ENCYCLOPÆDIA BRITANNICA.

America.

AMERICA (from *Americus Veſputius*, falſely ſaid to be the firſt diſcoverer of the continent); one of the four quarters of the world, probably the largeſt of the whole, and from its late diſcovery frequently denominated the *New World*.

1 Boundaries.

This vaſt country extends from the 80th degree of north, to the 56th degree of ſouth latitude; and, where its breadth is known, from the 35th to the 136th degree weſt longitude from London; ſtretching between 8000 and 9000 miles in length, and in its greateſt breadth 3690. It ſees both hemiſpheres, has two ſummers and a double winter, and enjoys all the variety of climates which the earth affords. It is waſhed by the two great oceans. To the eaſtward it has the Atlantic, which divides it from Europe and Africa; to the weſt it has the Pacific or Great South ſea, by which it is ſeparated from Aſia. By theſe ſeas it may, and does, carry on a direct commerce with the other three parts of the world.

2 North and South continent.

America is not of equal breadth throughout its whole extent; but is divided into two great continents, called *North* and *South America*, by an iſthmus 1500 miles long, and which at Darien, about Lat. 9° N. is only 60 miles over. This iſthmus forms with the northern and ſouthern continents, a vaſt gulf, in which lie a great number of iſlands, called the *Weſt Indies*, in contradiſtinction to the eaſtern parts of Aſia, which are called the *Eaſt Indies*.

3 Remarkable prevalence of cold.

Between the New World and the Old, there are ſeveral very ſtriking differences; but the moſt remarkable is the general predominance of cold throughout the whole extent of America. Though we cannot, in any country, determine the preciſe degree of heat merely by the diſtance of the equator, becauſe the elevation above the ſea, the nature of the ſoil, &c. affect the climate; yet, in the ancient continent, the heat is much more in proportion to the vicinity to the equator than in any part of America. Here the rigour of the frigid zone extends over half that which ſhould be temperate by its poſition. Even in thoſe latitudes where the winter is ſcarcely felt on the old continent, it reigns with great ſeverity in America, though during a ſhort period. Nor does this cold, prevalent in the new world, confine itſelf to the temperate zones; but extends its influence to the torrid zone alſo, conſiderably mitigating the exceſs of its heat. Along the eaſtern coaſt, the climate, though more ſimilar to that of the torrid zone in other parts of the earth, is nevertheleſs conſiderably milder than in thoſe countries of Aſia and Africa which lie in the ſame latitude. From the ſouthern tropic to the extremity of the American continent, the cold is ſaid to be much greater than in parallel northern latitudes even of America itſelf.

America.

For this ſo remarkable difference between the climate of the new continent and the old, various cauſes have been aſſigned by different authors. The following is the opinion of the learned Dr Robertſon on this ſubject. "Though the utmoſt extent of America towards the north be not yet diſcovered, we know that it advances nearer to the pole than either Europe or Aſia. The latter have large ſeas to the north, which are open during part of the year; and, even when covered with ice, the wind that blows over them is leſs intenſely cold than that which blows over land in the ſame latitudes. But, in America, the land ſtretches from the river St Lawrence towards the pole, and ſpreads out immenſely to the weſt. A chain of enormous mountains, covered with ſnow and ice, runs through all this dreary region. The wind paſſing over ſuch an extent of high and frozen land, becomes ſo impregnated with cold, that it acquires a piercing keenneſs, which it retains in its progreſs through warmer climates; and is not entirely mitigated until it reach the gulf of Mexico. Over all the continent of North America, a north-weſterly wind and exceſſive cold are ſynonymous terms. Even in the moſt ſultry weather, the moment that the wind veers to that quarter, its penetrating influence is felt in a tranſition from heat to cold no leſs violent than ſudden. To this powerful cauſe we may aſcribe the extraordinary dominion of cold, and its violent inroads into the ſouthern provinces in that part of the globe.

4 Dr Robertſon's reaſons for this ſuperior degree of cold. *Hiſtory of America*, vol. i. p. 253.

"Other cauſes, no leſs remarkable, diminiſh the active power of heat in thoſe parts of the American continent which lie between the tropics. In all that portion of the globe, the wind blows in an invariable direction from eaſt to weſt. As this wind holds its courſe acroſs the ancient continent, it arrives at the countries which ſtretch along the weſtern ſhore of Africa, inflamed with all the fiery particles which it hath collected from the ſultry plains of Aſia, and the burning ſands in the African deſerts. The coaſt of Africa is accord-

America. ingly the region of the earth which feels the moſt fervent heat, and is expoſed to the unmitigated ardour of the torrid zone. But this ſame wind, which brings ſuch an acceſſion of warmth to the countries lying between the river of Senegal and Caffraria, traverſes the Atlantic ocean before it reaches the American ſhore. It is cooled in its paſſage over this vaſt body of water; and is felt as a refreſhing gale along the coaſts of Braſil and Guiana, rendering thoſe countries, though amongſt the warmeſt in America, temperate, when compared with thoſe which lie oppoſite to them in Africa. As this wind advances in its courſe acroſs America, it meets with immenſe plains covered with impenetrable foreſts; or occupied by large rivers, marſhes, and ſtagnating waters, where it can recover no conſiderable degree of heat. At length it arrives at the Andes, which run from north to ſouth through the whole continent. In paſſing over their elevated and frozen ſummits, it is ſo thoroughly cooled, that the greater part of the countries beyond them hardly feel the ardour to which they ſeem expoſed by their ſituation. In the other provinces of America, from Terra Firma weſtward to the Mexican empire, the heat of the climate is tempered, in ſome places, by the elevation of the land above the ſea; in others, by their extraordinary humidity; and in all, by the enormous mountains ſcattered over this tract. The iſlands of America in the torrid zone are either ſmall or mountainous, and are fanned alternately by refreſhing ſea and land breezes.

"The cauſes of the extraordinary cold towards the ſouthern limits of America, and in the ſeas beyond it, cannot be aſcertained in a manner equally ſatisfying. It was long ſuppoſed, that a vaſt continent, diſtinguiſhed by the name of *Terra Auſtralis Incognita*, lay between the ſouthern extremity of America and the antarctic pole. The ſame principles which account for the extraordinary degree of cold in the northern regions of America, were employed in order to explain that which is felt at Cape Horn and the adjacent countries. The immenſe extent of the ſouthern continent, and the rivers which it poured into the ocean, were mentioned and admitted by philoſophers as cauſes ſufficient to occaſion the unuſual ſenſation of cold, and the ſtill more uncommon appearances of frozen ſeas in that region of the globe. But the imaginary continent to which ſuch influence was aſcribed having been ſearched for in vain, and the ſpace which it was ſuppoſed to occupy having been found to be an open ſea, new conjectures muſt be formed with reſpect to the cauſes of a temperature of climate, ſo extremely different from that which we experience in countries removed at the ſame diſtance from the oppoſite pole.

