the women were afcribed to the climate, which was believed to be endowed with qualities peculiarly favourable to the human fyftem. Their phyficians were in high repute; and among thofe, Alcmeon and Democides rendered themfelves moft confpicuous. Alcmeon was the firft who dared to amputate a limb, in order to fave the life of a patient; and alfo the firft writer who thought of inculcating moral precepts under the amufing cloak of apologues. This invention is more commonly attributed to Æfop, as he was remarkably ingenious in this fpecies of compofition. Democides was famous for his attachment to his native foil. Though careffed and enriched by the king of Perfia, whofe queen he had fnatched from the jaws of death, he abandoned wealth and honours, and by ftratagem efcaped to the humble comforts of a private life at Croton.—The Pythagoreans are faid to have difcovered that difpofition of the folar fyftem, which, with fome modifications, has been revived by Copernicus, and is now univerfally received, as being moft agreeable to nature and experiment. Theano, the wife of Pythagoras, and many other women, emulated the virtues of their hufbands.

In thofe fortunate days the ftate of Croton was moft flourifhing. Its walls inclofed a circumference of 12 miles. Of all the colonies fent out from Greece, this alone furnifhed fuccour to the mother-country when invaded by the Perfians. By its avenging arms the Sybarites were punifhed for their fhameful degeneracy; but victory proved fatal to the conquerors, for riches, and all their pernicious attendants, infinuated themfelves into Croton, and foon contaminated the purity of its principles. Indeed, the very conftitution of human nature militates againft any long continuance in fuch rigid practices of virtue; and therefore it is no wonder if the Crotonites fell by degrees into the irregularities they once abhorred. Not long after the Locrians, who were lefs corrupted, defeated them on the banks of the Sagra, and reduced the republic to diftrefs and penury. This reftored the remaining Crotonites to their priftine vigour of mind, and enabled them to make a brave, though unfuccefsful refiftance, when attacked by Dionyfius of Syracufe. They fuffered much in the war with Pyrrhus, and, by repeated misfortunes, decreafed in ftrength and numbers, from age to age, down to that of Hannibal, when they could not mufter 20,000 inhabitants. This fmall population being incapable of manning the extenfive works erected in the days of profperity, Croton was taken by the Carthaginians, and its citizens tranfported to Locri. The Romans fent a colony hither 200 years before Chrift. In the Gothic war, this city rendered itfelf confpicuous by its fidelity to Juftinian, and Totila befieged it long in vain.

CROTON, WILD RICINUS; a genus of plants, belonging to the monœcia clafs; and in the natural method ranking under the 38th order, *Tricoccæ*. See BOTANY *Index*.

CROTONA, a town of Italy, in the kingdom of Naples, feated on the gulf of Taranto, with a bifhop's fee and citadel. E. Long. 17. 27. N. Lat. 39. 10.

CROTOPHAGA, a genus of birds belonging to the order of picæ. See ORNITHOLOGY *Index*.

CROTOY, a town of France, in Picardy, and in Ponthieu. The fortifications are demolifhed. It is feated at the mouth of the river Somme. E. Long. 1. 45. N. Lat. 50. 15.

CROUCHED FRIARS. See CROISIERS.

CROUP, in *Medicine*. See MEDICINE *Index*.

CROUP of a Horfe, in the manege, the extremity of the reins above the hips.

CROUPADE, in the manege, a leap, in which the horfe pulls up his hind legs, as if he drew them up to his belly.

CROUTE, SOUR CROUTE, or KROUTE. As this preparation of cabbage has been found of fovereign efficacy as a prefervative in long voyages from the feafcurvy, it may not be unacceptable to give a concife account

account of the procefs for making it, according to the information communicated by an ingenious German gentleman.

The foundeft and moft folid cabbages are felected for this ufe, and cut very fmall, commonly with an inftrument made for this purpofe, not unlike the plane which is ufed in this country for flicing cucumbers. A knife is ufed when the preparation is made with great nicety. The cabbage thus minched is put into a barrel in layers, hand high, and over each is ftrewed a handful of falt and carraway feeds; in this manner it is rammed down with a rammer, *ftratum fuper ftratum*, till the barrel be full; when a cover is put over it and preffed down with a heavy weight. After ftanding fome time in this ftate it begins to ferment; and it is not till the fermentation has entirely fubfided that the head is fitted to it, and the barrel is finally fhut up and preferved for ufe. There is not a drop of vinegar employed in this preparation. The Germans write this preparation in the following manner: *Sauer kraut*, or *fauer kohl;* that is, in their language, "four herb, or four cabbage."

CROUSAZ, JOHN PETER DE, a learned philofopher and mathematician, was born in 1663. Having made great progrefs in the mathematics and the philofophy of Des Cartes, he travelled to Geneva, Holland, and France; was fucceffively profeffor in feveral univerfities; and at length was chofen governor to Prince Frederick of Heffe Caffel, nephew to the king of Sweden. He wrote many works; the moft efteemed of which are, 1. His Logic, the beft edition of which is that of 1741, in 6 vols 8vo. 2. A Treatife on Beauty. 3. A Treatife on the Education of Children, 2 vols 12mo. 4. Several Treatifes on Philofophical and Mathematical Subjects, &c. He died at Laufanne in 1748.

CROW. See CORVUS, ORNITHOLOGY *Index*.

CROW, in *Mechanics*, a kind of iron lever, with a claw at one end and a fharp point at the other; ufed for heaving or purchafing great weights.

Crow's Bill, among furgeons, a kind of forceps for drawing bullets and other foreign bodies out of wounds.

Crow's Feet, in the military art, machines of iron, having four points, each about three or four inches long, fo made that, whatever way they fall, there is ftill a point up; they are thrown upon breaches, or in paffes where the enemy's cavalry are to march, proving very troublefome, by running into the horfes feet, and laming them.

Crow's Foot, on fhipboard, a complication of fmall cords fpreading out from a long block, like the fmaller parts which extend from the backbone of a herring. It is ufed to fufpend the *ownings;* or to keep the topfails from ftriking violently, and fretting againft the tops.

Crow-Net, is an invention for catching wild-fowl in the winter feafon, and may be ufed in the day time. The net is made of double thread, or fine packthread; the mefhes fhould be two inches wide, the length about ten yards, and the depth three; it muft be verged on the fide with good ftrong cord, and ftretched out very ftiff on long poles prepared for that purpofe. When you are come to the place where you would fpread your net, open it, and lay it out at its full length, and breadth; then faften the lower end of the net all along the ground, fo as only to move it up and down; the upper end of the net muft ftand extended on the long cord; the further end thereof being ftaked firft to the earth by a ftrong cord about five yards diftant from the net. Place this cord in an even line with the lower edge of the net. The other end muft be at leaft 25 yards diftant to reach into fome natural or artificial fhelter, by the means of which you may lie concealed from the fowl, otherwife no good fuccefs can be expected. The net muft be placed in fuch exact order that it might give way to play on the fowl on the leaft pull of the cord, which muft be done fmartly, left the fowl fhould prove too quick for you. This net may be ufed for pigeons, crows, or other birds, on corn-fields newly fown; as alfo in ftubble-fields, provided the ftubble conceals the net from the birds.

CROWD, in a general fenfe, fignifies a number of people affembled in a place fcarce big enough to hold them all.

To Crowd, in the fea-language, is to carry an extraordinary force of fail upon a fhip, in order to accelerate her courfe on fome important occafion; as in purfuit of, or flight from an enemy; to efcape any immediate danger, &c.

CROWLAND, a town in Lincolnfhire, feated in the fens, in a dirty foil, and had formerly an abbey of very great note. There is no coming at it but by narrow caufeways, which will not admit a cart. It has three ftreets, feparated from each other by water-courfes, whofe banks are fupported by piles, and fet with willow trees. Their chief trade is in fifh and fowl, which are in great plenty in the adjacent pools and marfhes. W. Long. 0. 10. N. Lat. 52. 40.

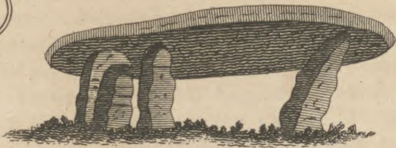
CROWN, an ornament worn on the head by kings, fovereign princes, and noblemen, as a mark of their dignity.

In fcripture there is frequent mention of crowns, and the ufe of them feems to have been very common among the Hebrews. The high prieft wore a crown, which was a fillet of gold placed upon the forehead, and tied with a ribbon of hyacinth colour, or azure blue. It feems alfo as if private priefts, and even common Ifraelites, wore alfo a fort of crown, fince God commands Ezekiel not to take off his crown, nor affume the marks of one in mourning. This crown was no more than a ribbon or fillet, with which the Jews and feveral people in the eaft girt their heads. And indeed the firft crowns were no more than a bandelet drawn round the head, and tied behind, as we ftill fee it reprefented on medals round the heads of Jupiter, the Ptolemies, and kings of Syria. Afterwards they confifted of two bandelets; by degrees they took branches of trees of divers kinds; at length they added flowers, infomuch that Claudius Saturninus fays, there was not any plant whereof crowns had not been made. The woods and groves were fearched to find different crowns for the feveral deities; and they were ufed not only on the ftatues and images of the gods, by the priefts in facrificing, and by kings and emperors, but alfo on altars, temples, doors of houfes, facred victims, fhips, &c.

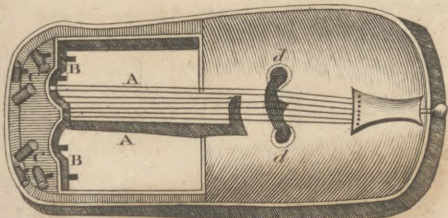
The Roman emperors had four kinds of crowns, ftill feen on medals, viz. a crown of laurels, a radial or radiating crown, a crown adorned with pearls and precious

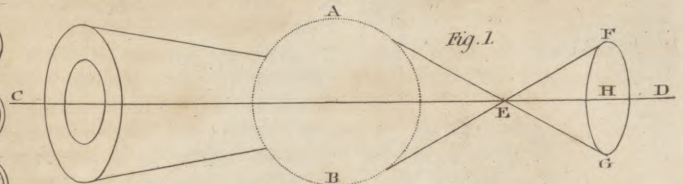
CORNET. **CONSANGUINITY.** CORONA or HALO. *PLATE CLXIV.*

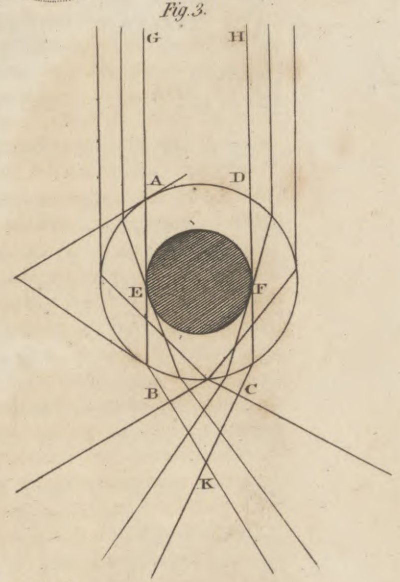
CROMLECH.

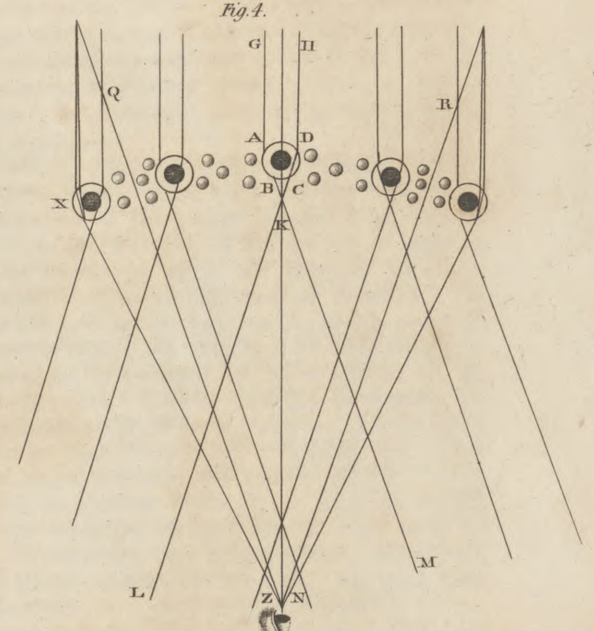


CROWTH.









CROWN.

W. Archibald Sculp.

ous ftones, and the fourth a kind of bonnet or cap, fomething like the mortier.

The Romans had alfo various kinds of crowns, which they diftributed as rewards of military atchievements; as, 1. The oval crown, made of myrtle, and beftowed upon generals who were entitled to the honours of the leffer triumph, called *ovation*. 2. The naval or roftral crown, compofed of a circle of gold, with ornaments reprefenting beaks of fhips, and given to the captain who firft grappled, or the foldier who firft boarded an enemy's fhip. 3. The crown called in Latin *vallaris*, or *caftrenfis*, a circle of gold raifed with jewels or palifades; the reward of him who firft forced the enemy's entrenchments. 4. The mural crown, a circle of gold indented and embattled; given to him who firft mounted the wall of a befieged place, and there lodged a ftandard. 5. The civic crown, made of the branch of a green oak, and given him who had faved the life of a citizen. 6. The triumphal crown, confifting at firft of wreaths of laurel, but afterwards made of gold; proper to fuch generals as had the honour of a triumph. 7. The crown called *obfidionalis*, or *graminea*, made of grafs growing on the place; the reward of a general who had delivered a Roman army from a fiege. 8. The radial crown, given to princes at their tranflation among the gods. We meet alfo with the corona aurea, often beftowed on foldiers without any other additional term; athletic crowns, and crowns of laurel, deftined to crown victors at the public games, poets, orators, &c. All thefe crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour. See Plate CLXIV. For an account of modern crowns fee HERALDRY.

CROWN is alfo ufed to fignify the poffeffions and dignity of a king. The crown of England, according to Sir William Blackftone, is by common law and conftitutional cuftom, hereditary; and this in a manner peculiar to itfelf; but the right of inheritance may from time to time be changed or limited by act of parliament, under which limitations the crown ftill continues hereditary. See SUCCESSION.

Pleas of the Crown. See PLEAS.

CROWN, in *Commerce*, is a general name for coins, both foreign and domeftic, of or near the value of five fhillings fterling. In its limited fenfe, crown is only applicable to that popular Englifh coin which bears the name, and which is equivalent to fixty Englifh pence or five fhillings, or to fix livres French money. But, in its extenfive fenfe, it takes in feveral others; as the French ecu, which we call the French crown, ftruck in 1641 for fixty fols, or three livres; alfo the petagon, dollar, ducatoon, rixdollar, and piaftre or piece of eight.

CROWN, in an ecclefiaftical fenfe, is ufed for the clerical tonfure; which is the mark or character of the Romifh ecclefiaftics, This is a little circle of hair fhaved off from the crown of the head; more or lefs broad, according to the quality of the orders received: That of a mere clerk is the fmalleft; that of priefts and monks the largeft. The clerical crown was anciently a round lift of hair, fhaved off around the head, reprefenting a real crown: this is eafily obfervable in feveral ancient ftatues, &c. The religious of St Dominic and St Francis ftill retain it.

CROWN, among jewellers, the upper work of the rofe diamond, which all centres in the point at the top, and is bounded by the horizontal ribs.

Crown-Office, an office belonging to the king's bench court, of which the king's coroner or attorney is commonly mafter. In this office, the attorney general and clerk of the crown feverally exhibit informations for crimes and mifdemeanours at common law, as in the cafe of batteries, confpiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

Crown-Glafs, denotes the fineft fort of window-glafs. See GLASS.

Crown Scabs. See FARRIERY *Index*.

Crown-Wheel of a Watch, the upper wheel next the balance, which by its motion drives the balance, and in royal pendulums is called the *fwing wheel*.

Crown-Imperial. See FRITILLARIA, BOTANY *Index*.

Crown-Work, in *Fortification*, is an out-work running into the field; defigned to keep off the enemy, gain fome hill or advantageous poft, and cover the other works of the place. The crown-work confifts of two demi-baftions at the extremes, and an entire baftion in the middle, with curtains.

CROWN, in *Aftronomy*, a name given to two conftellations, the fouthern and the northern.

CROWN, in *Geometry*, a plane ring included between two parallel or concentric peripheries of unequal circles.

Crown-Poft, is a poft in fome building ftanding upright in the middle between two principal rafters; and from which proceed ftruts or braces to the middle of each rafter. It is otherwife called a *king poft*, or *king's piece*, or *joggle-piece*.

CROWNE, JOHN, a celebrated dramatic writer, born in Nova Scotia, where his father was a minifter. Being impatient of the gloomy reftraint of that country, he came to England, where he was reduced to enter into the fervice of an old lady; of which he was foon as weary as he had been of America. He then had recourfe to his pen, which quickly procured him favour at court: but this kind of fubfiftence proving precarious, he ventured to folicit Charles II. for fome eftablifhment. Charles promifed to provide for him, but infifted firft on having another comedy; and fuggefted to him the plan of a Spanifh play, from which Crowne produced the comedy of *Sir Courtly Nice*: but the fudden death of the king on the laft day of the rehearfal, plunged him at once from his pleafing expectations into difappointment and diftrefs, and left him no refource but his wits. He died fome time about the year 1703; and left behind him 17 tragedies and comedies, fome of which are acted with great fuccefs. His chief excellence lay in comedy; yet his tragedies are far from being contemptible. His plots are for the moft part his own invention; his characters are in general ftrongly coloured and highly finifhed; and his dialogue lively and fpirited, attentively diverfified, and well adapted to the feveral fpeakers. So that on the whole he may affuredly be allowed to ftand at leaft in the third rank of our dramatic writers.

CROWNING, in *Architecture*, is underſtood, in the general, of any thing that terminates or finiſhes a member or decoration. Thus, a corniche, a pediment, &c. are called *crownings*. Thus alſo the abacus is ſaid to crown the capital; and thus any member or moulding is ſaid to be crowned when it has a fillet over it; and a niche is crowned when it is covered with a capital.

CROWNING, in ſea-language, denotes the finiſhing part of a knot made at the end of a rope. It is performed by interweaving the ends of the different ſtrands artfully amongſt each other, ſo as that they may not become looſened or untwiſted. They are uſeful in all kinds of ſtoppers.

CROWTH, or CRUTH. See CRUTH.

CROXAL, SAMUEL, an ingenious Engliſh divine, who in his youth wrote the celebrated poem entitled *The Fair Circaſſian*. He had the livings of Hampton in Middleſex, and the united pariſhes of St Mary Somerſet, and St Mary Mounthaw, in London; both which he held till his death in 1751. He publiſhed many other poems and tranſlations, with an entire Engliſh edition of Æſop's Fables. In conſequence of his attachment to Whig principles, he enjoyed ſome other preferments, and was chaplain in ordinary to George II.

CROYDON, a town of Surry in England. Its ſituation is low, near the ſpring-head of the river Wandel, and it is in a manner ſurrounded with hills. It is pretty large, and is chiefly noted for being the ſeat of the archbiſhop of Canterbury. It has a large handſome church, an hoſpital, and a free ſchool. W. Long. 0. 5. N. Lat. 51. 22.

CRUCIAL INCISION, in *Surgery*, an inciſion made in the form of a croſs.

CRUCIANELLA, PETTY MADDER; a genus of plants, belonging to the tetrandria claſs, and in the natural method ranking under the 47th order, *Stellatæ*. See BOTANY *Index*.

CRUCIBLE, a chemical veſſel made of earth, and ſo tempered and baked as to endure the greateſt heat. It is uſed to melt metals, and to flux minerals, ores, &c.

CRUCIFIX, a croſs upon which the body of Chriſt is faſtened in effigy, uſed by the Roman Catholics to excite in their minds a ſtrong idea of our Saviour's paſſion.

They eſteem it an eſſential circumſtance of their religious worſhip performed at the altar; and on Good Friday they perform the ceremony of adoring it, which is done in theſe words, *O crux ave, ſpes unica*; "Hail, thou croſs, our only hope." The officiating prieſt uncovers the crucifix, elevates it with both his hands, and ſays, *Ecce lignum crucis*; "Behold the wood of the croſs." The people anſwer, *in quo ſalus mundi pependit*; "on which the Saviour of the world ſuffered death." Then the whole congregation bow with great reverence, and devoutly kiſs the holy wood.

CRUCIFIXION, a capital puniſhment by nailing the criminal to a croſs. See CROSS.

CRUCIFORM, in general, ſomething diſpoſed croſs-ways; but more eſpecially uſed by botaniſts, for flowers conſiſting of four petals diſpoſed in the form of a croſs.

CRUCITA, in *Botany*, a genus of the digynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking with thoſe the order of which is doubtful. The interior calyx is tetraphyllous, the exterior calyx triphyllous; there is no corolla, and only one ſeed.

CRUDE, an epithet given to ſomething that has not paſſed the fire or had a proper degree of coction.

CRUDITY, among phyſicians, is applied to undigeſted ſubſtances in the ſtomach; to humours in the body which are unconcocted, and not prepared for expulſion; and to the excrements.

CRUISE, from the German *kruiſs*, "acroſs," ſignifies to croſs to and fro, to ſail up and down within a certain ſpace of the ſea, called the *cruiſing* latitude, in queſt of veſſels or fleets of an enemy, &c.

CRUISERS, in the navy, are ſmall men of war made uſe of to and fro in the Channel, and elſewhere, to ſecure our merchant ſhips and veſſels from the enemy's ſmall frigates and privateers. They are generally ſuch as ſail well, and are commonly well manned: and indeed the ſafety of the trade in the Channel, and up and down the ſoundings, and other places, abſolutely requires the conſtant keeping out ſuch ſhips at ſea.

CRUMENTATA, among zoologiſts, animals furniſhed with a pouch or bag, wherein to receive their young in time of danger; as the oppoſſum. See DIDELPHUS.

CRUOR, ſometimes ſignifies the blood in general; ſometimes only the venous blood; and ſometimes extravaſated or coagulated blood: but is moſt frequently uſed for the red globules of the blood; in contradiſtinction to the limpid or ſerous part.

CRUPPER, in the manege, the buttocks of a horſe; the rump: alſo a thong of leather put under a horſe's tail, and drawn up by thongs to the buckle behind the ſaddle, ſo as to keep him from caſting the ſaddle forwards on his neck.

CRURÆUS, CRUREUS, *Muſculus*, in *Anatomy*, a fleſhy maſs, covering almoſt all the foreſide of the os femoris, between the two vaſti, which likewiſe cover the edges of this muſcle on each ſide. See ANATOMY, *Table of the Muſcles*.

CRURAL, in *Anatomy*, an epithet given to the artery which conveys the blood to the crura or legs, and to the vein by which this blood returns towards the heart. See ANATOMY *Index*.

CRUS, in *Anatomy*, all that part of the body contained between the buttocks and the toes.

CRUSADE. See CROISADE.

CRUSADO, in commerce, a Portugueſe coin, ſtruck under Alphonſus V. about the year 1457, at the time when Pope Calixtus ſent thither the bull for a croiſade againſt the infidels. This coin has a croſs on one ſide and the arms of Portugal on the other.

CRUSCA, an Italian term ſignifying *bran*, is in uſe amongſt us to denote that celebrated academy called *Della Cruſca*, eſtabliſhed at Florence for purifying and perfecting the Tuſcan language. See ACADEMY, Nº 11. The academy took its name from its office, and the end propoſed by it; which is, to refine the language, and as it were to ſeparate the bran from it. Accordingly, its device is a ſieve; and its motto, *Il piu biel ſior ne coglie*; that is, "It gathers the fineſt flour thereof." In the hall or apartment where the academy

academy meets, M. Moneonis informs us, that every thing bears an allusion to the name and device; the seats are in form of a baker's basket; their backs like a shovel for moving of corn; the cushions of gray satin, in form of sacks or wallets; and the branches where the lights are placed resembling sacks. The vocabulary *Della Crusca* is an excellent Italian dictionary, composed by this academy.

CRUSTA LACTEA, in *Medicine*, the same with ACHOR.

CRUSTACEOUS FISH, in *Natural History*, are those covered with shells, consisting of several pieces or scales; as those of crabs, lobsters, &c.

These are usually softer than the shells of the testaceous kind, which consist of a single piece, and generally much thicker and stronger than the former; such as those of the oyster, scallop, cockle, &c.

Dr Woodward observes, in his Natural History, that of all the shells found in beds of all the different matters dug out of the earth, there are scarce any of the crustaceous kind: the reason he gives for it is, that these being much lighter than the rest, must have floated on the surface at the time of the deluge, when all the strata were formed; and there have corrupted and perished.

CRUTH, or CROWTH, a kind of musical instrument formerly in use among the common people in Wales. It is of the fidicinal kind, somewhat resembling a violin, 12 inches in length, and an inch and a half in thickness. It has six strings supported by a bridge, and is played on with a bow: the bridge differs from that of a violin, in that it is flat and not convex on the top; a circumstance from which it is to be inferred, that the strings are to be struck at the same time, so as to afford a succession of concords. The bridge is not placed at right angles with the sides of the instrument, but in an oblique direction; and, which is farther to be remarked, one of the feet of the bridge goes through one of the sound-holes, which are circular, and rests on the inside of the back; the other foot, which is proportionably shorter, resting on the belly before the other sound-hole. Of the strings the four first are conducted from the bridge down the finger board, as in a common violin; but the fifth and sixth, which are about an inch longer than the others, leave the small end of the neck about an inch to the right. The whole six are wound up either by wooden pegs in the form of the letter T, or by iron pins, which are turned with a wrest like those of a harp or spinet. Of the tuning, it is to be remarked, that the fifth and sixth strings are the unison and octave of G; the fourth and fifth, the same of C; and the second and first, the same of D; so that the second pair of strings are a fourth, and the third a fifth, to the first. See Plate CLXIV.