Ibid. p. 451. note xxx'. "The moſt obvious and probable cauſe of this ſuperior degree of cold towards the ſouthern extremity of America, ſeems to be the form of the continent there. Its breadth gradually decreaſes as it ſtretches from St Antonio ſouthwards; and from the bay of St Julian to the ſtraits of Magellan its dimenſions are much contracted. On the eaſt and weſt ſides, it is waſhed by the Atlantic and Pacific oceans. From its ſouthern point, it is probable that an open ſea ſtretches to the antarctic pole. In whichever of theſe directions the wind blows, it is cooled before it approaches the Magellanic regions, by paſſing over a vaſt body of water; nor is the land there of ſuch extent, that it can recover any conſiderable degree of heat in its progreſs over it. Theſe circumſtances concur in rendering the temperature of the air in this diſtrict of America more ſimilar to that of an inſular, than to that of a continental climate; and hinder it from acquiring the ſame degree of ſummer heat with places in Europe and Aſia, in a correſponding northern latitude. The north wind is the only one that reaches this part of America, after blowing over a great continent. But, from an attentive ſurvey of its poſition, this will be found to have a tendency rather to diminiſh than augment the degree of heat. The ſouthern extremity of America is properly the termination of the immenſe ridge of the Andes, which ſtretches nearly in a direct line from north to ſouth, through the whole extent of the continent. The moſt ſultry regions in South America, Guiana, Braſil, Paraguay, and Tucuman, lie many degrees to the eaſt of the Magellanic regions. The level country of Peru, which enjoys the tropical heats, is ſituated conſiderably to the weſt of them. The north wind, then, though it blows over land, does not bring to the ſouthern extremity of America an increaſe of heat collected in its paſſage over torrid regions; but, before it arrives there, it muſt have ſwept along the ſummits of the Andes, and become impregnated with the cold of that frozen region."

America.

5 Extreme moiſture of the American climate.

Another particularity in the climate of America, is its exceſſive moiſture in general. In ſome places, indeed, on the weſtern coaſt, rain is not known; but, in all other parts, the moiſtneſs of the climate is as remarkable as the cold. The foreſts wherewith it is everywhere covered, no doubt, partly occaſion the moiſture of its climate; but the moſt prevalent cauſe is the vaſt quantity of water in the Atlantic and Pacific oceans, with which America is environed on all ſides. Hence thoſe places where the continent is narroweſt are deluged with almoſt perpetual rains, accompanied with violent thunder and lightning, by which ſome of them, particularly Porto Bello, are rendered in a manner uninhabitable.

6 Large rivers, and exceſſive luxuriance of vegetation.

This extreme moiſture of the American climate is productive of much larger rivers there than in any other part of the world. The Danube, the Nile, the Indus, or the Ganges, are not comparable to the Miſſiſſippi, the river St Lawrence, or that of the Amazons; nor are ſuch large lakes to be found anywhere as thoſe which North America affords. To the ſame cauſe we are alſo partly to aſcribe the exceſſive luxuriance of all kinds of vegetables in almoſt all parts of this country. In the ſouthern provinces, where the moiſture of the climate is aided by the warmth of the ſun, the woods are almoſt impervious, and the ſurface of the ground is hid from the eye, under a thick covering of ſhrubs, herbs, and ſeeds. In the northern provinces, the foreſts are not encumbered with the ſame luxuriance of vegetation; nevertheleſs, they afford trees much larger of their kind than what are to be found anywhere elſe.

7 Malignity of climate unjuſtly aſcribed to America.

From the coldneſs and the moiſture of America, an extreme malignity of climate has been inferred, and aſſerted by M. de Paw, in his *Recherches Philoſophiques*. Hence, according to his hypotheſis, the ſmallneſs and irregularity of the nobler animals, and the ſize and enormous multiplication of reptiles and inſects.

But the ſuppoſed ſmallneſs and leſs ferocity of the American

America. *History of Mexico*, vol. ii. p. 255.

American animals, the Abbé Clavigero obſerves, inſtead of the malignity, demonſtrate the mildneſs and bounty of the clime, if we give credit to Buffon, at whoſe fountain M. de Paw has drank, and of whoſe teſtimony he has availed himſelf againſt Don Pernetty: Buffon, who in many places of his Natural Hiſtory produces the ſmallneſs of the American animals as a certain argument of the malignity of the climate of America, in treating afterwards of ſavage animals, in tom. ii. ſpeaks thus: "As all things, even the moſt free creatures, are ſubject to natural laws, and animals as well as men are ſubjected to the influence of climate and ſoil, it appears that the ſame cauſes which have civilized and poliſhed the human ſpecies in our climates, may have likewiſe produced ſimilar effects upon other ſpecies. The wolf, which is perhaps the fierceſt of all the quadrupeds of the temperate zone, is however incomparably leſs terrible than the tyger, the lion, and the panther, of the torrid zone; and the white bear and hyena of the frigid zone. In America, where the air and the earth are more mild than thoſe of Africa, the tyger, the lion, and the panther, are not terrible but in the name. They have degenerated, if fierceneſs, joined to cruelty, made their nature; or, to ſpeak more properly, they have only ſuffered the influence of the climate: under a milder ſky, their nature alſo has become more mild. From climes which are immoderate in their temperature, are obtained drugs, perfumes, poiſons, and all thoſe plants whoſe qualities are ſtrong. The temperate earth, on the contrary, produces only things which are temperate; the mildeſt herbs, the moſt wholeſome pulſe, the ſweeteſt fruits, the moſt quiet animals, and the moſt humane men, are the natives of this happy clime. As the earth makes the plants, the earth and plants make animals; the earth, the plants, and the animals, make man. The phyſical qualities of man, and the animals which feed on other animals, depend, though more remotely, on the ſame cauſes which influence their diſpoſitions and cuſtoms. This is the greateſt proof and demonſtration, that in temperate climes every thing becomes temperate, and that in intemperate climes every thing is exceſſive; and that ſize and form, which appear fixed and determinate qualities, depend, notwithſtanding, like the relative qualities, on the influence of climate. The ſize of our quadrupeds cannot be compared with that of an elephant, the rhinoceros, or ſea horſe. The largeſt of our birds are but ſmall, if compared with the oſtrich, the condore, and *caſoare*." So far M. Buffon, whoſe text we have copied, becauſe it is contrary to what M. de Paw writes againſt the climate of America, and to Buffon himſelf in many other places.

If the large and fierce animals are natives of intemperate climes, and ſmall and tranquil animals of temperate climes, as M. Buffon has here eſtabliſhed; if mildneſs of climate influences the diſpoſition and cuſtoms of animals, M. de Paw does not well deduce the malignity of the climate of America from the ſmaller ſize and leſs fierceneſs of its animals; he ought rather to have deduced the gentleneſs and ſweetneſs of its climate from this antecedent. If, on the contrary, the ſmaller ſize and leſs fierceneſs of the American animals, with reſpect to thoſe of the old continent, are a proof of their degeneracy, ariſing from the malignity of the clime, as M. de Paw would have it, we ought in like manner to argue the malignity of the climate of Europe from the ſmaller ſize and leſs fierceneſs of its animals, compared with thoſe of Africa. If a philoſopher of the country of Guinea ſhould undertake a work in imitation of M. de Paw, with this title, *Recherches Philoſophiques ſur les Européens*, he might avail himſelf of the ſame argument which M. de Paw uſes, to demonſtrate the malignity of the climate of Europe, and the advantages of that of Africa. The climate of Europe, he would ſay, is very unfavourable to the production of quadrupeds, which are found incomparably ſmaller, and more cowardly than ours. What are the horſe and the ox, the largeſt of its animals, compared with our elephants, our rhinoceroſes, our ſea horſes, and our camels? What are its lizards, either in ſize or intrepidity, compared with our crocodiles? its wolves, its bears, the moſt dreadful of its wild beaſts, when beſide our lions and tygers? Its eagles, its vultures, and cranes, if compared with our oſtriches, appear only like hens.

America. America not more infeſted than other countries with inſects and noxious animals.

As to the enormous ſize and prodigious multiplication of the inſects and other little noxious animals, "The ſurface of the earth (ſays M. de Paw), infected by putrefaction, was overrun with lizards, ſerpents, reptiles, and inſects monſtrous for ſize, and the activity of their poiſon, which they drew from the copious juices of this uncultivated ſoil, that was corrupted and abandoned to itſelf, where the nutritive juice became ſharp, like the milk in the breaſt of animals which do not exerciſe the virtue of propagation. Caterpillars, crabs, butterflies, beetles, ſpiders, frogs, and toads, were for the moſt part of an enormous corpulence in the ſpecies, and multiplied beyond what can be imagined. Panama is infeſted with ſerpents, Carthagena with clouds of enormous bats, Porto Bello with toads, Surinan with *kakerlacas*, or *cucarachas*, Guadaloupe, and the other colonies of the iſlands, with beetles, Quito with niguas or chegoes, and Lima with lice and bugs. The ancient kings of Mexico, and the emperors of Peru, found no other means of ridding their ſubjects of thoſe inſects which fed upon them, than the impoſition of an annual tribute of a certain quantity of lice. Ferdinand Cortes found bags full of them in the palace of Montezuma." But this argument, exaggerated as it is, proves nothing againſt the climate of America in general, much leſs againſt that of Mexico. There being ſome lands in America, in which, on account of their heat, humidity, or want of inhabitants, large inſects are found, and exceſſively multiplied, will prove at moſt, that in ſome places the ſurface of the earth is infected, as he ſays, with putrefaction; but not that the ſoil of Mexico, or that of all America, is ſtinking, uncultivated, vitiated, and abandoned to itſelf. If ſuch a deduction were juſt, M. de Paw might alſo ſay, that the ſoil of the old continent is barren, and ſtinks; as in many countries of it there are prodigious multitudes of monſtrous inſects, noxious reptiles, and vile animals, as in the Philippine iſles, in many of thoſe of the Indian archipelago, in ſeveral countries of the ſouth of Aſia, in many of Africa, and even in ſome of Europe. The Philippine iſles are infeſted with enormous ants and monſtrous butterflies, Japan with ſcorpions, the ſouth of Aſia and Africa with ſerpents, Egypt with aſps, Guinea and Ethiopia with armies of ants, Holland with field rats, Ukrania with toads,

America. as M. de Paw himſelf affirms; in Italy, the Campagna di Roma (although peopled for ſo many ages) with vipers, Calabria with tarantulas, the ſhores of the Adriatic ſea with clouds of gnats; and even in France, the population of which is ſo great and ſo ancient, whoſe lands are ſo well cultivated, and whoſe climate is ſo celebrated by the French, there appeared, a few years ago, according to M. Buffon, a new ſpecies of field mice, larger than the common kind, called by him *ſurmulots*, which have multiplied exceedingly, to the great damage of the fields. M. Bazin, in his Compendium of the Hiſtory of Inſects, numbers 77 ſpecies of bugs which are all found in Paris and its neighbourhood. That large capital, as M. Bomare ſays, ſwarms with thoſe diſguſtful inſects. It is true, that there are places in America, where the multitude of inſects and filthy vermine make life irkſome; but we do not know that they have arrived to ſuch exceſs of multiplication as to depopulate any place, at leaſt there cannot be ſo many examples produced of this cauſe of depopulation in the new as in the old continent, which are atteſted by Theophraſtus, Varro, Pliny, and other authors. The frogs depopulated one place in Gaul, and the locuſts another in Africa. One of the Cyclades was depopulated by mice; Amiclas, near to Taracina, by ſerpents; another place, near to Ethiopia, by ſcorpions and poiſonous ants; and another by ſcolopendras: and not ſo diſtant from our own times, the Mauritius was going to have been abandoned on account of the extraordinary multiplication of rats, as we can remember to have read in a French author.

With reſpect to the ſize of the inſects, reptiles, and ſuch animals, M. de Paw makes uſe of the teſtimony of M. Dumont, who, in his Memoirs on Louiſiana, ſays, that the frogs are ſo large there that they weigh 37 French pounds, and their horrid croaking imitates the bellowing of cows. But M. de Paw himſelf ſays (in his anſwer to Don Pernetty, cap. 17.), that all thoſe who have written about Louiſiana, from Henepin, Le Clerc, and Cav. Tonti, to Dumont, have contradicted each other, ſometimes on one and ſometimes on another ſubject. In fact, neither in the old or the new continent are there frogs of 37 pounds in weight; but there are in Aſia and Africa ſerpents, butterflies, ants, and other animals, of ſuch monſtrous ſize, that they exceed all thoſe which have been diſcovered in the new world. We know very well, that ſome American hiſtorians ſay, that a certain gigantic ſpecies of ſerpents is to be found in the woods, which attract men with their breath, and ſwallow them up; but we know alſo, that ſeveral hiſtorians, both ancient and modern, report the ſame thing of the ſerpents of Aſia, and even ſomething more. Megaſthenes, cited by Pliny, ſaid, that there were ſerpents found in Aſia, ſo large, that they ſwallowed entire ſtags and bulls. Metrodorus cited by the ſame author, affirms, that in Aſia there were ſerpents which, by their breath, attracted birds, however high they were, or quick their flight. Among the moderns, Gemelli, in vol. v. of his Tour of the World, when he treats of the animals of the Philippine iſles, ſpeaks thus: There are ſerpents in theſe iſlands of immoderate ſize; there is one called *ibitin*, very long, which ſuſpending itſelf by the tail from the trunk of a tree, waits till ſtags, bears, and alſo men paſs by, in order to attract them with its breath, and devour them at once entirely:" from whence it is evident, that this very ancient fable has been common to both continents. America.

Further, it may be aſked, In what country of America could M. de Paw find ants to equal thoſe of the Philippine iſlands, called *ſulum*, reſpecting which Hernandez affirms, that they were ſix fingers breadth in length and one in breadth? Who has ever ſeen in America butterflies ſo large as thoſe of Bourbon, Ternate, the Philippine iſles, and all the Indian Archipelago? The largeſt bat of America (native to hot ſhady countries), which is that called by Buffon *vampiro*, is, according to him, of the ſize of a pigeon. *La rougette*, one of the ſpecies of Aſia, is as large as a raven; and the *rouſette*, another ſpecies of Aſia, is as big as a large hen. Its wings, when extended, meaſure from tip to tip three Pariſian feet, and according to Gemelli, who meaſured it in the Philippine iſles, ſix palms. M. Buffon acknowledges the exceſs in ſize of the Aſiatic bat over the American ſpecies, but denies it as to number. Gemelli ſays, that thoſe of the iſland of Luzon were ſo numerous that they darkened the air, and that the noiſe which they made with their teeth, in eating the fruits of the woods, was heard at the diſtance of two miles. M. de Paw ſays, in talking of ſerpents, "It cannot be affirmed that the new world has ſhown any ſerpents larger than thoſe which Mr Adanſon ſaw in the deſerts of Africa." The greateſt ſerpent found in Mexico, after a diligent ſearch made by Hernandez, was 18 feet long: but this is not to be compared with that of the Moluccas, which Bomare ſays is 33 feet in length; nor with the *anacondaja* of Ceylon, which the ſame author ſays is more than 33 feet long; nor with others of Aſia and Africa mentioned by the ſame author. Laſtly, The argument drawn from the multitude and ſize of the American inſects is fully as weighty as the argument drawn from the ſmallneſs and ſcarcity of quadrupeds, and both detect the ſame ignorance, or rather the ſame voluntary and ſtudied forgetfulneſs, of the things of the old continent.