Concerning the antiquity of this instrument, there is but little written evidence to carry it further back than the time of Leland; nevertheless the opinion of its high antiquity is so strong among the inhabitants of the country where it was used, as to afford a probable ground of conjecture, that the cruth might be the prototype of the whole fidicinal species of musical instruments. Another evidence of its antiquity, but which tends also to prove that it was not peculiar to Wales, arises from a discovery lately made and communicated to the society of antiquarians, respecting the abbey-church of Melrose in Scotland, supposed to have been built about the time of Edward II. It seems that among the outside ornaments of that church there is the representation of a cruth, very little different from the description above given. The instrument is now disused, insomuch that Sir John Hawkins, from whom we extract, tells us, that there is but one person in the whole principality of North Wales that can play upon it; and as he was at that time near 60 years of age, the succession of performers is probably near an end.

CRUX, or St CROIX, one of the Caribbee islands, situated about 60 miles south-east of Porto Rico, and subject to Denmark. From being a perfect desert, it has begun to flourish exceedingly, being made a free port, and receiving great encouragement from government. W. Long. 64. 0. N. Lat. 17. 30.

LA CRUZ, an excellent harbour on the north-west coast of America, which was discovered by the Spaniards in 1779. They were introduced into it by a passage which they called *Bucarelli's entrance*, and which they placed in 55. 18. N. Lat. and 139. 15. W. Long. from the meridian of Paris. The latitude of this passage as laid down by the Spaniards seems to be correct; but the editor of Perouse's voyage concludes, from the survey made by Captain Cook on the coasts adjacent to the entrance of Bucarelli, that this entrance is about 135° 20′ to the west of Paris, or near 133° west of Greenwich.

The Spaniards were not long in the harbour of La Cruz before they received a visit from the inhabitants in its neighbourhood. Bartering took place. The Indians gave their peltry, and various trifles, for glass beads, bits of old iron, &c. By this traffic the Spaniards were enabled to gain a sufficiently exact knowledge of their genius, of their offensive and defensive arms, of their manufactures, &c. Their colour is a clear olive; many among them have, however, a perfectly white skin: their countenance is well proportioned in all its parts. They are robust, courageous, arrogant, and warlike. They clothe themselves in one or two undressed skins (with the fur apparently); these are the skins of otters, of sea-wolves, of benades (a species of deer), of bears, or other animals. These dresses cover them from the neck to the middle of the leg; some, however, among them wear boots of smooth skin, resembling English boots, only that those of the Indians open before, and are laced tight with a string. They wear hats woven from the fine bark of trees, which is formed into the shape of a funnel or a cone. At the wrists they have bracelets of copper or iron, or for want of these metals the fins of whales; and round the neck, necklaces of small fragments of bones of fishes and other animals, and even copper collars of the bigness of two fingers. They wear in their ears pendants of mother-of-pearl, or flat pieces of copper, on which is embossed a resin of a topaz colour, and which are accompanied with jet beads. Their hair is long and thick, and they make use of a comb to hold it together in a small queue from the middle to the extremity; a narrow ribbon of coarse linen, woven for this purpose, serves as a ligament. They wear also as a covering a kind of scarf, woven in a particular manner, something more than a yard and a half long, and about half a yard broad, round

which hangs a fringe something more than half a quarter of a yard deep, of which the thread is regularly twisted.

The women give proofs of their modesty and decency by their dress. Their physiognomy is agreeable, their colour fresh, their cheeks vermilioned, and their hair long: they plait it together in one long tress. They wear a long robe of a smooth skin tied round the loins, like that of a nun; it covers them from the neck as low as the feet; the sleeves reach down to the wrists. Upon this robe they put divers skins of otters or other animals to defend themselves from the inclemency of the weather. All the married women have a large opening in the under lip, and this opening or orifice is filled up by a piece of wood cut in an oval shape, of which the smallest diameter is almost an inch; the more a woman is advanced in years the more this curious ornament is extended; it renders them frightful, the old women especially, whose lip, deprived of its wonted spring, and dragged by the weight of this extraordinary jewel, necessarily hangs in a very disagreeable manner. The girls wear only a copper needle, which crosses the lip in the place where the ornament is intended hereafter to be placed.

These Indians in war make use of cuirasses and shoulder-pieces of a manufacture like that of the whalebone stays among the Europeans. Narrow boards or scantlings form, in some sort, the woof of the texture, and threads are the warp: in this manner the whole is very flexible, and leaves a free use to the arms for the handling of weapons. They wear round the neck a coarse and large gorget which covers them as high as below the eyes, and their head is defended by a morion, or skull-piece, usually made of the head of some ferocious animal. From the waist downwards, they wear a kind of apron, of the same contexture as their cuirass. Lastly, a fine skin hangs from their shoulders down to the knee. With this armour, they are invulnerable to the arrows of their enemies; but thus armed, they cannot change position with so much agility as if they were less burdened.

Their offensive arms are arrows; bows, of which the strings are woven like the large cords of our best musical instruments; lances, four yards in length, tongued with iron; knives, of the same metal, longer than European bayonets, a weapon however not very common among them; little axes of flint, or of a green stone, so hard that they cleave the most compact wood without injury to their edge.

The pronunciation of their language is extremely difficult; they speak from the throat, with a movement of the tongue against the palate. The little use the women make of their inferior lip greatly injures the distinctiveness of their language. The Spaniards could neither pronounce nor write the words which they heard.

From the vivacity of spirit in these Indians, and from their attention amply to furnish the market established in the harbour, it may be concluded that they are pretty laborious. They continually brought stuffs well woven and shaded with various colours, the skins of land and sea wolves, of otters, bears, and other smaller animals; of these some were raw, and others dressed. There were to be found at this market also coverlets of coarse cloth, shaded with white and brown colours, very well woven, but in small quantities: large ribbons of the same linen which might match with that of the Spanish officers mattresses; skeins of thread such as this cloth was made of; wooden plates or bowels neatly worked; small boats, or canoes, painted in various colours, the figures of which represented heads with all their parts; frogs in wood, nicely imitated, which opened like tobacco boxes, and which they employed to keep their trinkets in; boxes made of small planks, of a cubical form, being three quarters of a yard on each side, with figures well drawn or carved on the outside, representing various animals; the covers fabricated like Flanders etwees, with rabbeted edges, formed so as to shut into the body of the box; animals in wood, as well those of the earth as of the air; figures of men of the same material, with skull-caps representing the heads of various fierce animals; snares and nets for fishing; copper collars for the neck, and bracelets of iron for the wrist, but which they would not part with except at a very high price; beak-like instruments, from which they drew sounds as from a German flute. The principal officers took such of these merchandises as were most agreeable to them, and left the remainder to the ships crews.

As the Indians discovered that the Spaniards were very dainty in their fish, they did not let them want for choice: the greatest abundance was in salmon, and a species of sole or turbot three yards and a quarter long, broad and thick in proportion; cod and pilchards were also brought to market, and fishes resembling trout. From all this it may be inferred, that this gulf is full of fish; the banks too are covered with shells.

The quantity of mother-of-pearl that these Indians cut to pieces for making ear-rings awakened the curiosity of the Spaniards: they tried to discover whether these people had not in their possession, or whether their country did not produce pearls, or some precious stones: their researches were fruitless, they only found some stones which they judged to be metallic, and which they carried on board, not having the necessary means for extracting the metal they might contain.

The inhabitants of La Cruz feed upon fish, fresh or dry, boiled or roasted; herbs and roots which their mountains yield them, and particularly that which in Spain is called sea parsley; and, lastly, upon the flesh of animals which they take in hunting: the productions of the chase are undoubtedly abundant, seeing the number of dogs they keep for this purpose.

They appeared to the Spaniards to worship the sun, the earliest and most natural of all idolatrous worship; and they paid a decent respect to the remains of their dead. Don Maurelle, one of the Spanish officers, in an expedition round the gulf, found in two islands three dead bodies laid in boxes of a similar form to those which have been described above, though considerably larger, and decked in their furs. These biers were placed in a little hut upon a platform, or raised floor, made of the branches of trees.

The country is very hilly; the mountains are lofty, and their slope extends almost everywhere to the sea. The soil is lime-stone; it is nevertheless covered with an impenetrable forest of tall fir trees, very large and very straight. As these trees cannot strike very deep into the earth, the violence of the wind often tears them up by the roots: they rot and become a light mould, upon which

which grows a bushy thicket: and in this are found nettles, chamomile, wild celery, anise, a species of cabbage, celandine, elder, wormwood, sorrel; and without doubt there are other plants along the rivers.

The Spaniards saw ducks, gulls, divers, kites, ravens, geese, storks, gold-finches, and other little birds unknown to them.

The commerce between the Spaniards and the Indians was quite undisturbed; and so desirous were the latter to obtain iron, cloths, and other stuffs, that they sold their children for broken iron hoops and other wares. The Spaniards in this manner bought three young lads, one from five to six years old, another of four, and the third from nine to ten, not to make slaves, but Christians of them; they hoped besides to derive useful information from them as to the nature of the country and its inhabitants. These youths were so contented in being with the Spaniards, that they hid themselves when their parents came on board, from the apprehension of being again restored to them. Two young girls were also purchased with the same view; one very ugly, seven years of age; the other younger, better made, but sickly, and almost at the gates of death.

At the full and change of the moon, the sea rises in the harbour of La Cruz seventeen feet three inches English; it is then high water at a quarter after 12 at noon; the lowest tides are fourteen feet three inches; the night tides exceed by one foot nine inches those of the day.

CRYMODES, among physicians, a kind of fever attended with a shivering cold.

CRYOLITE, a mineral substance. See MINERALOGY *Index*.

CRYPTA, a subterraneous cell or vault, especially under a church, for the interment of particular families or persons. S. Ciampini, describing the outside of the Vatican, speaks of the *cryptæ* of St Andrew, St Paul, &c. The word is formed of κρυπτω, *abscondo*, "I hide;" whence κρυπτη, *crypta*.

Vitruvius uses the word *crypta* for a part of a building, answering nearly to our cellar; Juvenal for a *cloaca*. Hence *crypto-porticus*, a subterraneous place arched or vaulted, used as an under-work or passage in old walls. The same is also used for the decoration at the entry of a grotto.

CRYPTA is also used by some of our ancient writers for a chapel or oratory under ground.

CRYPTÆ, in *Anatomy*, a name given by Ruysch to glands situated on the back of the tongue, and to glands of the intestines.

CRYPTOGAMIA, (from κρυπτος, *occultus*, "concealed," and γαμος, *nuptia*, "nuptials"), the 24th class in the Linnæan system, comprehending those plants whose fructification is concealed, either through minuteness, or within the fruit. See BOTANY *Index*.

CRYPTOGRAPHY, the art of writing in cipher, or with sympathetic ink. Among the methods which Ovid teaches young women to deceive their guardians, when they write to their lovers, he mentions that of writing with new milk, and of making the writing legible by means of coal dust or soot; from which it appears, that the use of sympathetic ink was known to the ancients.

Tuta quoque est, fallitque oculos, è lacte recenti
Litera: carbonis pulvere tange; leges.

De Arte Amandi, lib. iii.

Ausonius proposes the same means to Paulinus in the two following verses:

Lacte incide notas; arescens charta tenebit
Semper inaspicuas; prodentur scripta favillis.

Epist. xxiii.

But it would appear, that the commentators on this poet have mistaken the meaning of the word *favilla*, which is used here to signify *fuligo*, or soot; and in the same sense it is often employed by other poets. Columella, speaking of the method of preserving plants from insects with soot, calls it *nigra favilla*. In another place he mentions the same practice, and says *fuliginem quæ supra focos tectis inhæret*. Other glutinous juices besides milk may be employed for the same purpose, as they will equally hold fast the black powder strewed over them. Pliny, therefore, recommends the milky juice of certain plants, and particularly mentions that of lettuce, to produce this effect.

It is now well known that several metallic solutions may be employed for a similar purpose, and being exposed to the action of certain vapours, the characters which are written with them become visible. This effect was perhaps accidentally discovered; but it does not appear to be of great antiquity. In a book *De secretis*, compiled by Wecker from Porta, Cardan, and some other old writers, and printed in 1592, there is no mention of it; nor even is it noticed by Caneparius in his book *de Atramentis*, printed in 1619. The first receipt given for the preparation of a sympathetic ink is in a book by Peter Borel printed at Paris in 1653, where it is called *magnetic water which acts at a distance*. *Beckmann. Hist. of Invent.* See CHEMISTRY *Index*, CIPHER, and INK.

CRYSTAL, in its original meaning, signified *ice*. It was afterwards applied to rock crystal, or crystallized siliceous earth; for the ancients, according to Pliny, regarded that body, as water which was congealed by the action of cold.

CRYSTAL, a species of stone belonging to the quartz or siliceous genus. It always appears, where there has been no interruption to its crystallization, in hexagonal prisms pointed at both ends. It is found of different kinds and colours. 1. Opaque or semitransparent, and white or of a milk colour. 2. Opaque and red, or of a carnelian colour, from Oran in Barbary. 3. Opaque and black, from the same place. 4. Clear. The specific gravity of these kinds of crystals is from 2650 to 2700. Professor Bergman extracted from them about six parts of argilla and one of calcareous earth per hundred weight; but Mr Gerhard found some so pure as to contain neither. 5. Clear and blackish brown; the smoky topaz, or *rauch topaz* of the Germans. It is found at Egan in Norway, and at Lovisa in Finland. These crystals are said to become clear by boiling them in tallow. 6. Clear and yellow; found in Bohemia, and sold instead of topazes. 7. Clear and violet-coloured; the amethyst from Saxony, Bohemia, and Dannemore in Upland. The most transparent of these are called false diamonds, Bristol, Kerry stones, Alençon diamonds, &c. 8. Colourless rock crystal, properly so called, found in Bohemia, the province of Jemtland, and many other places. 9. Pyramidal crystal with one or two points. These have no prismatic shape, but either stand upon a base in cavities of quartz veins, have only a single pyramid,

pyramid, and are of various colours; or they lie in clayey earths, and have both pyramids, but no priſm. They are found at Blackenburg upon the Hartz, and at Morſeroſh in the Silverland in Tranſylvania.

The coloured tranſparent cryſtals derive their tinge from an exceedingly ſmall portion of metallic oxide, but loſe them entirely when ſtrongly heated. They are called *falſe gems*; viz. the red from Oran in Barbary, falſe rubies; the yellow from Saxony, falſe topazes; the green from Dauphiny, very rare, falſe emeralds or praſes; the violet from Vil in Catalonia, falſe amethyſts; the blue from Puy in Valais in France, falſe ſapphires. There are likewiſe opal or rainbow cryſtals, the various colours of which are thrown out in zones acroſs the ſurface. They make a very fine appearance, though they never ſhine like the oriental opal.

M. Fourcroy makes a remarkable difference between the cryſtals and quartz, by affirming that the former are unalterable in the fire, in which they neither loſe their hardneſs, tranſparency nor colour; while the quartz loſes the ſame qualities, and is reduced by it to a white and opaque earth. He claſſes the rock cryſtals,

I. According to their form, viz. 1. Inſulated hexagonal cryſtals ending in pyramids of ſix faces, which have a double refraction, or ſhow two images of the ſame object when looked through. 2. Hexagonal cryſtals united, having one or two points. 3. Tetraedral, dodecaedral, flatted cryſtals; and which, though hexagonal, have nevertheleſs their planes irregular. 4. Cryſtals in large maſſes, from the iſland of Madagaſcar, which have a ſimple refraction.

II. With regard to their colour, as being either diaphanous, reddiſh, ſmoky, or blackiſh.

III. With regard to accidental changes, ſome are hollow; ſome contain water within one or more cavities: ſome are caſed one within the other; ſome are of a round form, as the pebbles of the Rhine; ſome have a cruſt of metallic calces or of a pyrites; ſome are found cryſtallized in the inſide of a cavity; while ſome ſeem to contain amianthus or aſbeſtus; and others contain ſhirls. The ſame author reckons among cryſtals the oriental topaz, the hyacinth, the oriental ſapphire, and the amethyſt. M. Daubenton has always looked upon this laſt as a quartz of a cryſtal.

When the rock cryſtals are ſemitranſparent or intermixed with opaque veins, they are called by the Swediſh lapidaries *milk-cryſtals*. When they are found in the form of round pebbles, which is occaſioned by their being toſſed about and rubbed againſt one another by floods or by the ſea, they are called by the Engliſh lapidaries *pebble-cryſtals*. They come from the Indies, Siberia, and other places.

According to Bomare, the rock-cryſtals are generally formed upon or among quartz, which ſhows their great affinity, and are to be found in all parts of the world. The greateſt quantity of them is brought from Mount Saint Gothard in Switzerland. Large pieces of theſe, weighing from 5 to 800 pounds, were found there at Grimſelberg; another of about 1200 pounds weight was found ſome years ago at Fiſbach in the Valais: and a piece ſix feet long, four wide, and equally thick, was found in the iſland of Madagaſcar, where theſe natural productions are of the moſt extraordinary ſize and perfection.

In the imperial collection at Vienna, there is a pyramidal cryſtal vaſe two ells in height, cut wholly out of one piece. It is uſual with the largeſt cryſtals of the German mountains to be full of cracks and flaws, and to be ſo conſtructed internally as to ſhow all the priſmatic colours; but the above-mentioned ones were quite free from theſe blemiſhes, and reſembled columns of the pureſt glaſs, only much clearer than any glaſs can be made. Cryſtal is alſo found in many parts of Britain and Ireland. About Briſtol it is found of an amethyſtine tinge. In Sileſia and Bohemia in Germany it is found ſtained with the colours of the ruby, ſapphire, emerald, and topaz; in which caſe jewellers take great advantage of it, ſelling it under the name of *occidental ſapphire*.

The orders of pure cryſtal are three: the firſt is perfect columnar cryſtals, with double pyramids, compoſed of 18 planes, in an hexangular column, terminated by an hexangular pyramid at each end: the ſecond order is that of perfect cryſtals, with double pyramids, without a column, compoſed either of 12 or of 16 planes, in two hexangular pyramids, joined cloſely baſe to baſe, without the intervention of any column; the third order is that of imperfect cryſtals, with ſingle pyramids, compoſed either of 12 or 10 planes, in an hexangular or pentangular column, affixed irregularly at one end to ſome ſolid body, and terminated at the other by an hexangular or pentangular pyramid.

Theſe are all the general forms into which cryſtal, when pure, is found concreted; but under theſe there are almoſt infinite varieties in the number of angles, and the length, thickneſs, and other accidents of the columns and pyramids.

When cryſtal is blended with metalline particles at the time of its formation, it aſſumes a variety of figures wholly different from theſe, conſtituting a fourth order, under the name of *metalline cryſtals*: when that metal is lead, the cryſtal aſſumes the form of a cube; when it is tin, of a quadrilateral pyramid, with a broad baſe; when iron, the cryſtal is found concreted in rhomboidal figures: theſe cryſtals are very common about mines; but the common ſpars, which are liable to be influenced in the ſame manner by the metals, and to appear in the very ſame form, are to be carefully diſtinguiſhed from them. There is one very eaſy teſt for this purpoſe, which is, that all ſpars are ſubject to be diſſolved by aquafortis, and effervеſce violently only on its touching them: but it has no ſuch effects on cryſtal.

The pebble-cryſtal is common enough in all parts of the world; but that which is formed of hexangular columns, affixed to a ſolid baſe at one end, and terminated by a hexangular column at the other, is infinitely more ſo: this is what we call *ſprig* or *rock cryſtal*, and is the ſpecies deſcribed by moſt authors under the name of *cryſtal of the ſhops*, or that kept for medicinal uſes.

With regard to the formation of cryſtals, it is certain that they muſt have been once in a ſoft ſtate, ſince ſome are found to have water in their cavities. Profeſſor Bergman obtained 13 regular formed cryſtals, by ſuffering the powder of quartz to remain in a veſſel with fluor acid for two years. Theſe were about the ſize of ſmall peas, and were leſs hard than quartz. Mr Magellan informs us, that he received from Mr Achard

Achard two cryſtals, one of the ſparry kind, and the other as hard and tranſparent as rock cryſtal. The firſt he procured by means of calcareous earth, and the latter from the earth of alum, both diſſolved in water impregnated with fixed air, the water filtrating very ſlowly through a porous bottom of baked clay. The apparatus is deſcribed by the author in the *Journal de Phyſique* for January 1778: but though the proceſs was attempted by Mr Magellan, and afterwards a ſecond time by Mr Achard himſelf, neither of them were able to ſucceed. Mr Morveau, however, in the firſt volume of the Dijon Memoirs for 1785, aſſerts that he has produced a very ſmall artificial cryſtal; and gives the proper method for ſucceeding in the proceſs.

Cryſtal is frequently cut; and luſtres, vaſes, and toys, are made of it as of other beautiful ſtones. For this purpoſe it is to be choſen perfectly clear and tranſparent. It is to be tried by aquafortis, or by drawing it along a pane of glaſs. The genuine cryſtal will not be affected by the acid, and will cut glaſs almoſt like a diamond. When any piece of workmanſhip of natural cryſtal is become foul and dark, the following method is to be uſed for recovering its brightneſs without hurting the poliſh. Mix together ſix parts of common water and one part of brandy; boil theſe over a briſk fire, and let the cryſtal be kept in it, in a boiling ſtate, a quarter of an hour; then take it out and rub it carefully over with a bruſh dipped in the ſame liquor; after this it is to be wiped with a napkin, and by that means its ſurface will be perfectly cleaned, and rendered as bright as at firſt, without any injury to the points of the cutting or the poliſh of the planes or faces, which would probably have happened had the cleaning been attempted by mere rubbing with a cloth.

Natural cryſtal may be reduced by calcination into a ſtate proper for making glaſs with alkaline ſalts, and thus becomes a very valuable frit. The method of doing it is as follows: calcine natural cryſtal in a crucible; when it is red hot, throw it into cold water. Repeat this eight times, covering the crucible, that no duſt or aſhes may get in among the cryſtal. Dry this calcined maſs, and reduce it to an impalpable powder.

Colouring Cryſtal, for the imitation of gems. See Doublet.

Cryſtal is alſo uſed for a factitious body, caſt in glaſs-houſes, called *cryſtal-glaſs*, being in fact no more than glaſs carried, in the compoſition and manufacture, to a greater perfection than the common-glaſs.

The beſt kind of glaſs-cryſtal is that called *Venice-cryſtal*, made at Moran near Venice. See Glass.

Iſland or *Iceland* Cryſtal, a tranſparent fiſſile ſtone, brought from Iceland, ſoft as talc, clear as rock cryſtal, and without colour, remarkable for its unuſual refractions. It is a carbonate of lime.

It is there found in great abundance all over the country, but is particularly plentiful in a mountain, not far from the bay of Roezfiord, where the fineſt and moſt pellucid pieces are found on digging. The mountain lies in 65 degrees latitude, and has its whole outſide made up of it; but though this makes a very bright and glittering appearance, it is not ſo fine as that which lies at a little depth, and is met with on opening the ſurface. This is generally taken up out of the earth in maſſes a foot long, and its corners very frequently are terminated in theſe large maſſes by a ſort of cryſtals, very different in figure and qualities from the reſt of the maſs. The ſtone itſelf is of a parallelopiped figure; but theſe excreſcences are either ſingle pyramids, affixed to columns like common cryſtal, or double pyramids with or without columns between. The ſtone itſelf is ſoft; theſe are hard, and cut glaſs: the ſtone calcines to lime in the fire; theſe run into glaſs: in ſhort, the ſtone itſelf is true ſpar, and theſe are true cryſtal. Beſide theſe, there ſometimes grows out of the end of the larger maſſes a pure fine aſbeſtos. This likewiſe is the caſe ſometimes in the ſpar found about Bareges in France, and ſhows how nearly together the formation of bodies, wholly different from one another, may happen. The general figure of the ſtone is parallelopiped; or, as ſome expreſs it, rhomboid: and it retains this not only while whole, but alſo when broken to pieces; every fragment it naturally falls into, though ever ſo ſmall, being truly of that ſhape. But it is remarkable, that in ſome places of this mountain the ſame ſort of matter is found in form of triangular pyramids, all which have the ſame property of the double refraction with the parallelopipeds of the ſame ſubſtance; ſo that the original error of ſuppoſing its qualities owing to its ſhape, is refuted by this, as well as by the trials made with other pellucid bodies of the ſame figure, which do not ſhow this remarkable property.

The Iceland cryſtal is electrical, and when rubbed will attract ſtraws, feathers, and other light ſubſtances, in the ſame manner that amber does.

The vaſt maſſes of white ſpar which are found in the lead mines of Derbyſhire, though they are not externally of the parallelopiped figure of the Iceland cryſtal, nor have any thing of its brightneſs or tranſparence in the general lump; yet when they are broken they ſeparate into rhomboidal fragments, and ſome of theſe are found to be tolerably pellucid: all thoſe which are ſo have the property of the Iceland cryſtal; and being laid upon paper where a black line is drawn, they all ſhow that line double, in the ſame manner as the real Iceland cryſtal does.

Iceland cryſtal bears a red heat without loſing its tranſparency; and in a very intenſe heat calcines without fuſion: ſteeped a day or two in water, it loſes its natural poliſh. It is very ſoft and eaſily ſcratched with the point of a pin: it will not give fire on being ſtruck againſt ſteel; and ferments and is perfectly diſſolved in aquafortis. It is found in Iceland, from whence it has its name; and in France, Germany, and many other places. In England fragments of other ſpars are very often miſtaken for it, many of them having in ſome degree the ſame property. It has none of the diſtinguiſhing characters of cryſtal; and is plainly a genus of ſpars, called from their figure *parallelopipedia*, which, as well as ſome other bodies of a different genus, have the ſame properties. Bartholine, Huygens, and Sir Iſaac Newton, have deſcribed the body at large, but have accounted it either a cryſtal or a talc; errors which could not have happened, had the criterions of foſſils been at that time fixed; ſince Sir Iſaac Newton has recorded its property of effervеſcing with nitric acid, which alone muſt prove that it is neither

talc.

talc nor cryſtal, both thoſe bodies being wholly unaffected by that menſtruum. It is always found in form of an oblique parallelopiped, with ſix ſides; and is found of various ſizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much leſs bright than the pureſt cryſtal; and its planes are all tolerably ſmooth, though when nicely viewed they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very ſingular in the ſtructure of this body is, that all the ſurfaces are placed in the ſame manner, and conſequently it will ſplit off into thin plates, either horizontally or perpendicularly; but this is found, on a microſcopic examination, to be owing to the regularity of figure, ſmoothneſs of ſurface, and nice joining of the ſeveral ſmall parallelopiped concretions, of which the whole is compoſed; and to the ſame cauſe is probably owing its remarkable property in refraction.