With reſpect to what M. de Paw has ſaid of the tribute of lice in Mexico, in that as well as in many other things he diſcovers his ridiculous credulity. It is true that Cortes found bags of lice in the magazines of the palace of King Axajacatil. It is alſo true, that Montezuma impoſed ſuch a tribute, not on all his ſubjects, however, but only on thoſe who were beggars; not on account of the extraordinary multitude of thoſe inſects, as M. de Paw affirms, but becauſe Montezuma, who could not ſuffer idleneſs in his ſubjects, reſolved that that miſerable ſet of people, who could not labour, ſhould at leaſt be occupied in louſing themſelves. This was the true reaſon of ſuch an extravagant tribute, as Torquemada, Betancourt, and other hiſtorians relate; and nobody ever before thought of that which M. de Paw affirms, merely becauſe it ſuited his prepoſterous ſyſtem. Thoſe diſguſting inſects poſſibly abound as much in the hair and clothes of American beggars as of any poor and uncleanly low people in the world: but there is not a doubt, that if any ſovereign of Europe was to exact ſuch a tribute from the poor in his dominions, not only bags, but great veſſels, might be filled with them.

At the time America was diſcovered, it was found

inhabited

America. inhabited by a race of men no leſs different from thoſe in the other parts of the world, than the climate and natural productions of this continent are different from thoſe of Europe, Aſia, or Africa. One great peculiarity in the native Americans is their colour, and the identity of it throughout the whole extent of the continent. In Europe and Aſia, the people who inhabit the northern countries are of a fairer complexion than thoſe who dwell more to the ſouthward. In the torrid zone, both in Africa and Aſia, the natives are entirely black, or the next thing to it. This, however, muſt be underſtood with ſome limitation. The people of Lapland, who inhabit the moſt northerly part of Europe, are by no means ſo fair as the inhabitants of Britain; nor are the Tartars ſo fair as the inhabitants of Europe who lie under the ſame parallels of latitude. Nevertheleſs, a Laplander is fair when compared with an Abyſſinian, and a Tartar, if compared with a native of the Molucca iſlands. In America, this diſtinction of colour was not to be found. In the torrid zone there were no negroes, and in the temperate and frigid zones there were no white people. All of them were of a kind of red copper colour, which Mr Forſter obſerved, in the Peſſerays of Terra del Fuego, to have ſomething of a gloſs reſembling that metal. It doth not appear, however, that this matter hath ever been inquired into with ſufficient accuracy. The inhabitants of the inland parts of South America, where the continent is wideſt, and conſequently the influence of the ſun the moſt powerful, have never been compared with thoſe of Canada, or more northerly parts, at leaſt by any perſon of credit. Yet this ought to have been done, and that in many inſtances too, before it could be aſſerted ſo poſitively as moſt authors do, that there is not the leaſt difference of complexion among the natives of America. Indeed, ſo many ſyſtems have been formed concerning them, that it is very difficult to obtain a true knowledge of the moſt ſimple facts. If we may believe the Abbé Raynal, the Californians are ſwarthier than the Mexicans; and ſo poſitive is he in his opinion, that he gives a reaſon for it. "This difference of colour," ſays he, "proves, that the civilized life of ſociety ſubverts, or totally changes, the order and laws of nature, ſince we find, under the temperate zone, a ſavage people that are blacker than the civilized nations of the torrid zone." —On the other hand, Dr Robertſon claſſes all the inhabitants of Spaniſh America together with regard to colour, whether they are civilized or uncivilized; and when he ſpeaks of California, takes no notice of any peculiarity in their colour more than others. The general appearance of the indigenous Americans in various diſtricts is thus deſcribed by the Chevalier Pinto: "They are all of a copper colour, with ſome diverſity of ſhade, not in proportion to their diſtance from the equator, but according to the degree of elevation of the territory in which they reſide. Thoſe who live in a high country are fairer than thoſe in the marſhy low lands on the coaſt. Their face is round; farther removed, perhaps, than that of any people from an oval ſhape. Their forehead is ſmall; the extremity of their ears far from the face; their lips thick; their noſe flat; their eyes black, or of a cheſnut colour, ſmall, but capable of diſcerning objects at a great diſtance. Their hair is always thick and ſleek, and without any tendency to curl. At the firſt aſpect, a South American

9 General deſcription of the natives.

appears to be mild and innocent: but, on a more attentive view, one diſcovers in his countenance ſomething wild, diſtruſtful, and ſullen." America.

10 Don Ulloa's account.

The following account of the native Americans is given by Don Antonio Ulloa, in a work entitled *Memoires philoſophiques, hiſtoriques, et phyſiques, concernant la decouverte de l'Amerique*, lately publiſhed.

The American Indians are naturally of a colour bordering upon red. Their frequent expoſure to the ſun and wind changes it to their ordinary duſky hue. The temperature of the air appears to have little or no influence in this reſpect. There is no perceptible difference in complexion between the inhabitants of the high and thoſe of the low parts of Peru; yet the climates are of extreme difference. Nay, the Indians who live as far as 40 degrees and upwards ſouth or north of the equator, are not to be diſtinguiſhed, in point of colour, from thoſe immediately under it.

There is alſo a general conformation of features and perſon, which more or leſs characterizes them all. Their chief diſtinctions, in theſe reſpects, are a ſmall forehead, partly covered with hair to the eyebrows, little eyes; the noſe thin, pointed, and bent towards the upper lip; a broad face; large ears; black, thick, and lank hair; the legs well formed, the feet ſmall, the body thick and muſcular; little or no beard on the face, and that little never extending beyond a ſmall part of the chin and upper lip. It may eaſily be ſuppoſed that this general deſcription cannot apply, in all its parts, to every individual; but all of them partake ſo much of it, that they may be eaſily diſtinguiſhed even from the mulattoes, who come neareſt to them in point of colour.

The reſemblance among all the American tribes is not leſs remarkable in reſpect to their genius, character, manners, and particular cuſtoms. The moſt diſtant tribes are, in theſe reſpects, as ſimilar as though they formed but one nation.

All the Indian nations have a peculiar pleaſure in painting their bodies of a red colour, with a certain ſpecies of earth. The mine of Guancavelica was formerly of no other uſe than to ſupply them with this material for dyeing their bodies; and the cinnabar extracted from it was applied entirely to this purpoſe. The tribes in Louiſiana and Canada have the ſame paſſion; hence minium is the commodity moſt in demand there.

It may ſeem ſingular that theſe nations, whoſe natural colour is red, ſhould affect the ſame colour as an artificial ornament. But it may be obſerved, that they do nothing in this reſpect but what correſponds to the practice of Europeans, who alſo ſtudy to heighten and diſplay to advantage the natural red and white of their complexions. The Indians of Peru have now indeed abandoned the cuſtom of painting their bodies: but it was common among them before they were conquered by the Spaniards; and it ſtill remains the cuſtom of all thoſe tribes who have preſerved their liberty. The northern nations of America, beſides the red colour which is predominant, employ alſo black, white, blue, and green, in painting their bodies.

11 Peculiarities in regard to ornament and dreſs.

The adjuſtment of theſe colours is a matter of as great conſideration with the Indians of Louiſiana and the vaſt regions extending to the north, as the ornaments of dreſs among the moſt poliſhed nations. The buſineſs

America. buſineſs itſelf they call *mactacher*, and they do not fail to apply all their talents and aſſiduity to accompliſh it in the moſt finiſhed manner. No lady of the greateſt faſhion ever conſulted her mirror with more anxiety, than the Indians do while painting their bodies. The colours are applied with the utmoſt accuracy and addreſs. Upon the eyelids, preciſely at the root of the eyelaſhes, they draw two lines as fine as the ſmalleſt thread; the ſame upon the lips, the openings of the noſtrils, the eyebrows, and the ears; of which laſt they even follow all the inflexions and ſinuoſities. As to the reſt of the face, they diſtribute various figures, in all which the red predominates, and the other colours are aſſorted ſo as to throw it out to the beſt advantage. The neck alſo receives its proper ornaments; a thick coat of vermilion commonly diſtinguiſhes the cheeks. Five or ſix hours are requiſite for accompliſhing all this with the nicety which they affect. As their firſt attempts do not always ſucceed to their wiſh, they efface them, and begin anew upon a better plan. No coquette is more faſtidious in her choice of ornament, none more vain when the important adjuſtment is finiſhed. Their delight and ſelf-ſatisfaction are then ſo great, that the mirror is hardly ever laid down. An Indian *mactached* to his mind is the vaineſt of all the human ſpecies. The other parts of the body are left in their natural ſtate, and, excepting what is called a *cachecul*, they go entirely naked.

Such of them as have made themſelves eminent for bravery, or other qualifications, are diſtinguiſhed by figures painted on their bodies. They introduce the colours by making punctures on their ſkin, and the extent of ſurface which this ornament covers is proportioned to the exploits they have performed. Some paint only their arms, others both their arms and legs, others again their thighs; while thoſe who have attained the ſummit of warlike renown, have their bodies painted from the waiſt upwards. This is the heraldry of the Indians; the devices of which are probably more exactly adjuſted to the merits of the perſons who bear them than thoſe of more civilized countries.

Beſides theſe ornaments, the warriors alſo carry plumes of feathers on their heads, their arms, and ancles. Theſe likewiſe are tokens of valour, and none but ſuch as have been thus diſtinguiſhed may wear them.

The propenſity to indolence is equal among all the tribes of Indians, civilized or ſavage. The only employment of thoſe who have preſerved their independence is hunting and fiſhing. In ſome diſtricts the women exerciſe a little agriculture in raiſing Indian corn and pompions, of which they form a ſpecies of aliment by bruiſing them together: they alſo prepare the ordinary beveridge in uſe among them, taking care, at the ſame time, of the children, of whom the fathers take no charge.

The female Indians of all the conquered regions of South America practiſe what is called the *urcu* (a word which among them ſignifies *elevation*.) It conſiſts in throwing forward the hair from the crown of the head upon the brow, and cutting it round from the ears to above the eye; ſo that the forehead and eyebrows are entirely covered. The ſame cuſtom takes place in the northern countries. The female inhabitants of both regions tie the reſt of their hair behind, ſo exactly in the ſame faſhion, that it might be ſuppoſed the effect of mutual imitation. This, however, being impoſſible, from the vaſt diſtance that ſeparates them, is thought to countenance the ſuppoſition of the whole of America being originally planted with one race of people. America.

This cuſtom does not take place among the males. Thoſe of the higher parts of Peru wear long and flowing hair, which they reckon a great ornament. In the lower parts of the ſame country they cut it ſhort, on account of the heat of the climate; a circumſtance in which they imitate the Spaniards. The inhabitants of Louiſiana pluck out their hair by the roots from the crown of the head forwards, in order to obtain a large forehead, otherwiſe denied them by nature. The reſt of their hair they cut as ſhort as poſſible, to prevent their enemies from ſeizing them by it in battle, and alſo to prevent them from eaſily getting their ſcalp, ſhould they fall into their hands as priſoners.

The whole race of American Indians is diſtinguiſhed by thickneſs of ſkin and hardneſs of fibres; circumſtances which probably contribute to that inſenſibility to bodily pain for which they are remarkable. An inſtance of this inſenſibility occurred in an Indian who was under the neceſſity of ſubmitting to be cut for the ſtone. This operation, in ordinary caſes, ſeldom laſts above four or five minutes. Unfavourable circumſtances in his caſe prolonged it to the uncommon period of 27 minutes. Yet all this time the patient gave no tokens of the extreme pain commonly attending this operation: he complained only as a perſon does who feels ſome ſlight uneaſineſs. At laſt the ſtone was extracted. Two days after, he expreſſed a deſire for food, and on the eighth day from the operation he quitted his bed, free from pain, although the wound was not yet thoroughly cloſed. The ſame want of ſenſibility is obſerved in caſes of fractures, wounds, and other accidents of a ſimilar nature. In all theſe caſes their cure is eaſily effected, and they ſeem to ſuffer leſs preſent pain than any other race of men. The ſkulls that have been taken up in their ancient burying-grounds are of a greater thickneſs than that bone is commonly found, being from ſix to ſeven lines from the outer to the inner ſuperficies. The ſame is remarked as to the thickneſs of their ſkins. 12 Remarkable inſenſibility to pain,

It is natural to infer from hence, that their comparative inſenſibility to pain is owing to a coarſer and ſtronger organization than that of other nations. The eaſe with which they endure the ſeverities of climate is another proof of this. The inhabitants of the higher parts of Peru live amidſt perpetual froſt and ſnow. Although their clothing is very ſlight, they ſupport this inclement temperature without the leaſt inconvenience. Habit, it is to be confeſſed, may contribute a good deal to this, but much alſo is to be aſcribed to the compact texture of their ſkin, which defends them from the impreſſion of cold through their pores. 13 and to the inclemencies of weather.

The northern Indians reſemble them in this reſpect. The utmoſt rigours of the winter ſeaſon do not prevent them from following the chaſe almoſt naked. It is true, they wear a kind of woollen cloak, or ſometimes the ſkin of a wild beaſt, upon their ſhoulders; but beſides that it covers only a ſmall part of their body, it would appear that they uſe it rather for ornament than warmth. In fact, they wear it indiſcriminately, in the ſeverities of winter and in the moſt ſultry heats of ſummer,

America. summer, when neither Europeans nor Negroes can suffer any but the slightest clothing. They even frequently throw aside this cloak when they go a hunting, that it may not embarrass them in traversing their forests, where they say the thorns and undergrowth would take hold of it; while, on the contrary, they slide smoothly over the surface of their naked bodies. At all times they go with their heads uncovered, without suffering the least inconvenience, either from the cold, or from those *coups de soleil*, which in Louisiana are so often fatal to the inhabitants of other climates.

The Indians of South America distinguish themselves by modern dresses, in which they affect various tastes. Those of the high country, and of the valleys in Peru, dress partly in the Spanish fashion. Instead of hats they wear bonnets of coarse double cloth, the weight of which neither seems to incommode them when they go to warmer climates, nor does the accidental want of them seem to be felt in situations where the most piercing cold reigns. Their legs and feet are always bare, if we except a sort of sandals made of the skins of oxen. The inhabitants of South America, compared with those of North America, are described as generally more feeble in their frame, less vigorous in the efforts of their mind, of gentler dispositions, more addicted to pleasure, and sunk in indolence.—This, however, is not universally the case. Many of their nations are as intrepid and enterprising as any others on the whole continent. Among the tribes on the banks of the Oroonoko, if a warrior aspires to the post of captain, his probation begins with a long fast, more rigid than any ever observed by the most abstemious hermit. At the close of this the chiefs assemble; and each gives him three lashes with a large whip, applied so vigorously, that his body is almost flayed. If he betrays the least symptom of impatience, or even of sensibility, he is disgraced for ever, and rejected as unworthy of the honour. After some interval, his constancy is proved by a more excruciating trial. He is laid in his hammock with his hands bound fast; and an innumerable multitude of venomous ants, whose bite occasions a violent pain and inflammation, are thrown upon him. The judges of his merit stand around the hammock; and whilst these cruel insects fasten upon the most sensible parts of his body, a sigh, a groan, or an involuntary motion expressive of what he suffers, would exclude him from the dignity of which he is ambitious. Even after this evidence, his fortitude is not deemed to be sufficiently ascertained, till he has stood another test more severe, if possible, than the former. He is again suspended in his hammock, and covered with the leaves of the palmetto. A fire of stinking herbs is kindled underneath, so as he may feel its heat, and be involved in smoke. Though scorched and almost suffocated, he must continue to endure this with the same patient insensibility. Many perish in this essay of their firmness and courage; but such as go through it with applause, receive the ensigns of their new dignity with much solemnity, and are ever after regarded as leaders of approved resolution, whose behaviour, in the most trying situations, will do honour to their country. In North America, the previous trial of a warrior is neither so formal nor so severe: Though, even there, before a youth is permitted to bear arms, his patience and fortitude are proved by

14 Terrible trials undergone by their chiefs.

blows, by fire, and by insults, more intolerable to a haughty spirit than either. America.