The phenomena of this ſtone are very remarkable, were firſt ſuggeſted by Bartholin, and have been examined with great accuracy by Mr Huygens and Sir Iſaac Newton.

1. Whereas in other pellucid bodies there is only one refraction, in this there are two; ſo that objects viewed through it appear double.

2. Whereas in other tranſparent bodies, a ray falling perpendicularly on the ſurface, paſſes ſtraight through, without ſuffering any refraction, and an oblique ray is always divided; in Iceland cryſtal, every ray, whether perpendicular or oblique, becomes divided into two, by means of the double refraction. One of theſe refractions is, according to the ordinary rule, the ſine of incidence out of air into cryſtal, being to the ſine of refraction as five to three; but the other is perfectly new. The like double refraction is alſo obſerved in cryſtal of the rock, though much leſs ſenſibly. When an incident ray is thus divided, and each moiety arrives at the farther ſurface, that refracted in the firſt ſurface after the uſual manner, is refracted entirely after the uſual manner at the ſecond; and that refracted in the unuſual manner in the firſt is entirely refracted after the like manner in the ſecond; ſo that each emerges out of the ſecond ſurface parallel to the firſt incident ray. Again, if two pieces of this cryſtal be placed over each other, ſo that the ſurfaces of the one be parallel to the correſponding ones of the other; the rays refracted in the uſual manner in the firſt ſurface of the firſt, are refracted after the uſual manner in all the other ſurfaces; and the ſame uniformity appears in the rays refracted after the unuſual manner; and this in any inclination of the ſurfaces, provided their planes of perpendicular refraction be parallel.

From theſe phenomena Sir Iſaac Newton infers, that there is an original difference in the rays of light; by means whereof ſome are here conſtantly refracted after the uſual manner; and others in the unuſual manner. Were not the difference original, and did it ariſe from any new modifications impreſſed on the rays at their firſt refraction, it would be altered by new modifications in the three following ones; whereas, in fact, it ſuffers no alteration at all. Again, he hence takes occaſion to ſuſpect, that the rays of light have ſeveral ſides, endued with ſeveral original properties: for it appears from the circumſtances, that theſe are not two ſorts of rays differing in their nature from each other, one conſtantly in all poſitions, refracted in the uſual, and the other in the unuſual manner; the difference in the experiment mentioned being only in the poſition of the ſides of the rays to the plane of perpendicular refraction. For one and the ſame ray is refracted ſometimes after the uſual, and ſometimes after the unuſual manner, according to the poſition of its ſides to the cryſtal: the refraction being alike in both, when the ſides of the rays are poſited the ſame way to both, but different when different. Every ray therefore may be conſidered as having four ſides or quarters; two of which, oppoſite to each other, diſpoſe the ray to be refracted after the unuſual manner; and the other two in the uſual. Theſe diſpoſitions, being in the rays before their incidence on the ſecond, third, and fourth ſurfaces, and ſuffering no alteration; for what appears in their paſſage through them muſt be original and connate.

Farther Beccaria corrects the obſervations of Huygens and Newton concerning the refraction of rock or mountain cryſtal. The double refraction of the latter happens when a ray paſſes through two ſides that are inclined to each other, and conſequently iſſues coloured: whereas that of the Iceland cryſtal is made by the paſſage of a ray through two parallel ſides, and therefore it iſſues colourleſs. He ſuggeſts, that there may be other ſubſtances in which there is a manifold refraction. Graveſande had a priſm of Braſil pebble, which had a double refraction at each angle, but of a different kind from one another. Mr B. Martin prepared ſeveral priſms of Iceland cryſtal, which exhibited not only a double but a multiple refraction. A ſingle priſm produced a ſix-fold refraction; and by combining ſeveral priſms, a number of refractions was obtained equal to the product of thoſe of the ſingle priſms; i. e. a priſm which afforded two images applied to one of ſix, produced a priſm of twelve images, &c. He farther obſerves, with reſpect to Iceland cryſtal, that though the ſides of its plane of perpendicular refraction be parallel to one another, a beam of light tranſmitted through them will not be colourleſs; in which property it differs from all other known ſubſtances.

CRYSTALLINE, in general, ſomething compoſed of or reſembling cryſtal. See Crystal.

Crystalline Heavens, in *Ancient Aſtronomy*, two ſpheres imagined between the primum mobile and the firmament, in the Ptolemaic ſyſtem, which ſuppoſes the heavens ſolid, and only ſuſceptible of a ſingle motion. See Astronomy.

Crystalline Humour. See Anatomy *Index*.

CRYSTALLINÆ, or Crystallines, in *Medicine*, are puſtules filled with water, and ſo called on account of their tranſparency. They are one of the worſt ſymptoms attendant on a gonorrhœa. They are lodged on the prepuce, without pain; and though cauſed by coition, have nothing of infection attending them. The cauſe is ſuppoſed to be a contuſion of the lymphatic veſſels in the part affected. Dr Cockburn, who hath deſcribed this caſe, recommends for the cure a mixture of three parts of lime-water and two of rectified ſpirit of wine, to be uſed warm, as a lotion three times a-day.

CRYSTALLIZATION.

troduction.

1
efinition.

CRYSTALLIZATION is the ſymmetrical arrangement of the particles of a body when it paſſes from the liquid to the ſolid form. This arrangement is determined by the mutual action of the ſmall ſolids of which the body is compoſed; and theſe ſolids are ſeparated from the liquid by their force of coheſion. Cryſtallization is one of the moſt remarkable effects of coheſion. The qualities of a ſolid in which the force of coheſion is more eaſily overcome in one direction than another; its brittleneſs, elaſticity, and ductility, depend on this arrangement of its particles.

2
dies ich cryllize uſt be ceptible

Solid bodies are found either in irregular maſſes, or exhibit certain determinate forms by the proceſs of cryſtallization. Thoſe ſubſtances which are capable of aſſuming regular figures, uniformly affect the ſame form; ſubject, however, to certain deviations, from the operation of particular circumſtances. Thoſe bodies only can aſſume the form of cryſtals which are ſuſceptible of being reduced to the fluid ſtate. This is the uſual method of cryſtallizing ſaline ſubſtances. The ſubſtance to be cryſtallized is diſſolved in a ſufficient quantity of water to retain it in ſolution. This is ſlowly evaporated; and as the bulk of the fluid is diminiſhed, the particles are brought nearer to each other; they combine together by the force of coheſion, and form cryſtals. Some ſaline bodies, which diſſolve but in ſmall proportion in cold water, are found to be very ſoluble in hot water. But when this water cools, it is no longer capable of holding them in ſolution. The particles then gradually approach each other, and arrange themſelves into certain determinate forms; or they cryſtallize. Many of the ſaline bodies which cryſtallize in this manner, combine with a conſiderable portion of water. This is called the *water of cryſtallization*. Other ſaline ſubſtances are equally ſoluble in hot and cold water. Theſe ſubſtances do not cryſtallize by cooling the fluid; they aſſume regular forms only by diminiſhing its quantity. This is effected by means of evaporation by the application of heat. In ſalts which are cryſtallized in theſe circumſtances, the proportion of water which enters into combination is ſmall.

3
ution;

4
fuſion.

There are ſome claſſes of bodies which aſſume regular forms, but are not ſoluble in any liquid. Such, for inſtance, are metallic ſubſtances, glaſs, and ſome other bodies. Subſtances of this nature are cryſtallized, by being previouſly ſubjected to fuſion; and thus having combined with caloric, they are reduced to the liquid ſtate, and the particles being ſeparated from each other are left at liberty to arrange themſelves into regular forms, or to cryſtallize, as the body cools.

5
onjectures out the uſe.

But what is the cauſe which operates in determining the regular arrangement of the particles of bodies in theſe circumſtances? or what is the cauſe of the ſame bodies in the ſame circumſtances aſſuming regular figures? The ancient philoſophers ſuppoſed that the elements of bodies conſiſted of certain regular geometrical figures; but it does not appear that they applied this theory to explain cryſtallization. The ſchoolmen aſcribed the regular figure of cryſtals to their ſubſtantial forms; and others ſuppoſed that it depended merely on the aggregation of the particles, but without explaining to what this aggregation was owing, or the reaſon of the regular figures thus produced.

Introduction.

6
Newton's.

According to Sir Iſaac Newton and the theory of Boſcovich, the particles of bodies held in ſolution in a fluid, are arranged at regular diſtances, and in regular order; and when the force of coheſion between the particles and the fluid is diminiſhed, it is increaſed between the particles themſelves. Thus they ſeparate from the fluid, and combine together in groups which are compoſed of the particles neareſt to each other. If we ſuppoſe that the particles compoſing the ſame body have the ſame figure, the aggregation of any determinate number of ſuch particles will produce ſimilar figures. Bergman is of opinion that the particles of ſaline ſubſtances poſſeſs a double tendency: by the one they arrange themſelves in the form of ſpiculæ; and by the other, theſe ſpiculæ arrange themſelves at certain angles of inclination, and according to the difference of theſe angles, different forms of cryſtals are produced. Theſe effects are aſcribed by the ingenious author to the mutual attraction which exiſts between the particles, which, according to the peculiar figures of the atoms, at one time arranges them in the form of ſpiculæ, and then combines the ſpiculæ thus formed under different angles of inclination. But this arrangement of the particles, or tendency to arrangement, aſſigned by Bergman as a cauſe, is only explaining the phenomenon by itſelf; while the cauſe of the tendency is yet unexplained. Nor will Newton's hypotheſis be more ſatisfactory; for if the particles of a body, after being equally diffuſed in a fluid, are brought together by a general attraction, it will follow that every ſaline body ſhould cryſtallize in the ſame manner.

7
Bergman's.

8
Hauy's.

According to the ingenious theory which has been propoſed by Hauy, the integrant particles always combine in the ſame body in the ſame way; the ſame faces and the ſame edges are always attracted towards each other. But theſe faces and edges are different in different cryſtals; and hence originates that variety of forms which different bodies aſſuming regular figures by cryſtallization exhibit. But why are the ſame edges and the ſame faces attracted in the ſame way; This ſtill wants explanation. If it be aſcribed, as ſome have ſuppoſed, to a certain degree of polarity exiſting among the particles, it might enable us to account for the regular figures of bodies produced by the proceſs of cryſtallization. For by the effects of this agent we might ſuppoſe that different parts of the particles of bodies are endowed with different forces; one an attractive, and another a repulſive force; and by the action of theſe two forces, the ſame arrangement of the particles will uniformly take place; for when one part of a particle is attracted, the other will be invariably repelled; and thus the ſame faces and edges will always be diſpoſed in the ſame way. But it ought to be obſerved that the exiſtence of this power, however ſatiſfactorily

Phenomena.

factorily it might account for the phenomena, has by no means been proved; and even if its existence were completely established, the difficulty still remains how this polarity is to be explained.

Without entering farther into these speculations, we propose, in the two following sections, to present our readers with a comprehensive view of the formation and structure of crystallized bodies. In the first section we shall treat of the phenomena of crystallization, the means of conducting this process to obtain the most perfect crystals, and the modifications of which each of the forms is susceptible. In the second we shall give a short view of the theory of the structure of crystals.

Sect. I. *Of the Phenomena of Crystallization, and the modifications to which it is subject.*

The most complete set of observations which has yet appeared on this branch of practical chemistry has been made by M. Leblanc; and to his ingenious memoir † we must acknowledge ourselves indebted for what we now lay before our readers that is new or interesting on this subject. This art, he observes, of managing or conducting the crystallization of salts, is in a great measure new; for it has hitherto attracted little attention. To insure success in obtaining perfect crystals, the process must be conducted in flat-bottomed vessels; and vessels of glass or porcelain are found preferable to those of any other materials for this purpose. The salt employed should be in a state of purity; and to favour the increase and regular form of the crystals, they are to be placed at a distance from each other in the vessels containing the solution. To these necessary precautions, it may be added, that the vessels in which the evaporation goes on should be at perfect rest, and that it is requisite to observe the density, or specific gravity, at which the solution begins to yield crystals.

† *Jour. de Physique*, tome lv. 300.

9 Conditions.

The particles of any saline body cannot come into contact and form crystals, as long as the force of affinity between these particles and the fluid in which they are held in solution is greater than the mutual affinity of the particles among themselves. A salt, for instance, which begins to crystallize at a certain specific gravity of its solution in water, will afford no crystals when that specific gravity is diminished; for then the particles of the salt are removed to a greater distance from each other; and while, by this distance, the force of their mutual attraction is diminished, the attraction between these particles and the water in which they are dissolved is increased by the increase of the quantity of the solvent. But, on the other hand, if a solution which begins to crystallize at a certain specific gravity, is more concentrated, the crystals which are thus obtained are greatly multiplied, but they are heaped together in confused masses, exhibiting no regular forms. Thus, a solution which has been scarcely reduced to that degree of concentration at which it begins to crystallize, being poured while it is hot into the proper vessel for carrying on the process, or left at rest in the same vessel in which the solution is made, to cool slowly, will yield a small number of crystals, which will have no other defects than what are occasioned by their contact with the vessel. Even perfect crystals will be sometimes found among the smaller ones. When the concentration of the solution has not been carried too far, or not farther than what is effected by slow cooling, not only have the embryo crystals less bulk, but the particles having come into contact slowly and without confusion, they possess a greater degree of transparency. After a certain period, which varies according to the species of salt which is subjected to the operation, small crystals may be distinctly observed. These are to be carefully detached from each other, and placed in a different position. Being placed by this management on a different side, the defects occasioned by their contact with the vessel are soon repaired. From the crystals treated in this way, the finest and most perfect are to be obtained. This operation of changing the position of the crystal from one side to the other, ought to be repeated at least once every day, if we wish to obtain the completest crystals.

10 Preparation of the solution.

At the end of a certain period, the small crystals are to be removed, that the fluid may be more concentrated, either by a new evaporation, or by dissolving a new portion of the same salt. After the new solution has cooled, and the crystals which have formed in it are separated, if it has been too much concentrated, or too great a portion of salt has been added; the crystals of the first solution are then to be introduced and treated in the same way as formerly.

11 Management of the crystals,

When the crystals have acquired a sufficient volume to handle them, and to choose such as we wish should increase to the largest size, either as simple or complete crystals, or as exhibiting varieties from position or particular circumstances, the individual crystals are then to be separated, and solutions are to be prepared for them and brought to such a degree of concentration as to afford crystals in a mass; which latter being removed, the single crystals are introduced into these solutions, which are now in a proper state to favour their increase. The crystals may be either previously disposed in the vessel, and then the solution may be poured on; or having first introduced the latter, they may be afterwards distributed on the bottom of the vessel. And thus by continuing the same process, by taking care to change the position of the crystal from one side to the other frequently, and by keeping up the solution to a proper degree of strength, we may obtain crystals of any bulk we choose.

12 which decrease if left too long in the solution.

When the quantity of particles, which in a certain state of concentration continue to be mutually attracted, has diminished in consequence of their accumulation on the crystals which are formed, at a certain stage of this diminution the crystals cease to enlarge or increase in bulk; it happens, on the contrary, if they are left in the fluid, that they begin to dissolve. It is usually on the corners and angles that this decrease takes place; and in some salts it seems to go on piecemeal, so as to present distinct layers of the particles; for in this case lines parallel to the sides may be observed, and these are disposed like steps of stairs. Should the accident which is here alluded to be allowed to go on too far, it may often require a long time to repair it; but it is in general easy to avoid this inconvenience, by watching the progress of the operation and the increase of the crystals. If their corners or angles are observed to become less sharp, they must be removed till the fluid is farther concentrated, or they

Pheno-mena.

they muſt be introduced into a new ſolution of the ſame ſalt of the proper degree of ſtrength. To prepare the new ſolution for the increaſe of the cryſtals, a quantity of the ſame ſalt is to be diſſolved in a given portion of water, ſo that it ſhall be fully ſaturated. It is then allowed to cool and cryſtallize. The cryſtals being ſeparated, the remaining ſolution is to be employed in ſuch quantity as may be judged neceſſary to replace that in which the diminution of the cryſtals had commenced.

Sometimes it happens, from want of neceſſary precaution, that the new ſolution in which the proceſs is to be conducted, either being too much ſaturated, or being diſturbed by pouring from one veſſel to another, exhibits many other points of attraction beſide the cryſtals whoſe increaſe is propoſed. In this caſe a great number of ſmall cryſtals make their appearance, and cover the ſurface of the former with a kind of incruſtation. The ſmall cryſtals, provided they are taken in time, may be removed without injury to the others; if not, they will be unavoidably ſpoiled.

13 Their poſition muſt be changed.

When the cryſtals have reached ſuch a ſize as that they may be placed one by one, without being in contact with each other, we muſt ſtill continue frequently to change their poſition. This may be done with a ſpatula, a glaſs rod, or with any inſtrument which will communicate nothing to the fluid. In this way the ſides of the cryſtal which are alternately in contact with the bottom of the veſſel will increaſe in equal proportion, and it will always remain complete.

It is chiefly in ſalts which furniſh elongated priſms that the influence of poſition may be moſt diſtinctly ſeen. If, for inſtance, a cryſtal before it has acquired much volume is found to reſt on one of its baſes as well as on one of its ſides, it will be obſerved to be compreſſed in the direction from baſe to baſe; and it will appear to be only a regular ſegment of the cryſtal, which having been placed on one of its ſides has obtained a great bulk. If we take a ſix-ſided priſm whoſe ſummits are obliquely truncated, and if it be placed on one of its ſides, it will enlarge in a greater or leſs degree, but always in ſuch a manner that the diſtance from one baſe to the other ſhall never be leſs than the diſtance between the ſides. But if the poſition be on one of its baſes, then its principal increaſe will be in the direction of the ſides, and it will appear to be compreſſed between the baſes. At firſt ſight, a cryſtal treated in this way will ſeem different from the former. For the corners form the ſummit of apparent pyramids which are ſeparated by a four-ſided priſm. This circumſtance affords a ſufficient explanation of one of the cauſes which produce varieties in the appearances of a cryſtal with regard to its relative extent; it ſhows that there is no foundation for the opinion of a ſuppoſed balance between the particles of the ſalt and that of the ſolvent; and it ſhows alſo, that if the force of attraction be the efficient cauſe of the ſaline particles coming into contact, the force of gravitation acts at the ſame time, and modifies in a greater or leſs degree the effects of the firſt.

According to theſe obſervations, and the different ſtates in which cryſtallized ſubſtances are found, it has been ſuppoſed that we might conclude, that the force of adheſion between the particles of the ſalt and thoſe of the ſolvent, varies according to circumſtances, which depend on the degree of tendency to combination between the bodies, and the relative weight or bulk of the parts of which theſe bodies are compoſed. If a cryſtal in the incipient ſtage of its increaſe be placed on one of its baſes, it enlarges in the direction of its ſides; but if it be reverſed and placed on one of its ſides, it enlarges in the dimenſions of an elongated priſm.

An inſulated cryſtal, placed on one of its ſides on a ſmooth ſurface, and left undiſturbed to enlarge in ſize, preſents on this part a kind of hollow, which correſponds exactly with the ſide which it replaces. Here the ſaline particles which cannot reach this ſurface, are diſtributed on the neighbouring parts with which they come in contact, with this circumſtance, that the edges of the ſurface on which the cryſtal reſts increaſe in proportion, but without allowing the liquid to have acceſs to this ſurface.

The hollows which are formed at the ſurface of liquids differ ſometimes from each other even in the ſame ſalt. If we ſuppoſe that a particle forms the incipient point of the hollow, the latter will aſſume a configuration correſponding to the ſide of the particle preſented to the ſurface of the liquid: but the part which it touches increaſes alſo; and if by any circumſtance a change of poſition happens, the hollow, thus neceſſarily formed according to the arrangement of the part which correſponds exactly to the ſurface of the liquid, will change its form, becauſe the new poſition of the ſide preſented differs from the firſt.

When a neutral ſalt, in a ſtate of purity, and after being cryſtallized, ceaſes to produce any effect on vegetable blues, it is not ſuppoſed that any of its conſtituent principles is in exceſs. But if in this ſtate it is found to combine with other bodies, in ſuch a manner as to produce ſolid and well-defined cryſtals, we muſt admit that there exiſts an affinity between the ſalt and the body with which it has combined.

14 Compound combination.

This ſubject, Leblanc obſerves, of the ſupra-compoſition, or compound combination, as it might perhaps be called, of which ſeveral ſalts are ſuſceptible, has not hitherto much occupied the attention of chemical philoſophers. Some indeed have been pointed out by Bergman and others; but it has been remarked that theſe affinities are probably much more extenſive than has been ſuppoſed; and not only with regard to neutral ſalts with each other, but alſo neutral ſalts with other bodies. Of this kind of combination is not to be reckoned that of one of the conſtituent parts of a ſalt being in exceſs, which frequently takes place in ſome ſalts, and is found to be more or leſs permanent. This circumſtance ſeems to prove that certain ſalts have two different points in the combination of their conſtituent parts. Let us ſee what has been obſerved in this reſpect of the ſulphate of alumina, which will perhaps explain the reaſon that this ſalt is almoſt always found in nature in the acidulous ſtate. It is found that the more that alum approaches to the ſtate of ſaturation by an additional portion of baſe, the leſs ſolid the new combination becomes; and in all caſes, after a certain time, which is longer or ſhorter according to circumſtances, the portion which was added ſeparates. It will perhaps appear in the ſequel, that this tendency to combination which is conſtantly in action, producing an immenſe multitude of different individuals, reſides not only among the properties of the ſimple principles,

ciples, but alſo in thoſe which belong to all the compounds.

Many of the ſulphates are always found in the acidulous ſtate; and all of them ſeem to be ſuſceptible of combination with a new quantity of the ſame baſe, till they reach the point of ſaturation. For example, the ſulphate of copper, in the ſtate in which it is uſually found, cryſtallizes in eight-ſided, oblique priſms, terminated by ſides according to the obliquity of the priſm. But if another portion of baſe be added, the cryſtals aſſume the form of pyramids of ſeveral faces, ſeparated by a four-ſided priſm. The acidulous ſulphate of zinc gives cryſtals of ſix-ſided priſms, which are often very regular; but an addition of baſe produces a great change, for then the cryſtals are in the rhomboidal form, very little different from the cube. Alum in its ordinary ſtate of combination cryſtallizes in the form of a regular octaedron; but in the intermediate proportions between this ſtate and that of ſaturation, it aſſumes the form of a cube.

Hauy, as will be afterwards noticed, has demonſtrated that the form of the primitive molecules is the ſame in all cryſtals of the ſame ſalt, and he has ſhown by calculation that the variations ariſe from the laws of decrement in the layers which ſurround the nucleus; but that the order according to which the ſecondary forms are produced may be interrupted, whether this form be complete or not; and the cryſtal may then, according to circumſtances, return to its primitive form, or to ſome of thoſe which are derived from it. But from the experiments of Leblanc, he thinks that theſe changes always depend on new conditions in the ſtate of the fluid, as a different proportion of the principles of which the ſalt is compoſed.

15
Cryſtals modified by the ſolution.

If a cryſtal of octaedral alum be placed in a ſolution which forms cubic cryſtals of the ſame ſalt, the former will aſſume the cubic form, by giving up a ſeries of molecules from the ſummits of the ſolid angles, ſo that the layers continue to decreaſe on the triangular faces till the cryſtal has completed its new form. In this proceſs, the change may be ſtopped at any period, and cryſtals of every modification of form may be obtained. From this it follows, that the centre of each of the faces of the octaedron correſponds to a ſolid angle of the cube in which it is inſcribed. But if a cubical cryſtal be introduced into the ſolution which yields the octaedron, its return to this latter form proceeds in the ſame order, by the ſubtraction of a ſeries of molecules from the ſolid angles of the cube. It often happens, however, at the ſame time, that the ſubtraction of the molecules extends to the corners of the cryſtal; ſo that the layers of ſuper-poſition decreaſe all at once, according to the order of the formation of the octaedron, and the dodecaedron with rhomboidal ſurfaces. This circumſtance ſeems to ſuggeſt the poſſibility of obtaining cryſtals of alum of this latter form; but it ſeems to depend on a particular proportion which is not eaſily determined.

Thus we learn from experiment that ſalts which exhibit different forms of cryſtals can be made to aſſume each of theſe at pleaſure. This phenomenon, which has not been much attended to, ſeems to merit particular inveſtigation. The tranſition from one form to another may be explained according to the laws of diminution, by the ſucceſſive and regular ſubtraction of ſeries of molecules; ſo that the form actually obtained, the reſtoration of the preceding form, is eaſily explicable on the principle of reſtitution alone. It may be obſerved, that during this kind of metamorphoſis, both operations, namely, that by which the cryſtal receives on the one hand a new form, and that by which on the other hand it increaſes on all its ſides, conſtantly take place.

16
Cryſtals differently affected at different heights in the fluid.

The particles of a ſalt which are in ſolution in a fluid, are attracted by it, particle by particle, without any ſeparation or decompoſition; but it is neceſſary that there be a balance of the attracting forces between the ſalt and the ſolvent. This is demonſtrated by the following experiment. A veſſel two feet high and two inches in diameter was filled with a ſolution of a proper degree of concentration for the growth of cryſtals, which were ſuſpended at different heights from the bottom of the veſſel to the ſurface of the fluid; and it was obſerved that the increaſe of the cryſtal was in proportion to its depth in the veſſel, that which was neareſt the bottom increaſing moſt rapidly. When the liquid was deprived of ſaline particles by their accumulation on the cryſtals, by reſt, and ſometimes even by the influence of the atmoſphere, the cryſtals decreaſed by ſimilar gradations to thoſe of their increaſe; ſo that it at laſt reached that ſtate when the cryſtals near the ſurface of the liquid were diſſolved, while thoſe towards the bottom continued to increaſe; and ſometimes it happened that the cryſtals at the bottom of the veſſel continued to increaſe on the ſurface which was in contact with it, while the oppoſite upper ſurface was in a ſtate of diſſolution.