15 Customs and dispositions of the North Americans more particularly.

Of the manners and customs of the North Americans more particularly, the following is the most consistent account that can be collected from the best informed and most impartial writers.

When the Europeans first arrived in America, they found the Indians quite naked, except those parts which even the most uncultivated people usually conceal. Since that time, however, they generally use a coarse blanket, which they buy of the neighbouring planters.

Their huts or cabins are made of stakes of wood driven into the ground, and covered with branches of trees or reeds. They lie on the floor either on mats or the skins of wild beasts. Their dishes are of timber; but their spoons are made of the skulls of wild oxen, and their knives of flint. A kettle and a large plate constitute almost the whole utensils of the family. Their diet consists chiefly in what they procure by hunting; and sagamite, or pottage, is likewise one of their most common kinds of food. The most honourable furniture amongst them are the scalps of their enemies; with those they ornament their huts, which are esteemed in proportion to the number of this sort of spoils.

The character of the Indians is altogether founded upon their circumstances and way of life. A people who are constantly employed in procuring the means of a precarious subsistence, who live by hunting the wild animals, and who are generally engaged in war with their neighbours, cannot be supposed to enjoy much gaiety of temper, or a high flow of spirits. The Indians therefore are in general grave even to sadness: they have nothing of that giddy vivacity peculiar to some nations of Europe, and they despise it. Their behaviour to those about them is regular, modest, and respectful. Ignorant of the arts of amusement, of which that of saying trifles agreeably is one of the most considerable, they never speak, but when they have something important to observe; and all their actions, words, and even looks, are attended with some meaning. This is extremely natural to men who are almost continually engaged in pursuits which to them are of the highest importance. Their subsistence depends entirely on what they procure with their hands; and their lives, their honour, and every thing dear to them, may be lost by the smallest inattention to the designs of their enemies. As they have no particular object to attach them to one place rather than another, they fly wherever they expect to find the necessaries of life in greatest abundance. Cities, which are the effects of agriculture and arts, they have none. The different tribes or nations are for the same reason extremely small, when compared with civilized societies, in which industry, arts, agriculture, and commerce, have united a vast number of individuals, whom a complicated luxury renders useful to one another. These small tribes live at an immense distance; they are separated by a desert frontier, and hid in the bosom of impenetrable and almost boundless forests.

16 Their remarkable pensiveness and taciturnity.

There is established in each society a certain species of government, which over the whole continent of America prevails with exceeding little variation; because over the whole of this continent the manners and way

17 Form of government among them.

of

America. of life are nearly ſimilar and uniform. Without arts, riches, or luxury, the great inſtruments of ſubjection in poliſhed ſocieties, an American has no method by which he can render himſelf conſiderable among his companions, but by ſuperiority in perſonal qualities of body or mind. But as Nature has not been very laviſh in her perſonal diſtinctions, where all enjoy the ſame education, all are pretty much equal, and will deſire to remain ſo. Liberty, therefore, is the prevailing paſſion of the Americans; and their government, under the influence of this ſentiment, is better ſecured than by the wiſeſt political regulations. They are very far, however, from deſpiſing all ſort of authority; they are attentive to the voice of wiſdom, which experience has conferred on the aged, and they enliſt under the banners of the chief in whoſe valour and military addreſs they have learned to repoſe their confidence. In every ſociety, therefore, there is to be conſidered the power of the chief and of the elders; and, according as the government inclines more to the one or to the other, it may be regarded as monarchical, or as a ſpecies of ariſtocracy. Among thoſe tribes which are moſt engaged in war, the power of the chief is naturally predominant; becauſe the idea of having a military leader was the firſt ſource of his ſuperiority, and the continual exigencies of the ſtate requiring ſuch a leader, will continue to ſupport, and even to enhance it. His power, however, is rather perſuaſive than coercive; he is reverenced as a father, rather than feared as a monarch. He has no guards, no priſons, no officers of juſtice, and one act of ill-judged violence would pull him from the throne. The elders, in the other form of government, which may be conſidered as an ariſtocracy, have no more power. In ſome tribes, indeed, there are a kind of hereditary nobility, whoſe influence being conſtantly augmented by time, is more conſiderable. (See the article NIAGARA.) But this ſource of power which depends chiefly on the imagination, by which we annex to the merit of our contemporaries that of their forefathers, is too refined to be very common among the natives of America. In moſt countries, therefore, age alone is ſufficient for acquiring reſpect, influence, and authority. It is age which teaches experience, and experience is the only ſource of knowledge among a barbarous people. Among thoſe perſons buſineſs is conducted with the utmoſt ſimplicity, and which may recall to thoſe who are acquainted with antiquity a picture of the moſt early ages. The heads of families meet together in a houſe or cabin appointed for the purpoſe. Here the buſineſs is diſcuſſed; and here thoſe of the nation, diſtinguiſhed for their eloquence or wiſdom, have an opportunity of diſplaying thoſe talents. Their orators, like thoſe of Homer, expreſs themſelves in a bold figurative ſtyle, ſtronger than refined, or rather ſoftened, nations can well bear, and with geſtures equally violent, but often extremely natural and expreſſive. When the buſineſs is over, and they happen to be well provided with food, they appoint a feaſt upon the occaſion, of which almoſt the whole nation partakes. The feaſt is accompanied with a ſong, in which the real or fabulous exploits of their forefathers are celebrated. They have dances too, though, like thoſe of the Greeks and Romans, chiefly of the military kind; and their muſic and dancing accompany every feaſt.

18 Their public aſſemblies.

To aſſiſt their memory, they have belts of ſmall ſhells or beads, of different colours, each repreſenting a particular object, which is marked by their colour and arrangement. At the concluſion of every ſubject on which they diſcourſe, when they treat with a foreign ſtate, they deliver one of thoſe belts; for if this ceremony ſhould be omitted, all that they have ſaid paſſes for nothing. Thoſe belts are carefully depoſited in each town, as the public records of the nation; and to them they occaſionally have recourſe, when any public conteſt happens with a neighbouring tribe. Of late, as the materials of which thoſe belts are made have become ſcarce, they often give ſome ſkin in place of the wampum (the name of the beads), and receive in return preſents of a more valuable kind from our commiſſioners; for they never conſider a treaty as of any weight, unleſs every article in it be ratified by ſuch a gratification. America.

19 Wampum or belts.

It often happens, that thoſe different tribes or nations, ſcattered as they are at an immenſe diſtance from one another, meet in their excurſions after prey. If there ſubſiſts no animoſity between them, which ſeldom is the caſe, they behave in the moſt friendly and courteous manner; but if they happen to be in a ſtate of war, or if there has been no previous intercourſe between them, all who are not friends are deemed enemies, and they fight with the moſt ſavage fury.

20 Their wars.

War, if we except hunting, is the only employment of the men; as to every other concern, and even the little agriculture they enjoy, it is left to the women. Their moſt common motive for entering into war, when it does not ariſe from an accidental rencounter or interference, is either to revenge themſelves for the death of ſome loſt friends, or to acquire priſoners who may aſſiſt them in their hunting, and whom they adopt into their ſociety. Theſe wars are either undertaken by ſome private adventurers, or at the inſtance of the whole community. In the latter caſe, all the young men who are diſpoſed to go out to battle (for no one is compelled contrary to his inclination), give a bit of wood to the chief, as a token of their deſign to accompany him; for every thing among thoſe people is tranſacted with a great deal of ceremony and many forms. The chief who is to conduct them faſts ſeveral days, during which he converſes with no one, and is particularly careful to obſerve his dreams; which the preſumption natural to ſavages generally renders as favourable as he could deſire. A variety of other ſuperſtitions and ceremonies are obſerved. One of the moſt hideous is ſetting the war-kettle on the fire, as an emblem that they are going out to devour their enemies; which among ſome nations muſt formerly have been the caſe, ſince they ſtill continue to expreſs it in clear terms, and uſe an emblem ſignificant of the ancient uſage. Then they deſpatch a porcelain, or large ſhell, to their allies, inviting them to come along, and drink the blood of their enemies. For with the Americans, as with the Greek of old,

21 Ceremonies before ſetting out.

"A generous friendſhip no cold medium knows;
"But with one love, with one reſentment, glows."

They think that thoſe in their alliance muſt not only adopt their enmities, but have their reſentment wound up to the ſame pitch with themſelves. And indeed no people carry their friendſhip or their reſentment ſo

far

America. far as they do; and this is what ſhould be expected from their peculiar circumſtances; that principle in human nature which is the ſpring of the ſocial affections, acts with ſo much the greater force the more it is reſtrained. The Americans, who live in ſmall ſocieties, who ſee few objects and few perſons, become wonderfully attached to theſe objects and perſons, and cannot be deprived of them without feeling themſelves miſerable. Their ideas are too confined to enable them to entertain juſt ſentiments of humanity, or univerſal benevolence. But this very circumſtance, while it makes them cruel and ſavage to an incredible degree towards thoſe with whom they are at war, adds a new force to their particular friendſhips, and to the common tie which unites the members of the ſame tribe, or of thoſe different tribes which are an alliance with one another. Without attending to this reflection, ſome facts we are going to relate would excite our wonder without informing our reaſon, and we ſhould be bewildered in a number of particulars, ſeemingly oppoſite to one another, without being ſenſible of the general cauſe from which they proceed.

Having finiſhed all the ceremonies previous to the war, and the day appointed for their ſetting out on the expedition being arrived, they take leave of their friends, and exchange their clothes, or whatever moveables they have, in token of mutual friendſhip; after which they proceed from the town, their wives and female relations walking before, and attending them to ſome diſtance. The warriors march all dreſſed in their fineſt apparel and moſt ſhowy ornaments, without any order. The chief walks ſlowly before them, ſinging the war-ſong, while the reſt obſerve the moſt profound ſilence. When they come up to their women, they deliver them all their finery, and putting on their worſt clothes, proceed on their expedition.

22 Enſigns. Every nation has its peculiar enſign or ſtandard, which is generally ſome beaſt, bird, or fiſh. Thoſe among the Five Nations are the bear, otter, wolf, tortoiſe, and eagle; and by theſe names the tribes are uſually diſtinguiſhed. They have the figures of thoſe animals pricked and painted on ſeveral parts of their bodies; and when they march through the woods, they commonly, at every encampment, cut the repreſentation of their enſign on trees, eſpecially after a ſucceſsful campaign; marking at the ſame time the number of ſcalps or priſoners they have taken.

23 Military habits. Their military dreſs is extremely ſingular. They cut off or pull out all their hair, except a ſpot about the breadth of two Engliſh crown pieces, near the top of their heads, and entirely deſtroy their eyebrows. The lock left upon their heads is divided into ſeveral parcels, each of which is ſtiffened and adorned with wampum, beads, and feathers of various kinds, the whole being twiſted into a form much reſembling the modern pompoon. Their heads are painted red down to the eyebrows, and ſprinkled over with white down. The griſtles of their ears are ſplit almoſt quite round, and diſtended with wires or ſplinters ſo as to meet and tie together on the nape of the neck. Theſe are alſo hung with ornaments, and generally bear the repreſentation of ſome bird or beaſt. Their noſes are likewiſe bored and hung with trinkets of beads, and their faces painted with various colours, ſo as to make an awful appearance. Their breaſts are adorned with a gorget or medal, of braſs, copper, or ſome other metal; and America. that dreadful weapon the ſcalping knife hangs by a ſtring from their neck.

The great qualities in an Indian war are vigilance and attention, to give and to avoid a ſurpriſe; and indeed in theſe they are ſuperior to all nations in the world. Accuſtomed to continual wandering in the foreſts, having their perceptions ſharpened by keen neceſſity; and living in every reſpect according to nature, their external ſenſes have a degree of acuteneſs which at firſt view appears incredible. They can trace out their enemies at an immenſe diſtance by the ſmoke of their fires, which they ſmell, and by the tracks of their feet on the ground, imperceptible to an European eye, but which they can count and diſtinguiſh with the utmoſt facility. They can even diſtinguiſh the different nations with whom they are acquainted, and can determine the preciſe time when they paſſed, where an European could not, with all his glaſſes, diſtinguiſh footſteps at all. Theſe circumſtances, however, are of ſmall importance, becauſe their enemies are no leſs acquainted with them. When they go out, therefore, they take care to avoid making uſe of any thing by which they might run the danger of a diſcovery. They light no fire to warm themſelves or to prepare their victuals: they lie cloſe to the ground all day, and travel only in the night; and marching along in files, he that cloſes the rear diligently covers with leaves the tracks of his own feet and of theirs who preceded him.

24 Quickneſs of their ſenſes.

When they halt to refreſh themſelves, ſcouts are ſent out to reconnoitre the country and beat up every place where they ſuſpect an enemy to lie concealed. In this manner they enter unawares the villages of their foes; and, while the flower of the nation are engaged in hunting, maſſacre all the children, women, and helpleſs old men, or make priſoners of as many as they can manage, or have ſtrength enough to be uſeful to their nation. But when the enemy is appriſed of their deſign, and coming on in arms againſt them, they throw themſelves flat on the ground among the withered herbs and leaves, which their faces are painted to reſemble. Then they allow a part to paſs unmoleſted, when all at once, with a tremendous ſhout, riſing up from their ambuſh, they pour a ſtorm of muſket bullets on their foes. The party attacked returns the ſame cry. Every one ſhelters himſelf with a tree, and returns the fire of the adverſe party, as ſoon as they raiſe themſelves from the ground to give a ſecond fire. Thus does the battle continue until the one party is ſo much weakened as to be incapable of farther reſiſtance. But if the force on each ſide continues nearly equal, the fierce ſpirits of the ſavages, inflamed by the loſs of their friends, can no longer be reſtrained. They abandon their diſtant war, they ruſh upon one another with clubs and hatchets in their hands, magnifying their own courage, and inſulting their enemies with the bittereſt reproaches. A cruel combat enſues, death appears in a thouſand hideous forms, which would congeal the blood of civilized nations to behold, but which rouſe the fury of ſavages. They trample, they inſult over the dead bodies, tearing the ſcalp from the head, wallowing in their blood like wild beaſts, and ſometimes devouring their fleſh. The flame rages on till it meets with no reſiſtance; then the priſoners are ſecured, thoſe unhappy men,