All the experiments which were made on ſalts of different degrees of ſpecific gravity accord with this obſervation; and the difference in the degrees of ſaturation of the waters of the ocean, which depends on the difference of depth, ſeems to be in favour of this opinion. It is confirmed by the analyſis of ſea-water by Bergman and others, which was taken up in different places and at different depths. It receives ſtill farther confirmation from a practice of the inhabitants of Salies in Bearn in eſtimating the degree of ſtrength of a ſalt ſpring. An egg is thrown into the waters of the ſpring, and the whole water which covers the ſurface of the egg is thrown away, as it is not of a ſufficient degree of concentration.

It is well known that a cold temperature is moſt convenient for the cryſtallization of ſalts. But it is not at the period when the ſalt begins to cryſtallize that it is moſt convenient to carry on the proceſs; for then it ſometimes happens, from too great concentration of the fluid, that the cryſtallization is too rapid and confuſed.

17
Two claſſes of ſaline ſubſtances.

Hitherto ſaline ſubſtances which are ſuſceptible of regular cryſtallization have been divided into two claſſes, according to the peculiarities in the formation of their cryſtals. The one claſs comprehends thoſe cryſtals which are formed by cooling the fluid in which the ſolution is made. The other claſs includes thoſe which are produced only during the evaporation of the ſolution. This diſtinction is no doubt well founded; but there are ſome exceptions to it which are neceſſary to be attended to in conducting the proceſs of cryſtallization. If a ſaline ſolution which is too much ſaturated, be cooled, it furniſhes a maſs of cryſtals which

Pheno-mena.

which are confused and irregular, and which present no determined form except on those sides which are in contact with the liquid. If in this state the remaining liquid is poured off, it will yield another set of crystals, but in very small number; and there are some salts which continue to form crystals after being several times successively treated in this way, the number of the crystals still diminishing from the first degree of concentration. It will be found too that this will take place whether the process be carried on in the open air or in close vessels. It follows from this that the increase or the formation of crystals, in this case, depends solely on the mutual attraction of the particles, or on the attraction between the particles and the crystal; an attraction or affinity which is not destroyed by the cooling of the fluid, but is probably regulated by the distance of the particles, and the degree of force or affinity which exists between the particles and the solvent. In some saline solutions the increase of the crystals goes on in this manner for a long time. It is only in the interval between the cooling of the liquid to the temperature of the atmosphere, and that period when its degree of concentration is so diminished that the increase of the crystals ceases, that the latter proceeds with that degree of perfection of which it is susceptible.

18
Some saline solutions attract moisture.

It is not a property peculiar to dry substances to absorb moisture from the atmosphere. Liquids saturated with certain salts seem also to possess this property; for in some saline solutions, the liquids assume a solvent power which never fails to attack the crystals, and not only to prevent their increase, but to diminish the bulk which they had acquired. This accident can only be obviated by regulating the state of the atmosphere in which the evaporating vessels are placed, and preserving it free from an excess of moisture. From causes which produce a contrary effect, the evaporation becomes too rapid; this circumstance also requires to be attended to, and properly regulated, to ensure the full success of the operation.

From the preceding observations it will appear, that solutions of salts which are susceptible of crystallization have certain degrees of concentration which are necessary for the formation of crystals; and that they must be reduced nearly to that degree in which they begin to yield crystals, before it can be expected that they afford proper results. It is therefore necessary to attend particularly to the degree of concentration which each salt requires for the regular formation of its crystals, and to obtain them with that degree of transparency of which they are susceptible. We have seen that in the formation of crystals they may be removed from one vessel to another, and from one solution to another; and that in proportion to the slowness of the process they become more beautiful and more perfect. These operations, it may be added, require much patience and attention, but at the same time the observer is fully compensated for his trouble, by perceiving the progress of the crystallization, and by the interest which is excited in all its stages.

It is essential to know that neither the crystals formed during the artificial evaporation, nor those which are produced during the cooling of the solution, are proper to be made choice of for being increased and brought forward to the most perfect crystals. When a solution has become cold, that is to say, when it has acquired the temperature of the atmosphere, and it is deprived of the excess of saline particles which it held in combination during its increase of temperature, it is still in a condition to yield crystals, and as long as the distances between the particles are not too great to allow of mutual attraction. A solution saturated to excess affords on cooling a confused mass of crystals; but after the fluid is poured off, it will still produce more crystals, but in smaller number. The degree of concentration of the solution before it yielded the last product may be considered as the term of saturation most proper to be employed for the species of salt which is thus treated. But by the repetition of these operations, and the observation of their progress, it will not be difficult to discover the proper proportions between the salt and the solvent.

It seems to be a mistake to suppose, with some, that the crystals which are placed in favourable circumstances to become larger and more perfect, are injured by coming in contact with each other during their increase. It is undoubtedly better that they should be kept separate; but it does not appear that they are hurt by touching each other, if the number in the vessel be not too great, and they are not heaped or pressed together. In that crystallization which results from the cooling of a solution too much saturated, the crystals are always confused and interlaced with each other; and the molecules which are arranged in this kind of disorder experience a kind of irregular distribution; and it may be observed, that in this case the summits only of the crystals which are elevated from the kind of cake which is formed on the surfaces of the vessel containing the solution, present regular and determined forms. The mass in which these crystals are implanted is a confused heap.

19
Cavities on crystals.

No cavities have been observed on the faces of crystals, excepting those which are formed on the surface of fluids. Those which are produced on that side of a crystal which rests on the bottom of the vessel are more common in other salts. This phenomenon seems to merit more attention than has yet been bestowed upon it; as it explains easily the introduction of extraneous bodies which are sometimes detected in the interior of crystals. For when a cavity of this kind has acquired a certain depth, it is capable of receiving part of any foreign substance, and to be filled up by the change of position of the same crystal, retaining at the same time the extraneous matter. By a little art and dexterity, these fortuitous circumstances may be favoured, so that phenomena exhibited by such occurrences may be traced and observed at the pleasure of the operator. Experiments have been made with the view of ascertaining whether an extraneous substance could be substituted as the nucleus of a crystal; but from the result of these experiments, it does not appear that the particles of any salt have a tendency to combine with any foreign matter, and to form regular crystals. The portions of the salt which were attached to the extraneous substance were always separate and independent crystals.

There are some saline substances which retain in their solution an excess of particles even after cooling, and which being strongly agitated instantly deposit a great number of small crystals which render the solu-

tion

Phenomena.

tion turbid. The introduction of cryſtals of the ſame ſalt, it is well known, as in the caſe of a ſolution of Glauber's ſalt, promotes this ſudden cryſtallization or ſeparation of the exceſs of the ſalt. If, in this ſtate of the ſolution, cryſtals are immerſed with the view of having them large and regular, they are certain of being ſpoiled by the accumulation of a great number of ſmall cryſtals on their ſurface, unleſs the precaution of immediately waſhing them with pure water when this happens is obſerved.

It may be remarked alſo that when the ſolution is diminiſhed below a certain degree of ſaturation, the cryſtals not only ceaſe to increaſe, but are alſo again in ſome meaſure diſſolved; the corners and angles reduced and rounded. And if the cryſtals in this ſtate be introduced into a ſolution of ſufficient ſtrength to promote their increaſe, ſupernumerary faces and truncatures, as they are denominated in technical language, are formed on the rounded corners and angles. But theſe faces always diſappear as the increaſe of the cryſtals proceeds, and are replaced by corners and angles, which become at laſt ſharp and diſtinct.

By attention to preſerve the ſolutions of ſalt in perfect purity, we ſhall be more certain of obtaining the moſt beautiful and tranſparent cryſtals. Some fluids, after a certain time, are obſerved to depoſit ſubſtances which are foreign to the ſalt held in ſolution, and were diſſolved along with it. Theſe ſubſtances ſometimes appear in the form of earthy matters, which precipitate to the bottom of the veſſel; in other caſes they are diffuſed in the form of flakes, and ſometimes they riſe and ſwim on the ſurface. In all theſe caſes, the cryſtals whoſe formation and increaſe are going forward muſt be removed, and the liquor muſt be filtrated before they are replaced.

20
Variations in cryſtals from changes in the ſolution.

A ſaline ſubſtance, which is capable of cryſtallization, poſſeſſes, in the ſtate of minute diviſion in which it is in ſolution, or in the condition of the molecules which compoſe it, a determined property which is uniform and conſtant, in which reſides eſſentially the power of uniting in a certain ſymmetrical manner, and thus conſtructing regular ſolids. The reſults alſo are uniform and conſtant when the proceſs is carefully conducted; but it is neceſſary to diſtinguiſh with accuracy the circumſtances which accompany the operation, and may occaſion a deviation from this uniformity. The ſulphate of iron, for inſtance, uſually cryſtallizes in the form of rhomboids; but ſometimes it has been found to aſſume that of an irregular octaedron. And although it may be true that an elongated octaedron may be claſſed with priſmatic cryſtals, it does not on that account belong leſs to the octaedral form; but it ſeems probable that theſe different varieties, in the forms of cryſtals, depend on ſome changes which take place in the ſolutions themſelves. The iron in the preſent caſe is conſtantly receiving new portions of oxygen from the atmoſphere, and in this new combination it is precipitated in the fluid: this, therefore, occaſions a change in the conſtituents of the ſalt.

Several ſulphates are found to combine readily with each other: thoſe of iron and copper are of this deſcription; and the reſult of this compound cryſtal is always a rhomboid. It ſeems to be doubtful whether this ſhould be conſidered as a caſe of ſimple interpoſition of one ſalt with the other.

When a liquid, which holds ſaline bodies in ſolution, is evaporated to a certain degree, a cruſt forms on the ſurface, acquires a certain thickneſs, and when this is removed, it is renewed. The point at which the liquid exhibits this appearance is known in chemiſtry, by the appellation of *evaporation to a pellicle*. When it has reached this point, the ſolution is in a ſtate of complete ſaturation; and the ſmalleſt additional quantity of fluid cannot be withdrawn without a correſponding quantity of ſalt aſſuming the ſolid form. On this principle Robinet has attempted to account for the formation of *dendrites*, or the arboreſcent appearance and efflореſcence of ſome ſalts. Almoſt all the different ſpecies of fucus or ſea-weed, he obſerves, are covered, in drying, with an effloreſcence of white matter. In ſome ſpecies, this white matter was obſerved to poſſeſs a ſaccharine quality. A number of large roots of the *fucus palmatus* was hung up in the ſhade, and ten days had elapſed without the appearance of any thing on the ſurface. After that period it became white, and it was ſoon covered with a light downy ſubſtance, the filaments of which gradually increaſed to a conſiderable length. When this downy matter was bruſhed off with a feather, it was renewed till the plants were completely dry. This ſubſtance, it appeared on examination, was of a ſaccharine nature, mixed with a ſmall portion of common ſalt, and a great quantity of mucilaginous matter. By ſolution and cryſtallization, the ſugar was ſeparated from the other ſubſtances.

21
Formation of dendrites.

In comparing the circumſtances of this effloreſcence with thoſe of the formation of the pellicle, in the progreſs of evaporation, the former ſeems to be a modification of the latter. In a veſſel which contains a liquid ſaturated with a ſalt, the ſurface ſubjected to evaporation has no ſooner aſſumed a ſolid form, than the ſurface immediately inferior is expoſed to the action of the ſame cauſes, and produces the ſame effect; and this effect continues till this cruſt has become ſo thick, or ſo compact, as to prevent the contact of air, and then the evaporation ceaſes. But, on the contrary, in the fucus, the air acting only on the ſurface of the plant, the liquid which it contains cannot undergo the proceſs of evaporation, without coming to the ſurface. The attraction of the matter of the plant tends to promote this motion; for as the liquid is equally diffuſed through its whole maſs, it riſes conſtantly to the ſurface, in proportion as this ſurface is dried by the ſurrounding air; and it would appear that this is the proceſs in the deſiccation of all thick and maſſy bodies. Now, the ſaline matter which, in the preſent caſe, is in the ſtate of effloreſcence, having the ſame power of attraction on the liquid, the rudiments of each filament conſtitute, at the inſtant of their formation, part of the whole maſs or body of the plant. They participate, therefore, of the ſame degree of moiſture as that of the plant, and it is on their ſurface that the evaporation and cryſtallization of ſaline matter chiefly take place.

The mechaniſm of the dendritical or arboreſcent form of ſaline bodies ſeems to be in this way capable of explanation. The whole ſaline maſs, which extends to the edges of the veſſel, and even redeſcends externally, is conſtantly in the humid ſtate, as long as any liquid remains in the veſſel. It may be ſuppoſed, that

Phenomena.

that the matter of the sides of the vessel determines, by its attraction, the external circle of the surface of the liquid to rise above the surface; a phenomenon which is sufficiently obvious, but especially in narrow vessels. This portion of liquid, which is more completely subjected to evaporation, gives origin to a circle of saline matter, which appears thus raised above the surface of the liquid, and which, being the first rudiments of the dendrites, contributes afterwards to its increase, in the way which has been already explained. Thus the vegetation of salts bears a striking resemblance to the process of efflorescence, or the formation of the downy matter on the surface of the fucus.

22
Efflorescence.

There is yet another kind of crystallization which seems to depend on the same cause. This is the saline efflorescence, which occurs in different places on the surface of the globe, and is frequently in such quantity as to become an important object of manufacture. Without extending our observations to the efflorescence of soda on the surface of the soil in Egypt, or that of nitre in Asiatic countries, we may refer to the production of muriate of soda, or common salt, in different parts of Europe, in those places which are covered with the waters of the ocean during high tides. The waters of the sea with which the sandy shores are twice periodically moistened in the course of the month, are far distant from the point of saturation which determines crystallization. They rarely contain more than 3 parts of salt in 100; and the sand at the degree of moisture, in which it is left by the sea, is not impregnated with a sufficient quantity of saline matter to be worthy the labour of manufacturing; but, during the interval between the tides, these circumstances are greatly changed. The dry air of summer, by evaporating the moisture on the surface, allows the matter of the sand to attract towards the surface a similar portion of water, which was in the lower part of the soil, and which always tends to diffuse itself equally through the whole mass. This liquid, carrying with it the salt which it holds in solution, increases the quantity of saline matter which exists on the surface. This process continues without interruption, as long as there is no fall of rain. It reaches at last a certain point, at which the water subjected to evaporation is saturated with the salt; and this process cannot proceed farther without the deposition of crystals of the salt, which discover themselves by their shining appearance. After some days, the sand on the surface is collected, and about six times the quantity of saline matter is found in the same proportion of sand, when it was first moistened by the sea water (A).

23
Crust on the bottom of vessels.

Another phenomenon which takes place during the process of artificial evaporation, should not pass unnoticed. This is the formation of a saline crust at the bottom of the vessels in which the process is conducted. This seems to be the immediate effect of ebullition; for when the temperature of the liquid is kept under the boiling point, no such effect is produced. This crust is composed of all the saline substances which are held in solution in the liquid; and even these substances are found combined in the same proportion in which they actually exist in the solution. Whatever be the attraction of these substances for water, or even if they possess a deliquescent property, they are not less disposed to enter into combination during the formation of the solid crust on the bottom of vessels in which the process of evaporation is conducted with a temperature equal to the boiling point. A slight degree of attention will satisfy us, that the formation of this crust depends on the particular circumstances of the evaporation in the case of ebullition. It must be obvious, that in this case the stratum of liquid which is in immediate contact with the vessel, receives the caloric which penetrates its sides, is charged with it beyond its capacity, changes its state, and assumes the gaseous form, and by this change having entirely lost its solvent power, whatever saline matter is held in solution must assume the solid state in contact with the sides of the vessel, and consequently adhere to it. Thus it happens, according to a very judicious observation, that in different saline solutions, the results of which have been compared, these scales or crusts are more abundant in proportion as the degree of saturation is less *.

* *Jour de Phys.* lviii. 124.

24
Microscopical crystals.

To these observations we shall only add a short account of the phenomena of crystallization, as they were observed, with the assistance of a microscope, by Mr Baker, and of the appearances of different saline bodies which he has described. This will not afford any scientific information to the philosopher, but it may perhaps be the source of amusement to some of our readers, and the means, by a minute observation of the phenomena, of leading to some useful discoveries. The method which he followed in conducting these experiments, is the following. The substance to be examined is to be dissolved in a quantity of pure water, so as to be completely saturated. For salts of easy solubility, cold water may be employed; but for salts which are dissolved with more difficulty, hot or boiling water may be found necessary. In preparing the solution, the same rule may be observed as in preparing solutions for obtaining large crystals, which has been given in the former part of this section. The solution should be allowed to remain at rest for some hours, so that the first crystallization, if too much saline matter has been added to the liquid, may be allowed to take place. Thus the solution will be always of the same strength, and the same appearances may be uniformly expected.

When the solution is thus prepared, a drop of it may be taken up with the point of a quill, cut in the form of a pen, and placed on a flat slip of glass, spreading it on the glass with the quill till the liquid is so shallow as to rise very little above its surface. It is then

(A) Common salt is manufactured in this way on the sandy shores of the Solway Frith, in Annandale in Scotland. These flat shores are covered with the waters of the ocean during spring tides; and in the interval of these tides the evaporation by the heat of the sun and the action of the air is so considerable, as to leave the sand impregnated with a quantity of salt, sufficient to defray the expence and trouble of manufacturing it by filtration and boiling.

Phenomena.

then to be held over the clear part of a moderate fire, or the flame of a candle, and ſuch a degree of heat applied as is found from experience to produce the neceſſary evaporation. This will be known by obſerving the formation of ſaline particles at the edges of the drop of fluid. The microſcope being previouſly adjuſted, and a magnifier of a moderate power being fitted on, the ſlip of glaſs is to be placed immediately under the eye, and brought exactly to the focus of the magnifier. After running over the whole drop, the attention is to be directed to that ſide on which the proceſs of cryſtallization firſt commences, and proceeds from the circumference towards the centre. The motion is at firſt ſlow, if too much heat has not been applied, but becomes quicker as the evaporation continues. In ſome cryſtallizations the configurations are produced towards the end of the proceſs with great rapidity, and exhibit an elegance, order, and regularity, which imagination only can conceive. When this rapid action has once begun, the eye muſt be kept fixed on the object, till the whole proceſs is completed, becauſe new forms appear, quite different from thoſe which were firſt produced, and which have been properly aſcribed to a quantity of different ſalts mixed with the ſubſtance to be examined, when the precaution has not been uſed of having it in a ſtate of purity. When the configurations are fully formed, and the water evaporated, ſuch ſalts as are deliqueſcent, it is ſcarcely neceſſary to obſerve, are ſoon deſtroyed by attracting the moiſture from the air; but thoſe which are more permanent, and not diſpoſed either to deliqueſce or to be deprived of their water of cryſtallization, may be preſerved, by being encloſed between glaſſes, for a long time, as amuſing objects for the microſcope. To make the liquid ſpread readily on the glaſs, the ſurface of it may be moiſtened with a little of it, and rubbed with the finger. In this way, the repulſion which ſometimes is obſerved between the liquid and the glaſs is completely removed. During the evaporation, the object-glaſs of the microſcope is ſometimes obſcured by the condenſation of the water from the ſaline ſolution on the ſlip of glaſs, and the viſion is thus rendered indiſtinct. When this happens, if the circumſtance be recollected, the glaſs muſt be wiped and replaced. In examinations of ſaline ſolutions, and in obſerving the progreſs of cryſtallization, Mr Baker recommends the light of a candle in preference to the light of day, which latter being of a whiter colour and nearly the ſame with the tranſparent cryſtals, they are leſs diſtinctly ſeen than with the brown light of a candle.

Plate CLXV.

Fig. 1. is a repreſentation of the microſcopical cryſtals of *nitre* or *ſaltpetre*. They begin to ſhoot out from the edges with very moderate heat into flat figures of different lengths, with ſtraight parallel ſides, and exceedingly tranſparent. They appear in different ſtates of their progreſs at the letters, *a*, *b*, *c*, *d*, and *e*; *a* exhibits the appearance when they firſt begin to form. When a number of cryſtals have made their appearance they ſometimes diſſolve under the eye, and diſappear entirely; but, by continuing to watch the changes which go on, the proceſs is frequently obſerved to recommence, and new ſhoots puſh out. The firſt cryſtals ſometimes become larger without undergoing any change of figure; and ſometimes form in the way which is repreſented in the figure. When the heat is too great, as might be expected, the proceſs goes on with great rapidity, and numerous ramifications are formed. This ariſes no doubt from the confuſed cryſtallization.

Fig. 2. ſhews the microſcopical cryſtals of *blue vitriol* (ſulphate of copper), which appear firſt round the edges, ſhort at the beginning, but gradually increaſing, as they are repreſented at the letters *a*, *b*, *c*, which denote their difference of form, and the progreſs of their growth. Theſe cryſtals, which are tranſparent, aſſume a ſolid regular form, and reflect the light from their poliſhed ſides and angles. As the evaporation proceeds, a great number of filaments as fine as hairs make their appearance, ſome croſſing each other, as at *d*; and others exhibiting a ſtellated form with many radiations, as at *e e*. The cryſtallization of this ſalt proceeds ſlowly. Towards the end of the proceſs the regular cryſtals appear, and are finely branched as at *f*.

Fig. 3. is a view of the cryſtals of diſtilled verdigriſe, or acetate of copper. When it is immediately applied to the microſcope, the regular figures 1, 2, 3, 4, 5, 6, 7, make their appearance; but if the ſolution is allowed to remain at reſt for a few hours, and a drop of it is then heated on a ſlip of glaſs till it begins to concrete about the ſides, ſharp-pointed ſolid figures are formed, and ſhoot forwards. Theſe cryſtals are often ſtriated obliquely, frequently ariſe in cluſters, or ſhoot from a centre. Sometimes, towards the end of the proceſs, and in the middle of the drop, they aſſume a foliated form, and have the appearance of four leaves of fern united by their ſtems.

Fig. 4. ſhews the microſcopical cryſtals of alum. Theſe are more or leſs perfect according to the ſtrength of the ſolution, and the temperature employed. To prepare this ſalt for examination, the ſaturated ſolution may remain for ſome days. In that time cryſtals will form, and if what remains liquid ſhould be found too weak, heat may be applied, which will again diſſolve the cryſtals.

In fig. 5. is a view of the cryſtals of borax, or the ſubborate of ſoda. The drop of this ſolution ſhould not be held too long over the fire, as it hardens on the ſlip of glaſs, and no cryſtals appear. A briſk heat for about a ſecond is recommended as the beſt method. It is then applied to the microſcope, and the cryſtals will form as in the figure.

Fig. 6. ſhews the microſcopical cryſtals of ſal ammoniac, or muriate of ammonia. Great numbers of thick, ſharp, and broad ſpiculæ ſhoot from the edges, and from their ſides are protruded others of the ſame form, which are parallel to each other, but perpendicular to the main ſtem. The formation of theſe cryſtals, unleſs the heat employed be very moderate, is very rapid.

Fig. 7. exhibits the appearance of the cryſtals of acetate of lead (ſugar of lead). After a little of this ſalt is diſſolved in hot water, and allowed to remain at reſt for a ſhort time, it is fit for being examined with the microſcope. A drop of it put on a ſlip of glaſs, and heat being applied, will be ſeen forming round the edge, a regular border of a clear and tranſparent ſubſtance, which with a ſtrong heat runs over the whole of the drop, and hardens on the glaſs; but when the heat employed is moderate, bundles of lines, arranged

Structure of Crystals.

ranged in a radiated form, make their appearance. They arise from points in the interior edge of the border, and spread out nearly at equal distances from each other, in all directions.

In fig. 8. are represented the crystals of Glauber's salt (sulphate of soda), which assumes the form of ramifications, proceeding from the side of the drop, like the growth of minute plants. Other appearances present themselves in different periods of the process. It is indeed but of short duration, for when the crystallization has once begun, it goes on with great rapidity.

The examples which we have now given will, we apprehend, be sufficient to enable those who are curious in microscopical observations, to prosecute researches of this kind. Many more might have been given from the same author; but as experiments on crystallization, conducted in this way, are little susceptible of accuracy or precision, we wish to avoid swelling out the article without conveying some useful information. Our chemical readers will readily perceive, that very different appearances will be the result of a slower or more rapid crystallization, greater or less purity of the salt, and different degrees of strength of the solution. In compound bodies, for instance, modifications in the form of the crystals are produced by a difference in the proportion of the constituent parts. The crystals of alum, which is a triple salt, viz. a sulphate of alumina and potash, are in the form of octahedrons. The addition of a quantity of alumina changes the form of the crystals to that of cubes; and if a cubic crystal of alum be introduced into a solution, the proportions of which afford octahedral crystals, the cubic crystal will assume the form of an octahedron, and the octahedral crystal put into a solution which affords cubic crystals, passes into that of the cube. The nature of the solvent also, in which the crystallization takes place, produces certain deviations in the form of the crystals. The solution of common salt in water affords cubical crystals, but in urine it crystallizes in the form of octahedrons. Muriate of ammonia dissolved in water, crystallizes in the form of an octahedron, but in urine it affords crystals in the form of cubes. But we now proceed to consider the theory of the structure of crystals, which will be the subject of the next section.

Sect. II. *Of the Theory of the Structure of Crystals.*

In the former section we have given a view of the phenomena of crystallization. The regular forms which bodies assume by means of this process, have occupied no small share of the attention of naturalists and chemical philosophers. The researches and investigations of Bergman, Romé de L'Isle, and Hauy, have been particularly directed this way. Bergman, in his 12th Dissertation *, treats of the variety of the forms of crystals, of the various figures derived from the spathaceous form, of the structure of the most minute parts, and of the different modes in which crystals are generated. Romé de L'Isle has arranged crystals into six species, derived from the varieties of form. 1. Tetrahedron. 2. Cube. 3. Octahedron. 4. Parallelopiped. 5. Rhomboidal octahedron. 6. Dodecahedron. But the ingenious researches of Hauy on this subject have been followed by the completest and most successful investigation of the theory of the structure of crystals which has yet appeared. Of this theory, an account of which the reader will find in the *Annales de Chimie* †, and in his *Traité de Mineralogie* ‡, we now propose to give a comprehensive view.

* Physic. & Chemic. Essays.

† Vol. xvii.

‡ Vol. i.

This theory, the author observes, cannot be fully understood without the aid of analytical calculations. For beside the convenience of analysis, including in the same formula a great number of different problems, it is by means of it alone, that the theory can assume the character of absolute certainty in arriving at the same results which are obtained by observation. But notwithstanding these considerations, it seemed to be better for those who had not a competent knowledge of the science of calculation to prefer the method of simple reasoning, but accompanied with geometrical figures, which are so useful in giving a distinct conception of the arrangement of the small solids which combine together to form a crystal. This arrangement is denominated *structure*, in opposition to the term *organization*, which expresses the more complicated mechanism of vegetables and animals. This method may perhaps be less direct, and less precise and expeditious, and it may require attention to those details which are passed over in the analytical method to reach its object more speedily; it has, however, this advantage, that the mind by its means perceives better the connexion of the different parts under consideration, and can more easily comprehend the facts with which it is furnished.

I. Mechanical Division of Crystals.

The same mineral substance, it is known, is susceptible of several different forms, well defined, some of which do not appear, at first sight, to have any common point of resemblance to indicate their relation. If, for instance, we compare the regular hexahedral prism of calcareous spar with the rhomboid of the same mineral (B), whose large angle is about 101$\frac{1}{2}$°, we

(B) The name of *rhomboid* is given by the author to a parallelopiped *a*, *e* (fig. 12.) terminated by six equal and similar rhombuses. In every rhomboid, two of the solid angles, such as *a*, *e* opposed to each other, are formed by the junction of three equal plane angles; each of the six solid angles is formed by a plane angle equal to each of the three preceding, and by two other angles of a different measure, but equal to each other. The points *a e* are the summits, the line *a e* is the axis. In any one of the rhombuses *a b*, *d f*, which compose the surface, the angle *a* contiguous to the summit, is called the superior angle; the angle *d* the inferior angle; and the angles *b* and *f* are the lateral angles. The sides *a b*, *a f* are the superior edges, and the sides *b d*, *d f* the inferior edges: *b f* is the horizontal diagonal, and *a d*, the oblique diagonal. The rhomboid is obtuse or acute, according as the angles of the summits are obtuse or acute. The cube is the limit of the rhomboids.

we ſhould be led to believe that each of theſe two forms is quite diſtinct from the other. But this point of relation, which eſcapes notice, when we conſider only the external form, becomes ſenſible when we attend to the intimate mechaniſm of the ſtructure. Here the author gives a hiſtorical view of the progreſs of his reſearches, and traces the ſteps which led him to the diſcovery of what became as it were the key of his whole theory.

He had in his hand a hexahedral priſm of calcareous ſpar, ſimilar to that mentioned above, and which had been detached from a group of the ſame cryſtals. The fracture preſented a very ſmooth ſurface, ſituated obliquely, like the trapezium *p ſ u t* (fig. 9.), and which had an angle of 135°, both with the remainder *a b c s p h* of the baſe, and with the remainder *t u e f* of the plane *i n e f*. Obſerving that the cuneiform ſegment *p s u t i n* which this fracture ſeparated from the cryſtal, had for its vertex one of the edges of the baſe, namely the edge *i n*, he attempted to ſeparate a ſecond ſegment in that part to which the contiguous edge *c n* belonged. For this purpoſe he employed the blade of a knife, directed with the ſame degree of obliquity as the trapezium *p ſ u t* and aided by the ſtroke of a hammer. This attempt failed; but having tried the ſame operation towards the next edge *b c*, a new trapezium ſimilar to the firſt came into view. The fourth edge *a b* reſiſted the inſtrument, but the following, *a h*, readily yielded to mechanical diviſion, and preſented a third trapezium, having as fine a poliſh as the other two. The ſixth edge *i h*, it is ſcarcely neceſſary to obſerve, could not be divided, more than the fourth and the ſecond.

Proceeding then to the inferior baſe *d e f g k r*, it was ſoon found that the edges of this baſe, which admitted of diviſions ſimilar to the preceding, were not the edges *e f*, *d r*, *g k*, which correſponded to thoſe which could be divided towards the upper part, but the intermediate edges *d e*, *v y*, *g f*. The trapezium *l q y v* ſhews the ſection made below the edge *k r*. This ſection is obviouſly parallel to that of the trapezium *p ſ u t* and the four other ſections are in like manner parallel, two and two. Now, theſe different ſections being in the direction of the natural joints of the laminæ, it was eaſy to obtain others parallel to each of them, but it was found impoſſible to divide the cryſtal in any other direction. Following this mechanical diviſion according to the paralleliſm ſtated above, new ſections were obtained, always nearer to the axis of the priſm; and when the ſections were carried ſo far as to make the remainder of the two baſes diſappear, the priſm was transformed into a ſolid OX (fig. 10.) terminated by 12 pentagons, parallel two to two, of which thoſe, of the extremities, namely, SAOIR, GIODE, BAODC, on the one ſide, and KNPQF, MNPXU, ZQPXY, on the other, were the reſults of the mechanical diviſion, and had their common vertices O, P, ſituated in the centres of the baſes of the priſm, fig. 9. The ſix lateral pentagons RSUXY, ZYRIG, &c. (fig. 10.) were the remainders of the planes of the ſame priſm.

In proportion as the ſections were multiplied, always parallel to the preceding, the lateral pentagons diminiſhed in height, and at a certain term the points R, G being confounded with the points Y, Z, the points S, R with the points U, Y, &c. there remained no more of theſe pentagons, but the triangles YIZ, UXY, &c. (fig. 11.) Beyond that term the ſections coming to paſs over the ſurface of theſe triangles, diminiſhed gradually in extent, till at laſt the ſame triangles were loſt, and then the ſolid obtained from the hexahedral priſm, appeared to be a rhomboid *a e* (fig. 12.) exactly ſimilar to that which is commonly denominated *Iceland ſpar*.

So unexpected a reſult led the ingenious author to the examination of other calcareous cryſtals in a ſimilar manner, all of which yielded to mechanical diviſion in ſuch a way, as, when all the external ſurfaces had diſappeared, the nucleus which remained was always a rhomboid, of the ſame form as the firſt. All that was neceſſary was to diſcover the direction of the ſections which conducted to the central rhomboid.

To extract, for inſtance, this rhomboid from the ſpar which is uſually denominated *lenticular*, and which is itſelf a much more obtuſe rhomboid, having its large plane angle equal to 114° 18′ 56″, it was neceſſary to begin with the two vertices, and to make the ſections paſs through the ſmall diagonals of the faces. But if it is wiſhed, on the contrary, to get at the nucleus of the rhomboidal ſpar with acute vertices, the direction of the ſections of the planes muſt be parallel to the edges contiguous to the ſummits, and in ſuch a manner that each of them ſhall be equally inclined to the faces which it cuts.

Theſe reſults are the more worthy of attention, as it would ſeem at firſt, that in the proceſs of cryſtallization, after the rhomboid has been once adopted with regard to a determined ſpecies of mineral, it ought always to re-produce it with the ſame angles. But the paradox which ariſes from this diverſity of appearance, is explained by the double uſe of the rhomboidal form, which ſerves here to diſguiſe itſelf, and conceals fixed and conſtant characters under a variable external appearance.

If we take a cryſtal of a different nature, ſuch as a cube of *fluor ſpar*, the nucleus will have a different form. This will be, in the preſent caſe, an octahedron, which we ſhall obtain by taking off the eight ſolid angles of the cube. Heavy ſpar will produce for a nucleus a right priſm with rhomboidal baſes; feld ſpar, an oblique-angled parallelopiped, but not rhomboidal; apatite or beryl, a right ſix-ſided priſm; the adamantine ſpar a rhomboid, a little acute; blende, a dodecahedron, with rhomboidal planes; iron of the iſland of Elba, a cube, &c.; and each of theſe forms will be conſtant in relation to the whole ſpecies, ſo that its angles will undergo no variation which is appreciable: and if we attempt to divide the cryſtal in any other direction, we ſhall not be able to find any joint; we ſhall only obtain indeterminate fragments; it will rather be broken than divided.

Theſe ſolids inſcribed each in all the cryſtals of the ſame ſpecies, ought to be regarded as the true primitive forms on which all the other forms depend. All minerals, it is true, are not ſuſceptible of mechanical diviſion, but the number is greater than what appeared at firſt ſight; and with regard to thoſe cryſtals in which the attempts to diſcover the natural joints have failed, it has been remarked that their ſurface ſtriated in a certain direction, or the relation of their different forms,

forms, among those which belong to the same substance, frequently presented indications of their structure, and by reasoning from their analogy with other divisible crystals, we may determine this structure, at least with a good deal of probability.

All deviations from the primitive form are called by Hauy, *secondary forms*. The number of these forms has certain limits, which can be determined by theory, according to the laws which regulate the structure of crystals.

The solid of the primitive form, which is obtained by means of the operation described above, may be farther subdivided in a direction parallel to its different faces. All the surrounding matter is equally divisible by sections parallel to the faces of the primitive form. Hence it follows, that the parts detached by the aid of all these sections are similar, and only differ in their volume, which continually decreases in proportion to the extent of the division. Those, however, must be excepted, which are near to the faces of the secondary solid; for these faces not being parallel to those of the primitive form, the fragments which have one of their facets taken in the same faces, cannot exactly resemble those which are detached towards the middle of the crystal. For instance, the fragments of the hexahedral prism (fig. 9.), whose external facets make part of the bases, or of the planes, have not, in this respect, the same figure with those which are situated nearer to the centre, all of whose facets are parallel to the sections *psut*, *lqyv*; but the difficulty which presents itself at first sight, in consequence of that diversity, is removed by the help of the theory, and the whole are reduced to a unity of form.

But the division of the crystal into small, similar solids, has a certain limit, beyond which we should arrive at particles so small, that they are no longer divisible, without destroying the nature of the substance, or decomposing it. At this term, the investigation stops; and to the small solids, which we might insulate if our organs and instruments were sufficiently delicate, Hauy has given the name of *integrant* or *integral molecules*. He thinks it probable, that these molecules are those which were suspended in the fluid in which the crystallization took place. In general it may be observed that with the aid of these molecules, the theory reduces to simple laws the different forms of crystals, and arrives at results which exactly represent those of nature.

When the nucleus is a parallelopiped, that is, a solid having six parallel faces, two to two, like the cube, the rhomboid, &c. and this solid admits of no other divisions than those which are made in the direction of its faces; it is obvious that the molecules which result from the subdivision, whether of the nucleus, or of the surrounding matter, are similar to this nucleus. In other cases, the form of the molecules is different from that of the nucleus. There are, besides, other crystals which afford, by means of mechanical division, particles of different figures combined together through the whole extent of these crystals. The ingenious author of the theory has thrown out some conjectures on the manner of resolving the difficulty which these kinds of mixed structures present; and at any rate he observes that it does not affect the stability of the theory.

II. Laws of Decrement.

1. Decrements at the Edges.

The primitive form, and that of the integrant molecules, being determined, after the dissection of the crystals, we must investigate the laws according to which these molecules were combined, to produce around the primitive form those kind of coverings which terminated so regularly, and from which resulted polyhedra so different from each other, although originally of the same substance. Now, such is the mechanism of the structure subject to these laws, that all the parts of the secondary crystal superadded to the nucleus, are formed of laminæ, which decrease regularly by subtractions of one or more ranges of integral molecules, so that theory determines the number of these rows, and by a necessary consequence the exact form of the secondary crystal.

To have a distinct idea of these laws, let us take a very simple and elementary example. Conceive EP (fig. 13.) to represent a dodecahedron whose faces are equal and similar rhombuses, and that this dodecahedron is a secondary form, having a cube for its nucleus or primitive form. By the inspection of fig. 14. the position of this cube in the crystal may be easily conceived. The small diagonals DC, CG, GF, FD of the four faces of the dodecahedron, being united round the same solid angle, form a square CDFG. Now there are six solid angles, composed of the four planes, namely the angles L, O, E, N, R, P (fig. 13.), and consequently, if sections are made to pass through the small diagonals of the faces which compose the solid angles, six squares will be successively uncovered. These squares will be the faces of the primitive cube, of which three are represented at fig. 14. namely CDFG, ABCD, BCGH.

This cube would evidently be an assemblage of cubic integral molecules, and it would be necessary that each of the pyramids, such as LDCGF (fig. 14.), which rest on the faces, should be itself composed of cubes equal to each other, and to those which form the nucleus. To have a more distinct conception of this arrangement, let us compose an artificial dodecahedron of a certain number of small cubes, the arrangement of which will be an imitation of the process of nature in disposing the molecules in the formation of the dodecahedron.

Let ABGF (fig. 15.) be a cube composed of 729 small cubes equal to each other, in which case each face of the whole cube will include 81 squares, that is, 9 on each side, which will be the external faces of as many partial cubes representing the molecules. This cube will be the nucleus of the dodecahedron which is to be constructed. On one of the faces, as ABCD, of the cube apply a square lamina, composed of cubes equal to those which form the nucleus, but having towards each a row of cubes less than if it were on a level with the contiguous faces BCGH, DCGF, &c. This lamina will be composed of 49 cubes, that is, 7 on each side, so that if the inferior base be *onfg* (fig. 16.) this base will fall exactly on the square marked with the same letters in fig. 15. Above this first lamina let a second be applied, composed of 25 cubes, 5 on each side, so that if *lmpu* (fig. 17.) represent its

Structure of Crystals.

its inferior base, this base will correspond exactly with the square marked with the same letters in fig. 15. If in like manner a third lamina be applied to the second, which is composed only of 9 cubes, that is, 3 on each side, so that *v x y z* (fig. 18.) being the interior base, shall correspond with the square marked with the same letters in fig. 15.; and if on the middle square *r* of the preceding lamina the small cube *r* (fig. 19.) be placed, this will represent the last lamina.

When this operation is completed, it will appear that there is formed on the face ABCD (fig. 15.) a four-sided pyramid, of which this face is the base, and the cube *r* (fig. 19.) is the summit. And if the same operation be continued on the other five sides of the cube, we shall have six four-sided pyramids, resting on the six faces of the nucleus, which is enveloped with them on all sides. But as the different rows of laminæ composing these pyramids project beyond each other for a certain way, as appears on fig. 20. where the parts raised above the planes BCD, BCG represent the two pyramids which rest on the faces ABCD, BCGH, (fig. 15.) the faces of the pyramids will not form continued planes; for they will be alternately re-entering and salient, in some measure imitating a stair with four sides.

Let us now suppose that the nucleus is composed of a number of almost imperceptible cubes incomparably greater, and that the laminæ applied on the different faces, which may be called the laminæ of superposition, continue to increase towards their four edges by subtractions of one range of cubes equal to those of the nucleus, the number of these laminæ will be incomparably greater than in the preceding hypothesis; and at the same time the cavities or furrows which they form, as they alternately become salient or re-entering, will be almost imperceptible; and indeed it might be supposed that the cubes of which the crystal is composed are so small as to become quite imperceptible to our senses, and the faces of the pyramids to be perfectly smooth.

Now DCBE (fig. 20.) being the pyramid which rests on the face ABCD (fig. 15.), and CBOG (fig. 20.) the pyramid applied to the face BCGH (fig. 15.), if we consider that every thing is uniform from E to O (fig. 20.) in the manner in which the laminæ of superposition mutually project beyond each other, we may readily conceive that the face CEB of the first pyramid ought to be exactly in the same plane as the face COB of the contiguous pyramid, so that the union of these two faces should form a rhombus ECOB. But we have, for the 6 pyramids, 24 triangles similar to CEB, which consequently will be reduced to 12 rhombuses, from which results a dodecahedron similar to what is represented in fig. 13. and 14.

The cube, before it arrives at the form of the dodecahedron, passes through a multitude of intermediate modifications, of which one is shown at fig. 21. The squares *p a e o*, *k l q u*, *m n t s*, &c. correspond to the squares ABCD, DCGF, CBHG, &c. (fig. 14.), and form the superior bases of as many pyramids, incomplete from the deficiency of the laminæ with which they ought to terminate. The rhombuses EDLC, ECOB (fig. 13.), by a necessary consequence, are reduced to simple hexagons *a e* C *l k* D, *e o* B *n m* C (fig. 21.), and the surface of the secondary crystal is composed of 12 of these hexagons and 6 squares. This is the case with the boracic spar (the borate of magnesia and lime), with the exception of some facets which surmount the solid angles, and which depend on a different law of decrement.

If the diminution of the laminæ of superposition proceeded in a more rapid ratio; for example, if each lamina had had on its circumference, two, three, or four rows of cubes less than the inferior lamina, the pyramids produced on the nucleus by this diminution being more depressed, and their contiguous faces being no longer on a level, the surface of the secondary solid would have been composed of 24 isosceles triangles, all inclined to each other. *Decrement on the edges*, is that which takes place parallel to the edges of the nucleus, and it ought to be distinguished from another kind of decrease to be afterwards mentioned.

2. Examples of Decrease on the Edges.

Martial Pyrites, or *Dodecahedral Sulphuret of Iron*.

Geometric Character.—Inclination of any one of the pentagons, as DPRFS (fig. 27.), to the pentagon CPRGL, which has the same base PR, 126° 56′ 8″. Angles of the pentagon CPRGL, L = 121° 35′ 17″; C or G = 106° 35′ 57″ 30‴; P or R = 102° 36′ 19″.

Let us conceive again a cubic nucleus, whose different edges are lines of departure to the same number of decrements which take place at the same time in two different ways; that is, by the subtraction of two rows parallel to the edges AB, CD (fig. 15.), and of one row parallel to the edges AB, BC. Let it be supposed also that each lamina being only equal in thickness to a small cube of the side AB and CD, is on the contrary equal to double the thickness of the side AD and BC. Fig. 22. represents this disposition with regard to the decrements which proceed from the lines DC, BC, (fig. 15.). It is plain that on account of the more rapid decrease in proceeding from DC or AB, than from BC or AD, the faces produced in the first case will be more inclined to the plane ABCD, while the faces produced in the second will remain as it were behind, so that the pyramid will no longer be terminated by a single cube E, as in fig. 20. which on account of its minuteness seems to be only a point, but by the row of cubes MNST (fig. 22.) which, supposing these cubes to be infinitely small, will present the appearance of a simple ridge. By a necessary consequence, the pyramid will have for its faces two trapeziums, such as DMNC, resulting from the first decrement, and two isosceles triangles, such as CNB, which will be the effect of the second decrement (c).

Let

(c) Here the face which corresponds to ABCD (fig. 15.) has 25 squares on each side, as may be seen in fig. 22. The structure of this pyramid may be imitated artificially, by regulating the arrangement and number of the cubes represented in the same figure.

Let us fuppofe farther, that with regard to the laminæ of fuperpofition, which arife on the face BCGH (fig. 15.), the decrements follow the fame laws, but in crofs directions; in fuch a way that the more rapid of the two may take place in proceeding from BC, or from GH, towards the vertex of the pyramid, and the flower decrement in proceeding from CG, or BH, towards the fame vertex. The pyramid which refults from thefe decrements will be placed in a direction oppofite to that which refts on ABCD, and will have the pofition reprefented at fig. 25. where the edge KL, which terminates the pyramid, inftead of being parallel to CD, like the edge MN, (fig. 22. and 23.) is on the contrary parallel to BC. We fhall then conceive what is to be done, that the pyramid which will reft on DC, GF (fig. 15.) may be turned as it is reprefented in fig. 24. and may have its terminating edge PR parallel to CG (fig. 15.). The pyramids which will reft on three other faces of the cube, will ftand like that which arifes on the oppofite face.

But as the decrements which produce the triangle CNB (fig. 23.) make a continuity with thofe from which refults the trapezium CBKL (fig. 25.), thefe two figures will be in the fame plane, and will form a pentagon CNBKL (fig. 26.). For the fame reafon the triangle DPC (fig. 24.) will be on a level with the trapezium DMNC (fig. 23.); and by applying the fame reafoning to the other pyramids, it will be conceived that the fix pyramids having for their whole faces 12 trapeziums and 12 triangles, the furface of the fecondary folid will be compofed of 12 pentagons, which will correfpond to the 12 rhombufes of fig. 13. but with this difference, that they will have other inclinations. This folid is reprefented at fig. 27. and with its cubic nucleus at fig. 28. where it may be feen how to proceed in the extraction of this nucleus. If, for example, a fection be made paffing through the points D, C, G, F, the pyramid which refts on the face DCGF of the nucleus will be detached, and by this fection the latter will be uncovered.

Among the cryftals belonging to the fulphuret of iron, or the arfeniate of cobalt, there is found a dodecahedron, having the faces equal and fimilar pentagons, and having for its nucleus a cube in the pofition above defcribed. But there are an infinite number of poffible dodecahedra, which may have for faces equal and fimilar pentagons, and will differ from each other by the refpective inclinations of their faces. Of all thefe dodecahedra, the one whofe ftructure would be fubjected to thefe laws, gives 126° 56′ 8″, as the angle formed by the inclination of any two of its faces DPRFS, CPRGL (fig. 27.) at the edge of junction PR, as might be fhewn by calculation. Some mineralogifts, overlooking the ufe of geometry in the confideration of cryftals, have confounded the dodecahedron of pyrites with the fame regular geometrical figure in which all the fides and angles of each pentagon are equal; but there is a ftriking difference between thefe two dodecahedra. The regular dodecahedron gives only 116° 33′ 54″, as the inclination of its refpective pentagons, making a difference of nearly $11\frac{1}{4}$° between it and the other. And indeed the regular dodecahedron cannot be produced by any law of decrement whatever, however compound it may be fuppofed, in regard to a cubic nucleus; and, as may be demonftrated generally, for a nucleus of any form. There are then two kinds of dodecahedra, one whofe faces are rhombufes, and another whofe faces are pentagons, produced upon a cubical nucleus, in confequence of two fimple and regular laws of decrement, in a direction parallel to the edges of the nucleus. By varying thefe laws in different other ways, a multitude of new polyhedra, having the fame nucleus may be conftructed.

Obtufe or Lenticular Calcareous Spar, (fig. 30.).

Geometric Character. Inclination of the rhombus $n\,a\,d\,b'$, to the rhombus $a\,i\,f'\,d'$, 134° 25′ 36″. Angles of the rhombus $n\,a\,d\,b'$; a or b' = 114° 18′ 56″; n or d' = 65° 41′ 4″.

This variety arifes from a decrement by a fingle row on both fides of the edges $a\,b$, $a\,g$, $a\,f$ (fig. 31.) and $e\,o$, $e\,d$, $e\,x$, contiguous to the fummits a, e, of the nucleus. An idea may be formed of its ftructure, by comparing it with that of the dodecahedron whofe planes form rhombufes (fig. 13. and 20.), originating from the cube, (fig. 15.); and by fuppofing that the laminæ, inftead of decreafing at the fame time on all the edges, decreafe only to thofe contiguous, three by three, to the angle C and its oppofite. The faces formed in that cafe will be reduced to fix, which, by prolonging themfelves, according to the law of continuity, fo as to interfect each other, will compofe the furface of a rhomboid analogous to the one which we are now treating of, excepting that it will have other angles, on account of the cubical form of its integral molecule.

From this it may be conceived, that the diagonals drawn from a to b' (fig. 30.), from a to g', from a to f', &c. on the fecondary rhomboid, will be confounded with the edges $a\,b$, $a\,g$, $a\,f$, (fig. 31.) of the nucleus, which ferve as lines of departure for the decrements: and hence to extract this nucleus, the planes of the fections muft pafs along thefe diagonals, as has been already remarked.

Common Topaz, (fig. 33.).

Geometric Character.—The inclination of the trapezoid $s\,r\,t\,m$ to the adjacent plane $r\,t\,e\,y$, 136°; of the fame plane, to $k\,r\,y\,z$, 124° 26′; of the plane $t\,m\,g\,e$, to $m\,l\,i\,g$, 93°.

The primitive form of this topaz is that of a right-angled, four-fided prifm $h\,y$ (fig. 32.) the bafes of which are rhombufes, having the angle h or r = 124° 26′. According to theory, in regard to the integrant molecule, the height $r\,y$ is to the fide $r\,n$ nearly in the ratio of 3 to 2. The pyramidal fummit of the topaz refults from a decrement by two rows of fmall prifms on the edges $x\,r$, $r\,n$, $n\,h$, $h\,x$ of the fuperior bafe of the primitive form. The planes $t\,m\,g\,e$, $l\,m\,g\,e$ (fig. 33.) on one fide, and $b\,k\,z\,p$, $b\,u\,d\,p$, on the other, arife from a decrement by three rows on each fide of the edges $n\,v$, $x\,q$ (fig. 32.), which decrement remains fufpended at a certain term, and leaves four rectangles $t\,r\,y\,e$, $k\,r\,y\,x$, $l\,h\,c\,i$, $u\,h\,c\,d$, (fig. 33.), parallel to the planes of the primitive form. The effect of this decrement is fhewn at fig. 34. where the rhombus $h\,n\,r\,x$ is the fame as fig. 32.; and all the fmall rhombs by which it is fubdivided, or which are exterior to it, reprefent the bafes of fo many molecules. The lines $x\,d$, $x\,z$, $n\,i$, $n\,e$, are

Structure of Crystals.

are directed according to the law of decrement already explained, and the lines *c d*, *c i*, *y z*, *y c*, correspond to the planes of the prism, which are not subject to this law.

3. Decrement on the Angles.

This position of the rhomboidal nucleus inclosed in the regular hexahedral prism of the calcareous spar being discovered, did not directly lead to the determination of the laws of those decrements of secondary crystals. More simple intermediate steps were necessary. To conceive the method of investigating these new decrements, it may be remarked that the same substances which exhibit the dodecahedron with pentagonal planes originating from the cubes (fig. 27. and 28.), and which might assume the form of the dodecahedron whose planes are rhombuses (fig. 13. and 14.), are found also under that of the regular octahedron. But if the laminæ of superposition decrease only on the edges of the two opposite faces of this cube, as on those of the superior base ABCD (fig. 14.) and of the inferior base, we shall in general have two pyramids applied on these bases. And if we suppose the effect of the law of decrements continued in the space situated between the bases of the cube, we shall arrive at an octahedron, whose angles will vary as there is a greater or smaller number of rows subtracted. But no law, however complicated, can give equilateral triangles as the faces of this octahedron.

On the other hand, by dividing a regular octahedron originating from a cube, the cubic nucleus will appear to be so situated in this octahedron that each of its six solid angles corresponds to the centre of one of the faces of the octahedron; but this could not be the case by supposing a decrement on the edges. The law of decrement accomplishes its ends, in such cases, by a different progress from that which conducts to the forms already described.

Let ABCD (fig. 35.) be the superior or inferior surface of a lamina composed of small cubes, whose bases are represented by the squares which subdivide the whose square. The series of cubes to which the squares *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, belong, are on the diagonal drawn from A to C; and they form one string, (fig. 36.) which will not differ from the string of the cubes a, n, g, r', s', t', u', z', x', (fig. 35.), lying in the direction of the edge AD, excepting that in the former the cubes touch only by one of their edges, and in the latter by one of their faces. There are also, throughout the whole extent of the lamina, strings of cubes parallel to the diagonal. The series of letters *q*, *v*, *k*, *u*, *x*, *y*, *z*, shews one, and the letters *n*, *t*, *l*, *m*, *p*, *o*, *r*, *s*, shew another string.

The laminæ of superposition, it may be conceived, project beyond each other one or more rows of cubes in a direction parallel to the diagonal. In like manner may be constructed around the cubic nucleus, solids of different figures, by placing successively above the different faces of this nucleus laminæ which may arise in the form of pyramids, and which will experience this kind of decrement. The faces of these solids will be roughened by an infinite number of salient angles formed by the exterior points of the composing cubes. This follows from the angular figure which is continually presented by the edges of the laminæ of superposition. But these points being on a level, the cubes may be supposed to be so small that the faces of the solid will appear smooth and continued planes.

Around the cube ABGF (fig. 37.), as a nucleus, let a secondary solid be constructed, in which the lamina of superposition shall decrease on all sides by a single row of cubes, in a direction parallel to the diagonals; and let ABCD (fig. 38.), the superior base of the nucleus, be subdivided in 81 small squares, representing the exterior faces of an equal number of molecules. Fig. 39. represents the superior surface of the first lamina which ought to be placed above ABCD (fig. 38.) in such a manner that the point a' may correspond to the point *a*, the point b' to the point *b*, the point c' to the point *c*, and the point d' to the point *d*. By this disposition the squares A*a*, B*b*, C*c*, D*d* (fig. 38.) remain uncovered, which will fulfil the above law of decrement; and the borders QV, ON, IL, GF (fig. 39.) project by one row beyond the borders AB, AD, CD, BC (fig. 37.), which is necessary that the nucleus may be enveloped towards these edges. For if the edges of the lamina represented (fig. 39.), as well as the following, coincided with the lines ST, EZ, YX, MU, on which supposition they would be on a level with AD, AB, CD, BC (fig. 38.), they would form re-entering angles towards the analogous parts of the crystal. Thus in the laminæ applied on ABCD (fig. 37.) all the edges answering to CD would be on a level with CDFG, of which they would form a prolongation; and in the laminæ applied on DCGF all the edges analogous to the same ridge CD would be on a level with ABCD, from which necessarily results a re-entering angle opposite to the salient angle formed by the two faces ABCD and CDFG. But by the laws which determine the formation of simple crystals, re-entering angles appear to be excluded. The solid will then increase in those parts to which the decrement does not extend. But this decrement alone being sufficient to determine the form of the secondary crystal, all the other variations which intervene only in a subsidiary manner may be set aside, excepting in the construction of artificial crystals, and in exhibiting the details relating to the structure.

The superior face of the second lamina will be like A'G'L'K' (fig. 40.), and this lamina must be placed above the preceding, in such a manner that the points a'', b'', c'', d'', may correspond with the points a' b' c', d' (fig. 39.), which will leave uncovered the squares having their exterior angles situated in Q, S, E, O, V, T, M, G, &c. and continuing to produce the decrement by one row. The solid increases towards the analogous edges at AB, BC, CD, AD (fig. 38.) since between A' and L', for instance, (fig. 40.) there are 13 squares, but between QV and LI (fig. 39.) there are only eleven.

The large faces of the laminæ of superposition which were hitherto octagons QVGFILNO (fig. 39.) having arrived at the figure of the square A'G'L'K' (fig. 40.), will after passing that term, decrease on all sides at the same time, and the following lamina will have for its superior face the square B'M'I'S (fig. 41.), less in every direction by one row than the square A'G'L'K' (fig. 40.). Let this square be disposed above the preceding so that the points c', f', g', h' (fig. 41.) may correspond with the

the points c, f, g, h, (fig. 40.). Fig. 42. 43. 44. and 45. represent the four laminæ which ought to rise successively above the preceding, the same letters being made to correspond. The last lamina is reduced to one cube z' (fig. 46.) which should correspond with the same letter (fig. 45.).

Thus it follows, that the laminæ of superposition applied on the base ABCD (fig. 37. and 38.) produce, by the total of their decreasing edges, four faces, which in proceeding from the points A, B, C, D, incline one to another in the form of a pyramidal summit. These edges, it may be remarked, have lengths which begin by increasing as in fig. 39. and 40. and which then proceed decreasing. Thus the faces produced by the same edges increase at first, and afterwards decrease in breadth, so that they become quadrilaterals. One of these is represented at fig. 47. in which the inferior angle C is confounded with the angle C (fig. 37.) of the nucleus; and the diagonal LQ represents the edge L′G′ of the lamina A′G′L′K′ (fig. 40.), which is the most extended in the direction of that edge. And the number of laminæ of superposition producing the triangle LCQ (fig. 47.) being less than that of the laminæ producing the triangle LZQ, since there is here only one lamina preceding the lamina A′G′L′K′ (fig. 40.), while there are six which follow it as far as the cube z (fig. 46.) inclusively, the triangle LZQ (fig. 47.) composed of the sum of the edges of these latter laminæ, will have a much greater height than the inferior triangle LCQ, as it is expressed in the figure.

The surface of the secondary solid, then, will be formed of 24 quadrilaterals, disposed three and three around each solid angle of the nucleus. But decreasing by one row, the three quadrilaterals belonging to each solid angle, such as C (fig. 37.) will be in the same plane, forming an equilateral triangle ZIN (fig. 48.). The 24 quadrilaterals, then, will produce eight equilateral triangles. One of these is represented at fig. 49. shewing the arrangement of the cubes that concur to form it; and the secondary solid will be a regular octahedron. This octahedron is represented at fig. 50. enclosing the cubic nucleus, so that each of its solid angles corresponds to the centre of one of the triangles IZN, IPN, PIS, SIZ, &c. of the octahedron. To extract this nucleus, it would be necessary to divide the octahedron in its eight solid angles, by sections parallel to the opposite edges. This is the structure of octahedral sulphuret of lead or galena.

Such then is an example of decrements on the angles which take place in a direction parallel to the diagonals. By this denomination may be expressed precisely the result of each decrement, by denoting the angle which serves it as a point of departure.

Acute calcareous Spar, (fig. 51.)

Geometric Character.—Inclination of $p\,z\,r\,y$ to $p\,u\,o\,y$, 78° 27′ 47″, and to $i\,r\,z\,s$, 101° 32′ 13″. Angles of the rhombus $p\,z\,r\,y$, p or r = 75° 31′ 20″; z or y = 104° 28′ 40″. Inclination of the oblique diagonal drawn from p to r with the edge $p\,u$, 71° 33′ 54.″

Geomet. Propert.—The angles of the rhombus are equal to the respective inclinations of the faces of the nucleus, and reciprocally. The angles of the principal quadrilateral, or that which passes through two opposite oblique diagonals $p\,r$, $u\,i$, and through the intermediate edges $p\,u$, $i\,r$, are the same as on the nucleus.

To conceive the structure of this rhomboid, suppose that $a\,b\,d\,f$ (fig. 52.) represents the face of the nucleus marked with the same letters (fig. 12.) subdivided into a multitude of partial rhombuses, which are the exterior faces of so many molecules. Suppose farther, that the laminæ of superposition, applied on this face, decrease by one row towards the lateral angles $a\,b\,d$, $a\,f\,d$, in such a manner, that on the first the two rhombuses $b\,h\,k\,l$, $f\,m\,i\,n$ are uncovered; that on the second the uncovered rhombuses are those traversed by the diagonals $c\,o$, $u\,y$, on the third those traversed by the diagonals $s\,t$, $q\,z$, &c.; in which case the decreasing edges will successively correspond with these diagonals. By this law of decrement two faces will be produced; which, proceeding from the angles $b\,f$, will rise in the form of a roof above the rhombus $a\,b\,d\,f$, and will meet on a common edge situated immediately above the diagonal $a\,d$, and which will be parallel to it; and, as there are six rhombuses, which undergo like decrements on the primitive form, the faces produced will be 12 in number. But, by the law of decrement by one row, the two faces which have the same angle b, f, g, &c. (fig. 12.) for the point of departure will be in the same plane; thus reducing the 12 faces to six, and transforming the secondary crystal into an acute rhomboid $p\,i$ (fig. 51.). In this rhomboid the edges $p\,z$, $p\,y$, $p\,u$, are situated each as the oblique diagonals of the nucleus, or those which would be drawn from a to d, from a to x, from a to c, &c. (fig. 12.).

Crystals of this variety are found near Lyons in France; and the freestone of Fontainbleau, commonly called *crystallized freestone*, which is nothing else than calcareous spar, mixed with particles of quartz, exhibits the same form. The crystals of this stone yield to mechanical division, and have their natural joinings like those of pure spar, situated in the planes parallel to the edges $p\,z$, $p\,y$, $p\,u$, &c. (fig. 51.), and which would pass at an equal distance from these edges.

Rhomboidal Iron ore, (fig. 53.).

Geometric Character.—Inclination of BCRP to BCOA or OCRS, 146° 26′ 33″; angles of the rhombus BCRP, C or P=117° 2′ 9″; B or R=62° 57′ 51″.

The laminæ composing this rhomboid decrease by two rows on the angles $b\,c\,r$, $o\,c\,r$, $b\,c\,o$, &c. (fig. 54.) which concur to the formation of the two solid angles $c\,n$, of a cubic nucleus. The faces produced, instead of being on a level, three and three, around these angles, as in the case of decrement by a single row, incline one to the other, and extend above the faces of the nucleus in such a manner that their diagonals are parallel to the horizontal diagonals of the same faces. The cube here answers the purpose of a rhomboid, which should have its summits in c and n, in which case there would be only one axis passing through the summits. In the dodecahedron, on the other hand, with pentagonal planes

planes (fig. 27.) the cube performs the functions of a rectangular parallelopipedon, and then three different axes may be conceived, each of which paſſes through the middle of the two oppoſite faces. When the cube begins to perform the one or the other, in regard to one ſpecies of mineral, it is obſerved to continue that function in all the varieties of that ſpecies.

The cryſtals of rhomboidal iron are found among thoſe of the iron ore of the iſland of Elba. It is uncommon, however, for the law of decrement to attain to its boundary, and for the rhomboid not to be modified by facets parallel to the faces of the nucleus. If the decrement which produces the rhomboid took place at the ſame time on the eight ſolid angles of the cube, there would reſult a polyhedron of 24 facets, of which nature are the cryſtals found at the Calton hill, Edinburgh, which have been conſidered as zeolites.

4. Intermediate Decrements.

In ſome cryſtals the decrements on the angles do not take place in lines parallel to the diagonals, but parallel to lines ſituated between the diagonals and the edges. This happens when the ſubtractions are made by double, triple, &c. rows of molecules. In figure 55. which is an inſtance of theſe ſubtractions, the molecules compoſing the row repreſented by the figure, are ſo arranged as if, of two, one only was formed. To reduce this caſe under that of the common decrements on the angles, we have only to conceive the cryſtal compoſed of parallelopipeds, having their baſes equal to the ſmall rectangles *a b c d*, *e d f g*, *h g i l*, &c. The name of intermediate decrement is given to this kind of diminution.

Syntactic Iron Ore, (fig. 50.).

Geometric Character.—Reſpective inclination of the trapeziums *b e g o*, *n q g o* of the riſing pyramids $=135^\circ\ 34'\ 31''$; of the edges *c g*, *g q*, $129^\circ\ 31'\ 16''$. Angles of the trapezium *b c g o*, *b* or $c=103^\circ\ 48'\ 35''$; *o* or $g=76^\circ\ 11'\ 25''$.

This variety of iron ore is found at Framont in Les Voſges. It commonly appears under the form of two oppoſite pyramids, and ſome groups reflect from the ſurface the priſmatic colours. Theſe cryſtals, claſſed by De L'Iſle among the modifications of the dodecahedron with iſoſceles triangular planes, have for nucleus a cube performing the functions of the rhomboid. The two regular hexagons by which they are terminated, ariſe from a decrement by a ſingle row of cubic molecules on the angles *c*, *n*, (fig. 54.) of the nucleus.

To comprehend the effect of this law, combined with the preceding, and which produces the lateral trapeziums, let it be ſuppoſed that *c b p r* (fig. 57.) repreſents the ſame ſquare as fig. 54. ſubdivided into ſmall ſquares, which are the external faces of ſo many molecules. Taking theſe molecules by pairs, ſo that they form rectangular parallelopipeds, having for baſes the oblong ſquares *b n g h*, *h g m* G, &c. and imagine, that the ſubtractions are made by two rows of theſe double molecules, the edges of the laminæ of ſuperpoſition will be ſucceſſively ranged in lines, as PG, TL, R*p*, S*p*, *k z*, *y z*, &c. and the ſum of all theſe edges will produce two faces, which departing from the angles *b*, *r*, will converge, the one towards the other, and will unite themſelves on a common ridge, ſituated above the diagonal *c p*, but inclined to that diagonal. The complete reſult of this decrement, then, is 12 faces; and it is ſhewn by calculation, that the ſix ſuperior faces being prolonged to the point where they meet the ſix lower faces, will form with them the ſurface of a dodecahedron, compoſed of two right pyramids united at their baſes. By the effect of the firſt law, theſe pyramids are here incomplete, which gives the hexagon *a b c d r u* (fig. 56.) and its oppoſite.

5. Mixed Decrements.

The decrements in other cryſtals, either on the edges, or on the angles, vary according to laws, the proportion of which can only be expreſſed by the fraction $\frac{2}{3}$ or $\frac{3}{2}$. It may happen, for inſtance, that each lamina exceeds the following by two rows parallel to the edges, and that it may, at the ſame time, have an altitude triple that of a ſimple molecule. A vertical, geometrical ſection of one of the kinds of pyramids, reſulting from this decrement, is repreſented at fig. 62. The effects of this decrement may be readily conceived by conſidering that AB is a horizontal line taken on the upper baſe of the nucleus *b a z r*, the ſection of the firſt lamina of ſuperpoſition, *g f e n* that of the ſecond. Theſe are called *mixed decrements*, which exhibit this new kind of exception from the ſimpleſt laws. They, as well as the intermediary ones, rarely exiſt anywhere elſe, and they have been particularly diſcovered in certain metallic ſubſtances. The application of the ordinary laws, Hauy obſerves, to a variety of theſe ſubſtances, preſented ſuch errors in the value of the angles, as led him to believe that they were inconſiſtent with theory. But extending his theory, he arrived at reſults ſo correct as removed every doubt of the exiſtence of the laws on which theſe reſults depended.

All the changes to which cryſtals are ſubjected depend on the laws of ſtructure which have been explained, and others of a ſimilar kind. The decrements ſometimes take place at the ſame time on all the edges, as in the dodecahedron having rhombuſes for its planes, or on all the angles, as in the octahedron originating from a cube. Sometimes they take place only on certain edges of certain angles. There is ſometimes a uniformity between them, ſo that it is one ſingle law by one, two, three rows, &c. which acts on the different edges, or the different angles. Sometimes the law varies from one edge to the other, or from one angle to the other. This happens particularly, when the form of the nucleus is not ſymmetrical, as, for inſtance, when it is a parallelopiped, whoſe faces differ by their reſpective inclinations, or the meaſure of their angles. In ſome caſes there is a concurrence of the decrements on the edges, with thoſe on the angles, to produce the ſame form; and ſometimes the ſame edge or the ſame angle is ſubjected to ſeveral laws of decrement ſucceeding each other. The ſecondary cryſtal, in ſome caſes, has faces parallel to thoſe of the primitive form, and which combine with the faces produced by the decrements to modify the figure of the cryſtal. Simple ſecondary forms, are thoſe which ariſe from a ſingle law of decrement, the effect of which entirely conceals the nucleus. Compound ſecondary forms ariſe from ſeveral ſimultaneous laws of decrement, or from one ſingle law not having attained to its extent; ſo that there remain

main faces parallel to those of the nucleus, which concur with the faces produced by the decrement, to diversify the form of the crystal. If, amidst this diversity of laws, sometimes insulated, sometimes united by more or less complicated combinations, the number of the rows subtracted were itself extremely variable; if, for instance, these decrements were by 12, 20, or 30 rows, or more, which is possible, the number of forms which might exist in each kind of mineral would be immense. But the power by which the subtractions are effected, seems to be very limited in its action. Its extent rarely exceeds 1 or 2 rows of molecules. Beyond four rows, only one variety of calcareous spar has been discovered. The structure of this variety depends on a decrement by six rows; but this seems to be a rare occurrence in nature. Yet, although the laws of crystallization are limited to two of the simplest, that is, those which produce subtractions by one or two rows, calcareous spar is susceptible of 2044 different forms, a number exceeding more than 50 times that of the forms at present known; and, admitting into the combination decrements by 3 and 4 rows, calculation will give 8,388,604 possible forms of the same substance, and by the operation of either mixed or intermediate decrements, this number will be greatly augmented.

The striæ observed on the surface of many crystals is another proof in favour of the theory; for they always have directions parallel to the projecting edges of the laminæ of superposition, which mutually go beyond each other, if the regularity of the process has not been disturbed. It must not, however, be supposed, that the inequalities arising from the decrements must be always sensible, if the form of the crystals be complete; for the molecules being extremely minute, the surface will appear finely polished, and no striæ would be perceptible. In some secondary crystals, therefore, they are not to be seen, while they are quite distinct in others of the same nature and form. In the latter case, the action of the causes producing crystallization, has not enjoyed all the necessary conditions; the operation has been interrupted; and the law of continuity not having been observed, there have remained on the surface of the crystal, perceptible vacancies. These deviations have this advantage, that they point out the direction, according to which the striæ are arranged in lines, and thus contribute to discover the real mechanism of the structure.

The small vacuities which the edges of the laminæ of superposition leave on the surface of even the most perfect secondary crystals, by their re-entering and salient angles, shew that the fragments obtained by division, whose external facets form part of the faces of the secondary crystal, are not like those drawn from the interior part. For this apparent diversity arises from these facets being composed of a multitude of small planes, really inclined to each other, but which being very minute, present the appearance of one plane. And if the division could reach its utmost bounds, these fragments would be resolved into molecules similar to each other, and to those situated towards the centre. It happens, too, that molecules of different figures arrange themselves in such a manner, as to produce similar polyhedra in different kinds of minerals. Thus the dodecahedron with rhombuses for its planes, which is obtained by combining cubic molecules, exists in granite, with a structure composed of small tetrahedra, having isosceles triangular faces. It exists also in sparry fluor, where there is also an assemblage of tetrahedra, but regular; that is to say, the faces of which are equilateral triangles.

Examples of Compound Secondary Forms.

Prismatic Calcareous Spar, (fig. 9.).

The bases of this prism are produced in consequence of a decrement, by a single row on the angles of the summits $b\,a\,f$, $g\,a\,f$, $b\,a\,g$, $d\,e\,x$, $d\,e\,c$, $c\,e\,x$ (fig. 12.) of the primitive form. The six planes result from a decrement by two rows on the angles $b\,d\,f$, $f\,x\,g$, $b\,c\,g$, $d\,f\,x$, $d\,b\,c$, $c\,g\,x$, opposite to the preceding. Let $a\,b\,d\,f$ (fig. 58.) be the same face of the nucleus, as fig. 12. The decreasing edges situated towards the angle of the summit a, will successively correspond with the lines $h\,i$, $k\,l$, &c. and those which look towards the inferior angle d, will have the positions pointed out by $m\,n$, $o\,p$; but as the first decrement takes place by one row, it is proved, that the face which results from it is perpendicular to the axis; and calculation shews, in like manner, that the second decrement taking place by two rows, produces planes parallel to the axis, and thus the secondary solid is a regular hexahedral prism.

To develope farther the structure of this prism, it may be remarked, that in the production of any one $a\,b\,c\,n\,i\,h$ (fig. 9.) of the two bases, the effect of one only of the three decrements which take place around the solid angle a (fig. 12.) may be considered, for example, of that which takes place on the angle $b\,a\,f$, supposing that the laminæ applied on the two other faces $f\,a\,g\,x$, $b\,a\,g\,c$, do not decrease, but to assist the result of the principal decrement which takes place in regard to the angle $b\,a\,f$. Here these auxiliary decrements are quite similar to that whose effect they are supposed to prolong.

The case will be totally different by applying the same observation to the decrements which are affected by two rows on the inferior angles $b\,d\,f$, $d\,f\,x$, $f\,x\,g$, &c. and which produce the six planes of the prism. If, for example, we consider the effect of the decrement on the angle $d\,f\,x$, it is necessary also that the laminæ applied on the faces $a\,f\,d\,b$, $a\,f\,x\,g$ (fig. 12.) should experience, towards their lateral angles $a\,f\,d$, $a\,f\,x$, adjacent to the angle $d\,f\,x$, variations which second the effect of the generating decrement. Here, however, these variations are intermediary decrements by rows of double molecules.

Amphitrigonous Iron Ore. Fig. 59. shews this crystal in a horizontal projection, and fig. 60. in perspective.

Geometric Character.—Respective inclination of the triangles $g\,c\,n$, $g\,c\,d$, &c. from the same summit, 146° 26′ 33″; of the lateral triangles $b\,g\,u$, $b\,g\,q$, to the adjacent pentagons, such as $g\,u\,t\,m\,n$, 154° 45′ 39″.

This is the common form of the iron ore of the island of Elba. It results from a decrement by two rows on the angles c, n (fig. 54.) to the summits of a cubic nucleus, which produces the isosceles triangles $g\,c\,n$, $g\,c\,d$, $n\,c\,d$ (fig. 59. and 60.), and of a second decrement by three rows on the lateral angles $c\,b\,p$, $c\,r\,p$, $c\,r\,s$, &c. which produce the triangles $m\,n\,r$, $r\,n\,k$, $u\,g\,b$, $g\,g\,b$, &c. These two decrements stop at a certain term, so that

that there remain faces parallel to those of the nucleus, viz. the pentagons *gutmn*, *hdnkl*, &c. (fig. 59.). The first decrement is similar to that which produces the rhomboidal iron ore. The second has this property, that if its effect were complete, it would give a dodecahedron of isosceles triangles, or composed of two right pyramids united at their bases. The triangles of the summits are frequently furrowed by striæ parallel to the bases *gn*, *dn*, *gd*, of these triangles, and which point out the direction of the decrement.

Analogical Calcareous Spar, (HAUY), fig. 61.

Geometric Character.—Inclination of any one, *imeh*, of the trapezoids of the summits to the corresponding vertical trapezoid *ecpg*, 116° 33′ 54″; angles of the same trapezoid *i*=114° 18′ 56″; *e*=75° 31′ 20″; *m* or *h*=85° 4′ 52″. Angles of the trapezoid *ehog*, *e*=90°; *o*=127° 25′ 53″; *g*=67° 47′ 44″; *h*=74° 46′ 23″; of the trapezoid *cegp*, *c*=60°; *p*=98° 12′ 46″; *c* or *g*=100° 53′ 37″.

Geomet. Propert.—1. In each vertical trapezoid, the triangle *ceg* is equilateral. 2. The height *ex* of this triangle is double the height *px* of the opposite triangle *cpg*. 3. In the trapezoid *ehog*, and the other similarly situated, the angle *heg* is a right angle. 4. If the diagonal *gh* be drawn, the triangle *heg* will be similar to any one *aof* (fig. 12.) of those which would be produced by drawing in the primitive rhombus the two diagonals *bf*, *ad*. 5. If in the trapezoid *emih*, or any other situated at the summits, the diagonals *ei*, *mh* be drawn, the height *el* of the inferior triangle *meh* will be double the height *il* of the superior triangle *mih*. 6. The triangle *mih* is similar to ½ of the rhombus of every obtuse spar, divided by the horizontal diagonal, and the triangle *meh* is similar to ½ of the rhombus of the acute spar divided in the same manner.

The numerous analogies connecting this variety with different crystalline forms, whether considering certain angles formed by planes, or certain triangles obtained by drawing the diagonals of the trapezoids, led the author of this theory to give it the name of *analogical spar*. It is derived from three other varieties, viz. very obtuse spar, by the trapezoids *emih*, *fiht*, &c.; metastatic spar, by the trapezoids *emdc*, *ehog*, *ohtz*, &c.; and the prismatic spar by the trapezoids *back*, *cegp*, &c. which are consequently parallel to the axis. The trapezoids *imeh*, *fiht*, &c. are often separated by an intermediary ridge from the vertical trapezoids *cegp*, *gozr*, &c. In that case the trapezoids *cdme*, *geho*, &c. are changed into pentagons.

Icosahedral Sulphuret of Iron, (fig. 63.).

Geometric Character.—Respective inclinations of the isosceles triangles PLR, PSR, 126° 52′ 11″; of any one PNL of the equilateral triangles to each adjacent isosceles triangle, PLR, or LNK, 140° 46′ 17″. Angles of the isosceles triangle PLR, L=48° 11′ 20″; P or R=65° 54′ 20″.

This variety is the result of a combination of the law which produces the octahedron originating from a cube (fig. 50.), with that which takes place for the dodecahedron with pentagonal planes (fig. 27. and 28.) The first law produces the eight equilateral triangles which correspond with the solid angles of the nucleus; and the second produces twelve isosceles triangles, situated two and two above the six faces of the same nucleus. If a dodecahedron similar to that of fig. 28. were converted geometrically into this icosahedron, it would be sufficient to make the planes of eight sections pass through it in the following manner; viz. one through the angles P, N, L, (fig. 27.), another through the angles P, M, S; a third through the angles L, R, U, &c. By comparing the figures 27. and 63. the relation between the polyhedra will be seen by the correspondence of the letters; but this is merely an artificial operation; for it may be observed, that the nucleus of the icosahedra which would be obtained, would be much smaller than that of the dodecahedron, since the solid angles of the latter nucleus would be confounded with the angles D, C, G, &c. (fig. 28.) of the dodecahedron; but the other nucleus would have its solid angles situated in the middle of the equilateral triangles MPS, NPL, URL, (fig. 63.).

The icosahedron of the sulphuret of iron, which is not very common, has been confounded with the regular geometrical icosahedron which has all its angles equilateral. Theory shows that the existence of the latter icosahedron is equally impossible in mineralogy as the geometrical dodecahedron. Among the five regular polyhedra of geometry, viz. the cube, the tetrahedron, the octahedron, the dodecahedron, and the icosahedron, the three former can only exist among minerals according to the laws of crystallization.

Polynomous Petunze (HAUY), fig. 64.

Geometric Character.—Respective inclination of the narrow planes, *onkm*, *cfhg*, to the adjacent planes on each side 150°; of the planes *ct* F *g*, P *om* N to those contiguous to them by the edges *t* F, PN, 120°; of the heptagon *p* G *cldez* to the enneagon B *zebno* P *rs*, 99° 41′ 8″; of the trapezium *dafc* both to the plane *nbafhilk*, and to the heptagon *p* G *tcdez*, 135°; of the facet *deab*, or AB *zp* to the same heptagon, 124° 15′ 15″.

Hauy had not observed the petunze crystallized under its primitive form. This form, such as it is given by the mechanical division of secondary crystals, is that of an oblique prism of four planes (fig. 66.), two of which, such as GOAD, RBHN, are perpendicular to the bases ADNH, OGRB; the other two, viz. BOAH, RGDN, make with the former, angles of 120° at the ridges OA, RN, and angles of 60° towards the opposite ridges BH, GD. These planes are inclined to the bases at that place of the ridges GO, BR, 111° 29′ 43″, and at the opposite ridges 68° 30′ 17″. This form is at the same time that of the molecule. By theory, the two parallelograms GOAD, OGRB, as well as their parallels are equal in extent; and the parallelogram BOAH, or its opposite, RGDN, is double each of the preceding. This may serve to explain the roughness of the sections made in the direction BOAH, when compared with those in the directions of the small parallelograms, the latter being always smooth and brilliant. If, however, the diagonal OR, be drawn, it will be found perpendicular to OA and RN; or, it will be situated horizontally,

tally, by supposing that the ridges OA, BH have a vertical position.

This mineral exhibits the most complicated variety which the author has observed among this kind of crystals. To comprehend its structure, suppose that *b p y r*, (fig. 65.) represents a section of the nucleus AR, (fig. 66.), made by a plane perpendicular to the parallelograms GOAD, BOAH, and subdivided into a multitude of small parallelograms, which are the analogous sections of so many molecules. Here the side *y r* (fig. 65.), which is the same section of the cutting plane as GOAD, is greater than it ought to be in regard to the side *c r* (fig. 65.), which is the same section as BOAH (fig. 66.). But these dimensions are suited to those of the secondary crystal, and here occasion no difficulty, because it may be supposed that the primitive form has been extended more in one direction than in another; for this form is to be considered only as a convenient datum for the explanation of the structure, and the crystal consists merely in an assemblage of similar molecules; so that it is the dimensions of these molecules, which remain invariable.

By comparing fig. 64. and 65. it will be found, 1. That the plane *f a b n k l i h* (fig. 64.) and its opposite which correspond to *m n*, *d g* (fig. 65.) are parallel to two planes of the nucleus, viz. GOAD, BRNH (fig. 66.), and therefore do not result from any law of decrement. 2. That the plane P *o m* N, and its opposite (fig. 64.) which correspond to *a o*, *e g*, (fig. 65.) are also parallel to two of the planes of the nucleus, viz. BOAH RGDN, (fig. 66.). 3. That the plane *o n k m*, and its opposite (fig. 64.) which correspond to *o n*, *e g*, (fig. 65.) result from a decrement by two rows parallel to the ridges AO, NR, (fig. 66.). 4. That the plane *c f g h*, and its opposite, (fig. 64.), result from a decrement by four rows parallel to the ridges GD, BH, (fig. 66.), which decrement takes place on the other side of these ridges. From this it may be seen, that decrements different in their measure, give rise to planes similarly situated, such as *o n k m* and *c f g h*, (fig. 64.), which is a consequence of the particular figure of the molecules. With regard to the faces of the summit, the heptagon *p* G *t c d e z*, (fig. 64.), is situated parallel to the base BRGO, (fig. 66.). The enneagon B *s r* P *o n b e z* (fig. 64.) is produced in consequence of a decrement by one row on the angle OBR (fig. 66.), or parallel to the diagonal OR; which decrement does not attain to its full extent, and leaves subsisting the neighbouring heptagon parallel to the base BRGO. It may be conceived, from what has been said on the position of the diagonal OR, why the line *e z* (fig. 64.), which separates the two large faces of the summit, is situated horizontally, by supposing that the planes have a vertical position.

The trapeziums *d a f c*, A *p* GC, are the result of a decrement by one row on the ridges GO, BR (fig. 66.). The facet *d e b a* (fig. 64.) arises from a decrement by two rows parallel to the ridge BO (fig. 66.). With regard to the other facet AB *z p*, which has the same position as the preceding, in relation to the opposite part of the crystal, it results from an intermediary law, by a row of double molecules on the angle OBR (fig. 66.). The rhombuses *b c l h*, *k l s u* (fig. 67.) represent the horizontal sections of two of these double molecules taken in the same row, and whose relation to the rest of the arrangement will become sensible, by comparing these rhombuses with those marked with the same letters in fig. 65. This variety of crystals is subject to a change of dimensions; the faces *p* G *t c d e z*, *f a b n k l i h*, and their opposites, which are at right angles to each other, are elongated in the direction of their breadth, exhibiting the appearance of a quadrilateral, rectangular prism, the summits of which would be formed by the faces situated towards the ridges PN, F*t*. Crystals of this variety, which are opaque, and of a whitish, yellowish, and sometimes reddish colour, are found in granites; some are in groups, and some, but more rarely, are met with in single crystals.

III. Number of Primitive Forms.

In the examples which have been given, the author of the theory has chosen the parallelopiped for a nucleus, on account of the simplicity of its form. He has hitherto found that all the primitive forms may be reduced to six. 1. The parallelopiped in general, which comprehends the cube, the rhomboid, and all the solids terminated by six faces parallel two and two. 2. The regular tetrahedron. 3. The octahedron with triangular faces. 4. The hexagonal prism. 5. The dodecahedron with rhomboidal planes. 6. The dodecahedron with isosceles triangular faces.

Among these forms there are some found as nucleus, which have the measure of their angles the same in different kinds of minerals. It is to be considered that these nuclei are composed, in the first instance, of elementary molecules, and that it is possible that the same form of nucleus may be produced in one species by elements of a certain nature, and in another species by different elements combined in a different manner, as we see integrant molecules, some cubic, and some tetrahedral, produce similar secondary forms by the operation of different laws of decrement. But it may be observed, that all the forms which have hitherto occurred as nuclei, on the different species, are such as have a particular charact r of perfection and regularity, as the cube, the regular octahedron, and the dodecahedron with equal and similar rhombuses for its faces.

IV. Forms of the Integral Molecules.

The primitive form is that which is obtained by sections made on all the similar parts of the secondary crystals; and these sections, continued parallel to themselves, conduct to a determination of the form of the integral molecules, of which the whole crystal is the assemblage. There is no crystal from which a nucleus in the form of a parallelopiped may not be extracted, by making the limitation to six sections, parallel two and two. In a great number of substances, this parallelopiped is the last term of the mechanical division, and consequently the real nucleus; but in some minerals this parallelopiped is divisible, as well as the rest of the crystal, by farther sections made in the different directions of the faces, from which results a new solid, which will be the nucleus, if all the parts of the secondary crystal supperadded to this nucleus are similarly situated. When the mechanical division conducts to a parallelopiped, divisible only by sections parallel to its six faces, the molecules are parallelopipeds

similar

ſimilar to the nucleus; but in all other caſes their form differs from that of the nucleus. This may be illuſtrated by an example.

Let *a c h s n o* (fig. 68.) be a cube, having two of its ſolid angles *a*, *s*, ſituated on the ſame vertical line; this line will be the axis of the cube, and the points *a* and *s* will be its ſummits. Let it be ſuppoſed that this cube is diviſible by ſections, each of which, ſuch as *a h n*, paſſes through one of the ſummits *a*, and by two oblique diagonals *a h*, *a n*, contiguous to the ſummit. By this ſection the ſolid angle *i* will be detached; and as there are ſix ſolid angles, ſituated laterally, viz. *i*, *h*, *c*, *r*, *o*, *n*, the ſix ſections will produce an acute rhomboid, the ſummits of which will be confounded with thoſe of the cube. At fig. 69. this rhomboid is repreſented exiſting in the cube in ſuch a manner, that its ſix lateral ſolid angles *b*, *d*, *f*, *p*, *g*, *e*, correſpond with the middle of the faces *a c h i*, *c r s h*, *h i n s*, &c. of the cube; but each of the angles at the ſummits *b a g*, *d s f*, *p s f*, &c. of the acute rhomboid, are $=60^{\circ}$, from which it follows, that the lateral angles *a b f*, *a g f*, &c. are $=120^{\circ}$. Beſides, it is proved by theory, that the cube is the reſult of a decrement which takes place by a ſingle row of ſmall rhomboids, ſimilar to the acute rhomboid on the ſix oblique ridges *a b*, *a g*, *a e*, *s d*, *s f*, *s p*. This decrement produces two faces, one on each ſide of each of theſe ridges, making in the whole 12 faces; but as the two faces, having the ſame line of ridge for their departure, are on the ſame plane; by the nature of the decrement, the 12 faces will be reduced to ſix, which are ſquares, ſo that the ſecondary ſolid is a cube.

Suppoſe that the cube (fig. 68.) admits, in regard to its ſummits *a*, *s*, two new diviſions ſimilar to the preceding ſix, one of which paſſes through the points *c*, *i*, *o*, and the other through the points *h*, *n*, *r*. The firſt will alſo paſs through the points *b*, *g*, *e*, and the ſecond through the points *d*, *f*, *p*, (fig. 69. and 70.) of the rhomboid; from which it follows, that theſe two diviſions will each detach a regular tetrahedron *b a g e*, or *d s f p* (fig. 70.); ſo that the rhomboid will be found converted into a regular octahedron *e f* (fig. 71.), which will be the real nucleus of the cube; for it is produced by diviſions ſimilarly made in relation to the eight ſolid angles of the cube. If we ſuppoſe the ſame cube to be diviſible throughout its whole extent by analogous ſections, it is clear that each of the ſmall rhomboids, of which it is the aſſemblage, will be found in like manner ſubdivided into an octahedron, and two regular tetrahedrons, applied on the two oppoſite faces of the octahedron. By taking the octahedron for a nucleus, a cube may be conſtructed round it, by regular ſubtractions of ſmall complete rhomboids. If, for example, we ſuppoſe decrements, by a ſingle row of theſe rhomboids, having *b* for the point of their departure, and made in a direction parallel to the inferior edges *g f*, *e g*, *d e*, *d f*, of the four triangles, which unite to form the ſolid angle *b*, there will reſult four faces, which will be found on a level, and like the octahedron, with ſix ſolid angles, ſimilar decrements around the other five angles will produce twenty faces, which taken four and four will be equally on a level, making in the whole ſix diſtinct faces, ſituated as thoſe of the cube (fig. 68.). The reſult will be exactly the ſame as in the caſe of the rhomboid, conſidered as nucleus.

In whatever way we proceed to ſubdivide, either the cube, the rhombus, or the octahedron, we ſhall always have ſolids of two forms, that is to ſay, octahedrons and tetrahedrons, without being able to reduce the reſult of the diviſion to unity. But the molecules of a cryſtal being ſimilar, Hauy thinks it probable, that the ſtructure was, as it were, interſperſed with a multitude of ſmall vacuities, occupied either with the water of cryſtallization or ſome other ſubſtance; ſo that, if it were poſſible to carry the diviſion to its limits, one of thoſe two kinds of ſolids would diſappear, and the whole cryſtal would be found compoſed only of molecules of the other form. This view is the more admiſſible, as each octahedron being enveloped with eight tetrahedrons, and each tetrahedron being in like manner enveloped with four octahedrons, whichever of theſe forms may be ſuppoſed to be ſuppreſſed, the remaining ſolids will join exactly by their edges; ſo that in this reſpect there will be continuity and uniformity throughout the whole extent of the maſs. It may be readily conceived how each octahedron is enveloped with tetrahedrons. By attending to the diviſion of the cube only by the ſix ſections which give the rhomboid, we may depart at pleaſure from any two, *a*, *s*; *o*, *h*; *c*, *n*; *i*, *r*, of the eight ſolid angles, provided that theſe two angles be oppoſite to each other. But by departing from the angles *a*, *s*, the rhomboid will be in the poſition ſhewn at fig. 70. If, on the contrary, we depart from the ſolid angles *o*, *h*, theſe angles will become the ſummits of a new rhomboid (fig. 72.), compoſed of the ſame octahedron as that of fig. 71. with two new tetrahedrons applied on the faces *b d f*, *e g p*, (fig. 72.), which were unoccupied on the rhomboid of fig. 70. Fig. 73. repreſents the caſe in which the two tetrahedrons repoſe on the faces *d b e*, *f g p*, of the octahedron; and fig. 74. repreſents the caſe in which they would reſt on the faces *b f g*, *d e p*. Hence, whatever may be the two ſolid angles of the cube aſſumed for the points of departure, we ſhall always have the ſame octahedron, with two tetrahedrons contiguous by their ſummits to theſe two ſolid angles; and there being eight of theſe ſolid angles, the central octahedron will be circumſcribed with eight tetrahedrons, which will reſt on its faces. By continuing the diviſion always parallel to the firſt ſections, the ſame effect will always take place. Each face of the octahedron, however ſmall it may be ſuppoſed to be, adheres to a face of the tetrahedron, and reciprocally; and each tetrahedron is enveloped with four octahedrons.

The ſtructure which is here explained is that of fluate of lime, or fluor ſpar. By dividing a cube of this ſubſtance, we may at pleaſure extract rhomboids which have the angles formed by their planes equal to 120°, or regular octahedrons, or tetrahedrons equally regular. In ſome other ſubſtances, as rock cryſtal, carbonate of lead, &c. which being mechanically divided beyond the term at which we ſhould have a rhomboid or a parallelopiped, parts of various different forms are obtained, arranged together even in a more complicated manner than in fluor ſpar. In conſequence of theſe mixed ſtructures, there is ſome uncertainty reſpecting the real figure of the integral molecules

cules which belong to these substances. It is observed, however, that the tetrahedron is always one of those solids which concur to the formation of small rhomboids or parallelopipeds that would be extracted from the crystal by a first division. But, on the other hand, there are substances, which being divided in every possible direction, resolve themselves only into tetrahedrons. Garnet, blendes, and tourmaline, belong to this number.

Several minerals are divisible into right triangular prisms. Such is the apatite, whose primitive form is a regular right hexahedral prism, divisible parallel to its bases and its planes, from which necessarily result right prisms with three planes. Fig. 76. represents one of the bases of the hexahedral prism, divided into small equilateral triangles, which are the bases of so many molecules, and which being taken two and two, form quadrilateral prisms, with rhombuses for their bases.

By adopting then the tetrahedron, in the doubtful cases already mentioned, all the forms of integral molecules may be in general reduced to three, which are remarkable for their simplicity, viz. the parallelopiped, the simplest of all the solids, having parallel faces two and two; the triangular prism, the simplest of all prisms; and the tetrahedron, which is the simplest of pyramids. This simplicity may furnish a reason for the preference given to the tetrahedron in fluor spar, and the other substances which have been mentioned as examples. But the ingenious author of the theory cautiously declines to speak decisively on the subject, as the want of direct and precise observations, he observes, leaves to theory only conjectures and probabilities.

But the essential object is, that the different forms to which these mixed structures lead, are arranged in such a manner, that their assemblage is equivalent to a sum of small parallelopipeds, as has been seen to be the case in regard to fluor spar; and that the laminæ of superposition applied on the nucleus, decrease by subtractions of one or more rows of these parallelopipeds. The basis of the theory exists, therefore, independently of the choice which might be made of any of the forms obtained by the mechanical division.

With the help of this result, the decrements to which crystals are subject, whatever be their primitive forms, are found reducible to those which take place in substances, where this form, as well as that of the molecules, are indivisible parallelopipeds; and the theory has this advantage of being able to generalise its object, by connecting with one fact, that multitude of facts which, on account of their diversity, seem to be little susceptible of being brought to one common point. But what has been said, will be still more illustrated by examples of the manner in which we may reduce to the theory of the parallelopiped, that of the forms which are different from that solid.

Crystals whose Molecules are Tetrahedrons, with Isosceles Triangular Faces.

Garnet.

1. *Primitive Garnet* (fig. 76.).

Geometric Character.—Respective inclinations of any two of the faces of the dodecahedron, 120°. Angles of the rhombus CLGH, C or G=109° 28′ 16″; L or H=78° 31′ 44″.

Notwithstanding the vitreous appearance in general exhibited on the fractures of garnets of the primitive form, laminæ may be perceived on them, situated parallel to the rhombuses which compose their surface. Let us suppose the dodecahedron divided in the direction of its laminæ, and for the greater simplicity, let us suppose the sections to pass through the centre. One of these sections, viz. that which will be parallel to the two rhombuses DLFN, BHOR, will concur with a hexagon, which would pass through the points E, C, G, P, I, A, by making the tour of the crystal. A second section parallel to the two rhombuses GLPF, BEAR, will coincide with another hexagon shewn by the points D, C, H, O, I, N. And if the division be continued parallel to the other eight rhombuses, taken two and two, it will be found that the planes of the sections will be confounded with four new hexagons analogous to the preceding. But by resuming all these hexagons, it will appear that their sides correspond, some of them with the small diagonals of the rhombuses of the dodecahedron, viz. those which would be drawn from C to G, from A to I, from C to B, &c. and others would correspond with the different ridges EC, GP, PI, EA, &c.

1. The planes then of the sections passing through the sides and through the small diagonals of the twelve rhombuses, will subdivide the whole surface into 24 isosceles triangles, which will be the halves of these rhombuses. 2. Since the planes of the sections pass also through the centre of the crystal, they will detach 24 pyramids with three faces; the bases of which, if we choose, will be the external triangles that make part of the surface of the dodecahedron, and of which the summits will be united in the centre.

Besides, if we take, for example, the six tetrahedrons, which have for external faces the halves of the three rhombuses CEDL, CLGH, CEBH, these six tetrahedrons will form a rhomboid represented by fig. 77. and in which the three inferior rhombuses DLGS, GHBS, DEBS, result from three divisions which pass, one through the hexagon DLGORA, (fig. 76.); the second through the hexagon GHBANF; and the third through the hexagon BEDFPO. Fig. 77. also represents the two tetrahedrons, the bases of which make part of the rhombus CLGH. One of these is marked with the letters L, C, G, S, and the other with the letters H, C, G, S. And by applying what has been said to the other nine rhombuses, which are united, three and three, around the points F, A, H, (fig. 77.), we shall have three new rhomboids; from which it follows, that the 24 tetrahedrons, considered six and six, form four rhomboids; so that the dodecahedron may be conceived as being itself immediately composed of these four rhomboids, and in the last analysis of 24 tetrahedrons.

It may be observed, that the dodecahedron having eight solid angles, each formed with three planes, they might have been considered as the assemblage of the four rhomboids, which would have for exterior summits the four angles G, B, D, A; from which it follows that any one of the faces, such as CLGO, is common to two rhomboids, one of which would have its

its summit in C, and the other in G, and which would themselves have a common part in the interior of the crystal.

We may remark farther, that a line GS (fig. 77.) drawn from any one G (fig. 76.) of the solid angles composed of three planes, as far as the centre of the dodecahedron, is at the same time the axis of the rhomboid, which would have its summit in C (fig. 76. and 77.). The composing rhomboids then have this property, that their axis is equal to the sides of the rhombus. From which, with a little attention, we may conclude, that in each tetrahedron, such as CLGS (fig. 77.), all the faces are equal and similar isosceles triangles.

If the division of the dodecahedron be continued by sections passing between those which we have supposed to be directed towards the centre, and which should be parallel to them, we should obtain tetrahedrons always smaller, and arranged in such a manner, that taking them in groups of six, they would form rhomboids of a bulk proportioned to their own.

The tetrahedrons, which would be the term of the division, were it possible to reach it, ought to be considered as the real molecules of the garnet. But it will be seen, that in the passage to the secondary forms, the laminæ of superposition, which envelope the nucleus, really decrease by rows of small rhomboids, each of which is the assemblage of these tetrahedrons.

The sulphuret of zinc, or blende, has the same structure as the garnet. Hauy informs us that he has divided fragments of this substance by very clean sections, in such a manner as to obtain successively the dodecahedron, the rhomboid and the tetrahedron.

2. *Trapezoidal Garnet*, (fig. 78.).

Geomet. Character.—Respective inclination of the trapezoids, united three and three around the same solid angle D, C, G, &c. 131° 48′ 33″; of the trapezoids united four and four around the same solid angle *u*, *x*, *r*, &c. 131° 48′ 36″. Angles of any one of the trapezoids *m* D *u* L, L=78° 27′ 46″; D=117° 2′ 8″; *m* or *u*=82° 15′ 3″. The value of the angle L is the same as that of the acute angle of the nucleus of calcareous spar.

This variety is the result of a series of laminæ, decreasing at the four edges, on all the faces of the primitive dodecahedron. For the more simplicity, let us first consider the effect of this decrement in regard to the rhombus CLGH (fig. 76.). We have just seen that this rhombus was supposed to belong in common to two rhomboids, which should have for summits, one the point C, and the other the point G. Let us suppose that the laminæ applied on this rhombus decrease towards their four edges by subtractions of a single row of small rhomboids, in such a manner that in regard to the two edges CL, CH, circumstances are the same as if the rhombus belonged to the rhomboid which has its summit in C; and that in regard to the other two edges GL, GH, the effect is the same as if the rhombus belonged to the rhomboid, which has its summit in G. This disposition is admissible here in consequence of the particular structure of the dodecahedron, which permits us to obtain small rhomboids; some of which have their faces parallel to the faces of that with its summit in C, and the rest to that having its summit in G (D).

The results of the four decrements being thus quite similar to each other, the laminæ of superposition, applied on the rhombus CLGH, and on each of the other rhombuses of the dodecahedron, will form as many right quadrangular pyramids, which will have for bases these same rhombuses. Fig. 79. represents the pyramids which rest on the three rhombuses CLDE, CEBH, CGHB (fig. 76.), and which have for summits the points *m*, *e*, *s*, (fig. 76.); but on account of the decrement by a simple row, the adjacent triangular faces, such as E *m* C, E *s* C of the two pyramids that belong to the rhombuses CLDE, CEBH, are on a level, and form a quadrilateral E *m* C *s*. But we had 12 pyramids, and consequently 48 triangles. These divided by two give 24 quadrilaterals, which will compose the surface of the secondary crystal. But because the rhomboidal bases of the two pyramids extend more, in proceeding from L to E, or from H to E, than in proceeding from D to C, or from B to C, the sides *m* E, E *s* of the quadrilateral will be longer than the sides C *m*, C *s*. And besides *m* E will be equal to E *s*, and C *m* equal to C *s*. Thus the quadrilaterals will be trapezoids which have their sides equal two and two. There is no crystalline form in which the striæ, when they do exist, shew in a more sensible manner the mechanism of the structure than in this variety of garnet. We may here see the series of decreasing rhombuses which form each of the pyramids CLDE *m*, CEBH *s*, &c. (fig. 79.), and sometimes the furrows are so deep that they produce a kind of stair, the steps of which have a more particular polish and brilliancy than those of the facets, which are parallel to the faces CEDL, CHBE, of the nucleus.

If the decrements stop abruptly at a certain term, so that the pyramids are not terminated, the 24 trapezoids will be reduced to elongated hexagons, which will intercept 12 rhombuses parallel to the faces of the nucleus. To this variety Hauy has given the name of *intermediary garnet*.

In the sulphuret of zinc the regular octahedron is the result of a decrement by a row around the eight solid angles, composed of three planes, viz. C, B, O, G, F, D, A, I, (fig. 76.). The same substance also assumes the form of a regular tetrahedron, by the help of a decrement by one row on four only of the eight solid angles before mentioned, such as C, O, F, A. The structure of this tetrahedron is remarkable, as it presents an assemblage of other tetrahedrons with isosceles faces.

Crystals

(D) Theory, the author observes, has conducted him to another result, which is, that the sum of the nucleus and laminæ of superposition, taken together in proportion as the latter are applied one upon the other, is always equal to a sum of rhomboids; though at first view it does not appear that this should be the case, according to the the figure of these laminæ, which represent rising pyramids.

Cryftals whofe Molecules are Triangular Prifms.

Oriental.

Hauy has thus denominated the gem which is known under the different names of *ruby*, *fapphire*, *oriental topaz*, according as the colour is red, blue, or yellow. The different varieties of this gem have not been accurately defcribed, and the nature of the particular angles of each has not been precifely indicated, on account of the rare occurrence of regularly formed cryftals, or, when fuch have been found, on account of their being defaced by being water-worn, or otherwife injured. But from fome cryftals which were fufficiently characterifed, Hauy obtained the following refults.

1. *Primitive Oriental.*

This mineral cryftallizes in the form of a regular hexahedral prifm, which is divifible parallel to its bafes. According to theory, which points out other joinings parallel to the planes, the molecule is an equilateral triangular prifm. The height of this prifm, calculated by theory, is a little lefs than three times the height of the triangle of the bafe.

2. *Elongated Oriental*, (fig. 80.).

Geometric Character.—Refpective inclinations of the triangles IAS, IBS, 139° 54′. Angles of the triangle IAS, A=22° 54′. I or S=78° 47.

This form is the refult of a decrement by a fimple row of fmall quadrangular prifms on all the edges of the bafes of the nucleus. Let *q d* (fig. 75.) be the fuperior bafe, fubdivided into fmall triangles, which reprefent the analogous bafes of fo many molecules. The edges of the laminæ of fuperpofition will correfpond fucceffively to the hexagons *h i l m n r*, *e k u x y v*, &c.; from which it follows that the fubtractions take place by rows of fmall parallelopipeds of quadrangular prifms compofed each of two triangular prifms.

3. *Minor Oriental.*

Geometric Character.—Dodecahedron formed of two right pyramids lefs elongated than thofe of the preceding variety. The triangles correfponding to IAS, IBS, are inclined to each other 122° 36′. In each of thefe triangles the angle of the fummit is 31°, and each of the angles at the bafe is 74° 30′.

The law of which this variety is the refult, differs from that which produces the preceding, as it determines a mixed decrement by three rows in breadth and two rows in height.

4. *Enneagonal Oriental*, (fig. 81.).

Geometric Character.—Inclination of each fmall triangle, fuch as *c q i*, to the adjacent bafe *a c i p l b g e d*, 122° 18′.

This is the elongated oriental, whofe fummits are replaced by two faces, parallel to the bafes of the nucleus, with the addition of fix fmall ifofceles triangles *c q i*, *l b f*, *v z m*, &c. the three fuperior of which are alternate in pofition with the three inferior. Thefe triangles are the refult of a decrement, by three rows of fmall quadrangular prifms on the three angles of the fuperior bafe of the nucleus, fuch as *b*, *d*, *g* (fig. 75.), and on the intermediate angles of the inferior bafe. It may be readily conceived, that in the decrement which takes place, for example, on the angle *g*, the three rows which remain unoccupied between that angle and the correfponding edge of the firft lamina of fuperpofition, are, 1. the fmall rhombus *g o i p*, which alone forms the firft row; 2. the two rhombufes *o s t i*, *p z d i*; 3. the three rhombufes fituated on the fame line behind the two preceding.

Cryftals of this gem are chiefly found in the kingdom of Pegu. Some have been found in France, which have received the name of fapphires of Puy. They have been alfo found at a little diftance from Velay, on the banks of a rivulet near the village of Expailly, where they are mixed with garnets and hyacinths. Thefe have all the characters of the ftone which is denominated *oriental fapphire*.

V. Difference between Structure and Increment.

In what has been faid refpecting the decrements to which the laminæ of fuperpofition are fubjected, the author obferves, that it was his view only to unfold the laws of ftructure; and he adds, that he is far from believing that in the formation of a dodecahedral cryftal, or one of any other form, having a cube for a nucleus, the cryftallization has originally produced that nucleus fuch as it is extracted from the dodecahedron, by the fucceffive application of all the laminæ of fuperpofition with which it is covered. It feems proved, on the contrary, that from the firft moment the cryftal is already a very fmall dodecahedron, containing a cubical nucleus proportioned to its fmall fize, and that the cryftal afterwards increafes by degrees without changing its form, by new layers which envelope it on all fides, fo that the nucleus increafes alfo, preferving always the fame relation with the whole dodecahedron.

An example taken from a plane figure will make this more ftriking; and what is faid refpecting this figure may be eafily applied to a folid, fince a plane figure may be always conceived as a fection of a folid. Let ERFN (fig. 82.) be an arrangement of fmall fquares, in which the fquare ABCD, compofed of 49 partial fquares, reprefents a fection of the nucleus, and the extreme fquares R, S, G, A, I, L, &c. that of the kind of ftair formed by the laminæ of fuperpofition. It may be readily conceived, that the arrangement began with the fquare ABCD; and that different files of fmall fquares were afterwards applied on each of the fides of the central fquare: for example, on the fide AB, firft the five fquares comprehended between I and M, next the three fquares comprehended between L and O, and then the fquare E. This increment correfponds with that which would take place if the dodecahedron began by being a cube proportioned to its bulk, and which increafed afterwards with the addition of continually decreafing laminæ.

But on the other hand, the arrangement may be conceived to be fuch as is reprefented in fig. 84. in which the fquare *a b c d* is compofed of only nine molecules, and bears upon each of its fides only one fquare

Structure of Crystals.

ſquare *e*, *n*, *f*, or *r*; and that afterwards by means of the application of new ſquares arranged round the former, the aſſortment has become that of fig. 83. where the central ſquare *a' b' c' d'* is formed of 25 ſmall ſquares, and bears on each ſide of its ſides a file of three ſquares, plus a terminating ſquare *e'*, *n'*, *f'*, or *r'*; and that, in ſhort, by a farther application, the aſſortment of fig. 83. is converted into that of fig. 82. Theſe different tranſitions will give ſome notion of the manner in which ſecondary cryſtals may increaſe in bulk, and yet retain their form; and from this it will appear, that the ſtructure is combined with that augmentation of bulk, ſo that the law, according to which all the laminæ applied in the nucleus of the cryſtal, when arrived at its greateſt dimenſions, ſucceſſively decreaſe, in departing from this nucleus, exiſted already in the riſing cryſtal.

Such is the ingenious theory of the ſtructure of cryſtals, which the author obſerves, is in this ſimilar to other theories, that it ſets out from a principal fact, on which it makes all facts of the ſame kind to depend, and which are only as it were corollaries. This fact is the decrement of the laminæ ſuperadded to the primitive form; and it is by bringing back this decrement to ſimple and regular laws, ſuſceptible of accurate calculation, that theory arrives at reſults, the truth of which is proved by the mechanical diviſion of cryſtals, and by obſervation of their angles. But new reſearches are ſtill wanting, in order to aſcend a few ſteps farther towards the primitive laws by which cryſtallization is regulated. The object of one of theſe reſearches would be to explain how theſe ſmall polyhedrons, which are as it were the rudiments of cryſtals of a ſenſible bulk, ſometimes repreſent the primitive form, without modification; ſometimes a ſecondary form produced in virtue of a law of decrement; and to determine the circumſtances which produce decrements on the edges, as well as thoſe which give riſe to decrements on the angles.

END OF THE SIXTH VOLUME.

DIRECTIONS FOR PLACING THE PLATES OF VOL. VI.

PART I.	Page
Plate CXLV. to face - - -	94
CXLVI.—CXLVIII. - -	208
CXLIX. - - - -	236
CL. CLI. - - - -	370
PART II.	
CLII.—CLV. - - -	484
CLVI.—CLXIII. - - -	548
CLXIV. - - - -	776
CLXV.—CLXVII. - - - -	808

CRYSTALLIZATION. PLATE CLXV.

Fig. 1. Nitre or Salt Petre.

Fig. 2. Blue Vitriol.

Fig. 3. Verdigrease distilled.

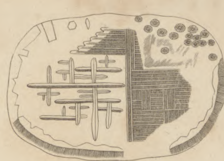


Fig. 4. Alum.

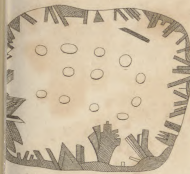


Fig. 5. Borax

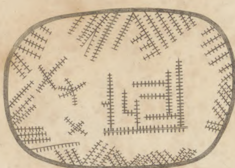


Fig. 6. Sal Ammoniac.

Fig. 7. Salt of Lead

Fig. 8. Glaubers Salt.

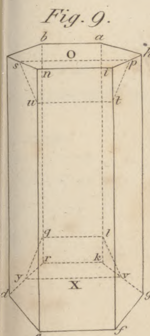


Fig. 9.

Fig. 10.

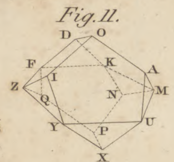


Fig. 11.

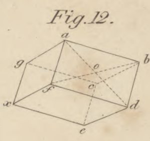


Fig. 12.

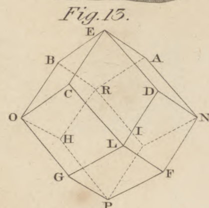


Fig. 13.

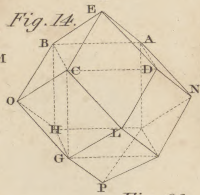


Fig. 14.

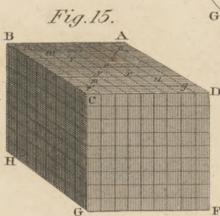


Fig. 15.

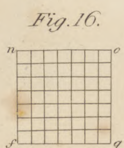


Fig. 16.

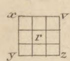


Fig. 18.

Fig. 19.

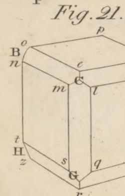


Fig. 21.

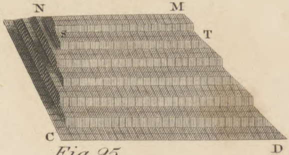


Fig. 22.

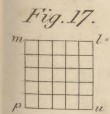


Fig. 17.

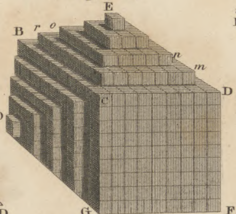


Fig. 20.

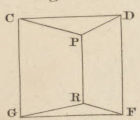


Fig. 24.

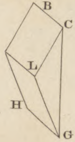


Fig. 25.

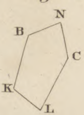


Fig. 26.

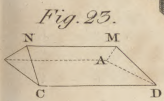


Fig. 23.

E. Mitchell sculp.

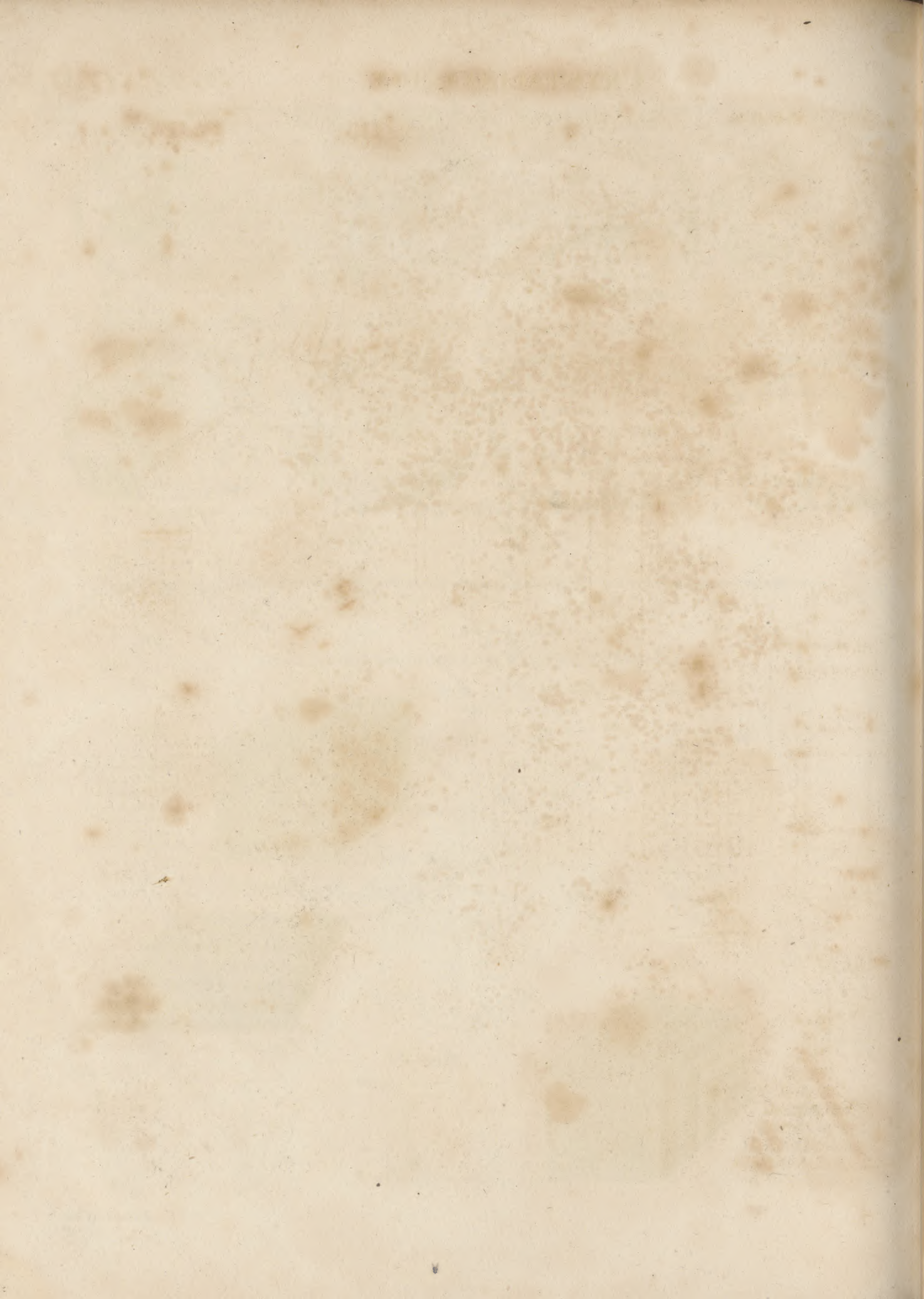


Fig. 27.

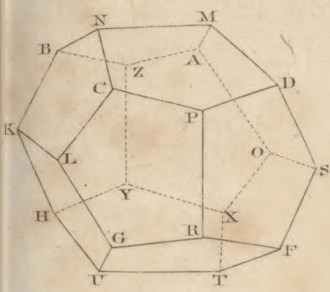


Fig. 28.

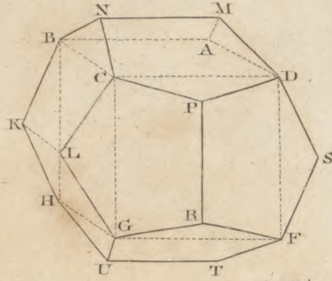


Fig. 29.

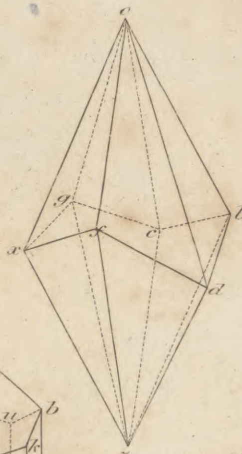


Fig. 30.

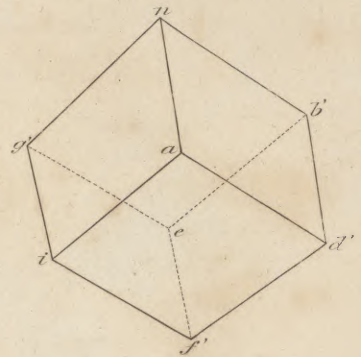


Fig. 32

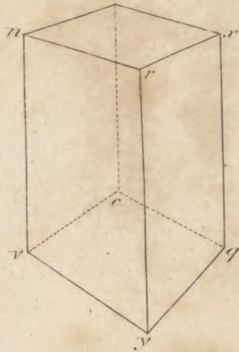


Fig. 33

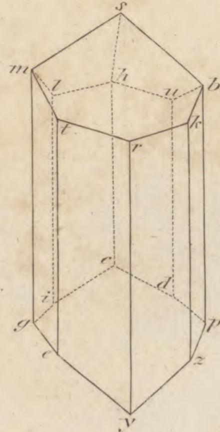


Fig. 34.

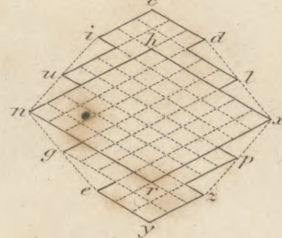


Fig. 35.

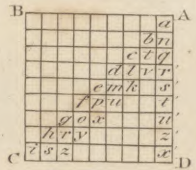


Fig. 31.

Fig. 36.

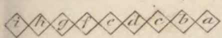


Fig. 37.

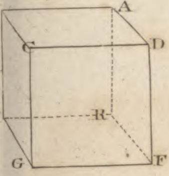


Fig. 38.

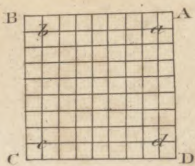


Fig. 39.

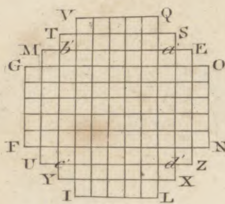


Fig. 40.

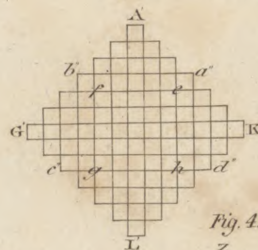


Fig. 41.

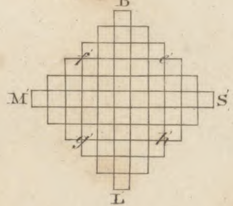


Fig. 42.

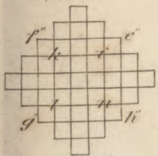


Fig. 43.

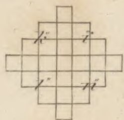


Fig. 44.

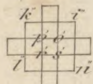


Fig. 45.

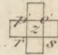


Fig. 46.

Fig. 47.

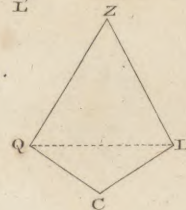


Fig. 48.

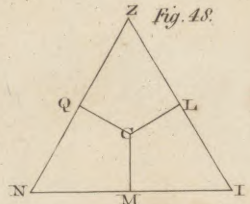


Fig. 49.

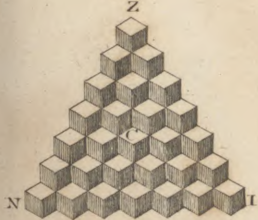


Fig. 50.

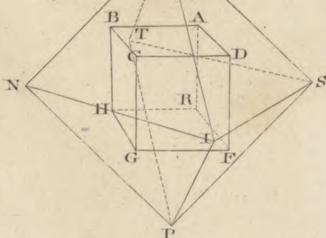


Fig. 51.

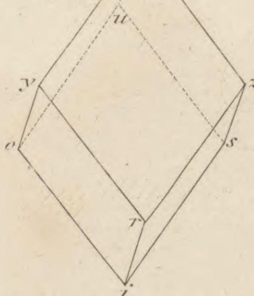
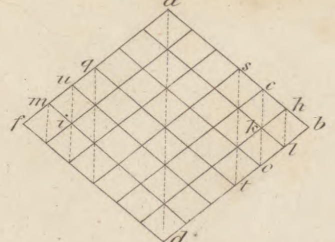


Fig. 52.



W. Archibald Sculp.t

CRYSTALLIZATION. *PLATE CLXVII.*

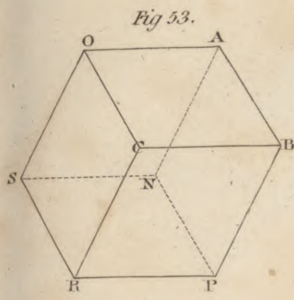


Fig. 53.

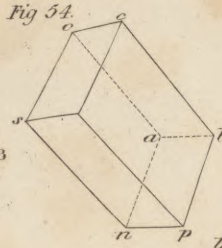


Fig. 54.

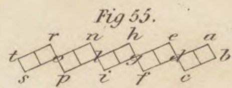


Fig. 55.

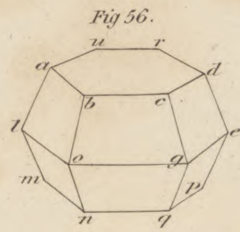


Fig. 56.

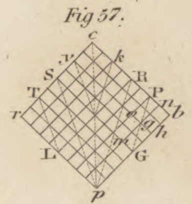


Fig. 57.

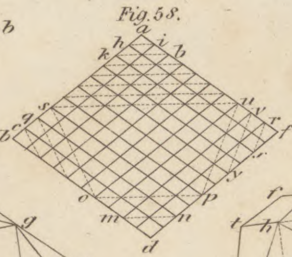


Fig. 58.

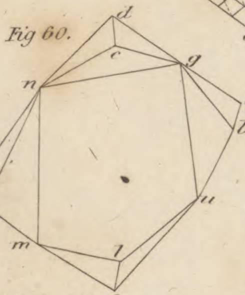


Fig. 60.

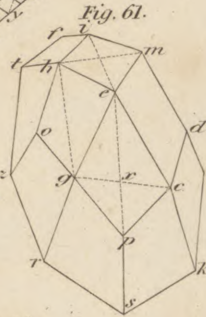


Fig. 61.

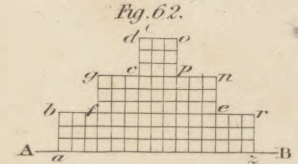


Fig. 62.

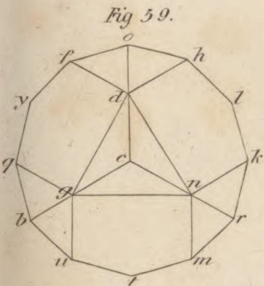


Fig. 59.

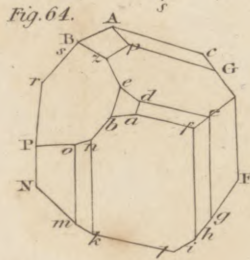


Fig. 64.

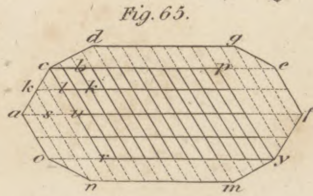


Fig. 65.

Fig. 66.

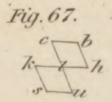


Fig. 67.

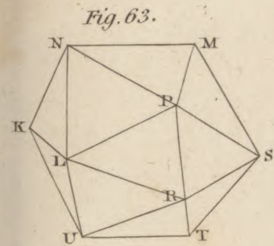


Fig. 63.

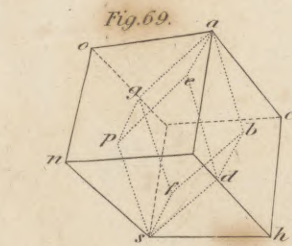


Fig. 69.

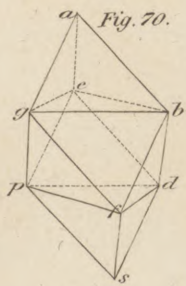


Fig. 70.

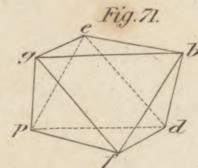


Fig. 71.

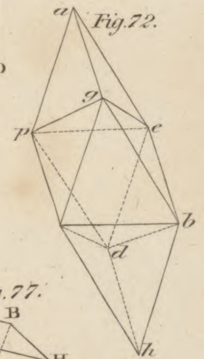


Fig. 72.

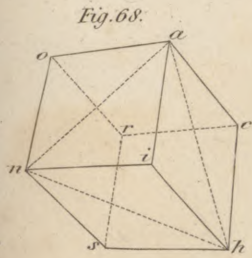


Fig. 68.

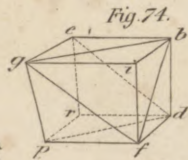


Fig. 74.

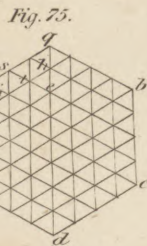


Fig. 75.

Fig. 76.

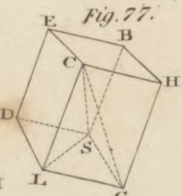


Fig. 77.

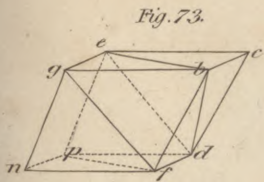


Fig. 73.

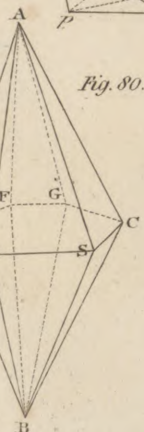


Fig. 80.

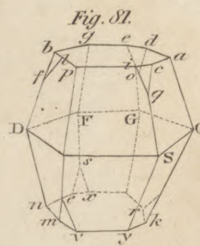


Fig. 81.

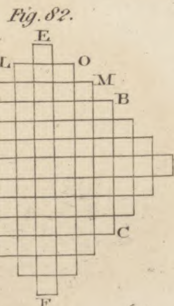


Fig. 82.

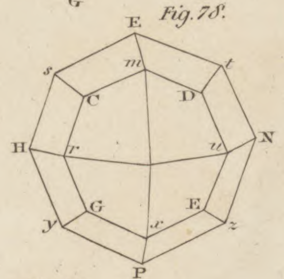


Fig. 78.

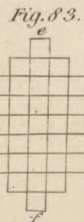


Fig. 83.

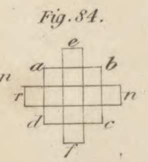


Fig. 84.

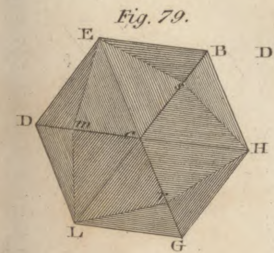


Fig. 79.

W. Archibald Sculpt.