25 Vigilance and circumſpection.

26 Manner of fighting.

America. whoſe fate is a thouſand times more dreadful than theirs who have died in the field. The conquerors ſet up a hideous howling to lament the friends they have loſt. They approach in a melancholy and ſevere gloom to their own village; a meſſenger is ſent to announce their arrival, and the women, with frightful ſhrieks, come out to mourn their dead brothers or their huſbands. When they are arrived, the chief relates in a low voice to the elders a circumſtantial account of every particular of the expedition. The orator proclaims aloud this account to the people; and as he mentions the names of thoſe who have fallen, the ſhrieks of the women are redoubled. The men too join in theſe cries, according as each is moſt connected with the deceaſed by blood or friendſhip. The laſt ceremony is the proclamation of the victory; each individual then forgets his private misfortunes, and joins in the triumph of his nation; all tears are wiped from their eyes, and by an unaccountable tranſition, they paſs in a moment from the bitterneſs of ſorrow to an extravagance of joy. But the treatment of the priſoners, whoſe fate all this time remains undecided, is what chiefly characterizes the ſavages.

We have already mentioned the ſtrength of their affections or reſentments. United as they are in ſmall ſocieties, connected within themſelves by the firmeſt ties, their friendly affections, which glow with the moſt intenſe warmth within the walls of their own village, ſeldom extend beyond them. They feel nothing for the enemies of their nation; and their reſentment is eaſily extended from the individual who has injured them to all others of the ſame tribe. The priſoners, who have themſelves the ſame feelings, know the intentions of their conquerors, and are prepared for them.

27 Treatment of their priſoners.

The perſon who has taken the captive attends him to the cottage, where, according to the diſtribution made by the elders, he is to be delivered to ſupply the loſs of a citizen. If thoſe who receive him have their family weakened by war or other accidents, they adopt the captive into the family, of which he becomes a member. But if they have no occaſion for him, or their reſentment for the loſs of their friends be too high to endure the ſight of any connected with thoſe who were concerned in it, they ſentence him to death. All thoſe who have met with the ſame ſevere ſentence being collected, the whole nation is aſſembled at the execution, as for ſome great ſolemnity. A ſcaffold is erected, and the priſoners are tied to the ſtake, where they commence their death-ſong, and prepare for the enſuing ſcene of cruelty with the moſt undaunted courage. Their enemies, on the other ſide, are determined to put it to the proof, by the moſt refined and exquiſite tortures. They begin at the extremity of his body, and gradually approach the more vital parts. One plucks out his nails by the roots, one by one; another takes a finger into his mouth, and tears off the fleſh with his teeth; a third thruſts the finger, mangled as it is, into the bowl of a pipe made red hot, which he ſmokes like tobacco; then they pound his toes and fingers to pieces between two ſtones; they cut circles about his joints, and gaſhes in the fleſhy parts of his limbs, which they ſear immediately with red-hot irons, cutting, burning, and pinching them alternately; they pull off his fleſh, thus mangled and roaſted, bit by bit, devouring it with greedineſs, and ſmearing their faces with the blood in an enthuſiaſm of horror and fury. When they have thus torn off the fleſh, they twiſt the bare nerves and tendons about an iron, tearing and ſnapping them, whilſt others are employed in pulling and extending their limbs in every way that can increaſe the torment. This continues often five or ſix hours; and ſometimes, ſuch is the ſtrength of the ſavages, days together. Then they frequently unbind him, to give a breathing to their fury, to think what new torments they ſhall inflict, and to refreſh the ſtrength of the ſufferer, who, wearied out with ſuch a variety of un-heard-of torments, often falls into ſo profound a ſleep, that they are obliged to apply the fire to awake him, and renew his ſufferings. He is again faſtened to the ſtake, and again they renew their cruelty; they ſtick him all over with ſmall matches of wood that eaſily takes fire, but burns ſlowly; they continually run ſharp reeds into every part of his body; they drag out his teeth with pincers, and thruſt out his eyes; and laſtly, after having burned his fleſh from the bones with ſlow fires; after having ſo mangled the body that it is all but one wound; after having mutilated his face in ſuch a manner as to carry nothing human in it; after having peeled the ſkin from the head, and poured a heap of red-hot coals or boiling water on the naked ſkull—they once more unbind the wretch; who, blind, and ſtaggering with pain and weakneſs, aſſaulted and pelted upon every ſide with clubs and ſtones, now up, now down, falling into their fires at every ſtep, runs hither and thither, until one of the chiefs, whether out of compaſſion, or weary of cruelty, puts an end to his life with a club or dagger. The body is then put into a kettle, and this barbarous employment is ſucceeded by a feaſt as barbarous.

28 Shocking tortures.

America.

The women, forgetting the human as well as the female nature, and transformed into ſomething worſe than furies, even outdo the men in this ſcene of horror; while the principal perſons of the country ſit round the ſtake, ſmoking and looking on without the leaſt emotion. What is moſt extraordinary, the ſufferer himſelf, in the little intervals of his torments, ſmokes too, appears unconcerned, and converſes with his torturers about indifferent matters. Indeed, during the whole time of his execution, there ſeems a conteſt which ſhall exceed, they in inflicting the moſt horrid pains, or he in enduring them with a firmneſs and conſtancy almoſt above human: not a groan, not a ſigh, not a diſtortion of countenance, eſcapes him; he poſſeſſes his mind entirely in the midſt of his torments; he recounts his own exploits; he informs them what cruelties he has inflicted upon their countrymen, and threatens them with the revenge that will attend his death; and, though his reproaches exaſperate them to a perfect madneſs of rage and fury, he continues his inſults even of their ignorance of the art of tormenting, pointing out himſelf more exquiſite methods, and more ſenſible parts of the body to be afflicted. The women have this part of courage as well as the men; and it is as rare for an Indian to behave otherwiſe, as it would be for any European to ſuffer as an Indian. Such is the wonderful power of an early inſtitution, and a ferocious thirſt of glory. "I am brave and intrepid (exclaims the ſavage in the face of his tormentors); I do not fear death, nor any kind of tortures; thoſe who fear them are cowards; they are leſs than women:

29 Conſtancy of the ſufferers.

America. women: life is nothing to thoſe that have courage: May my enemies be confounded with deſpair and rage! Oh! that I could devour them, and drink their blood to the laſt drop."

30 Surpriſing contraſt in the American character.

But neither the intrepidity on one ſide, nor the inflexibility on the other, are among themſelves matter of aſtoniſhment: for vengeance, and fortitude in the midſt of torment, are duties which they conſider as ſacred; they are the effects of their earlieſt education, and depend upon principles inſtilled into them from their infancy. On all other occaſions they are humane and compaſſionate. Nothing can exceed the warmth of their affection towards their friends, who conſiſt of all thoſe who live in the ſame village, or are in alliance with it. Among theſe all things are common; and this, though it may in part ariſe from their not poſſeſſing very diſtinct notions of ſeparate property, is chiefly to be attributed to the ſtrength of their attachment; becauſe in every thing elſe, with their lives as well as their fortunes, they are ready to ſerve their friends. Their houſes, their proviſions, even their young women, are not enough to oblige a gueſt. Has any one of theſe ſucceeded ill in his hunting; has his harveſt failed; or is his houſe burned—he feels no other effect of his misfortunes, than that it gives him an opportunity to experience the benevolence and regard of his fellow-citizens. On the other hand, to the enemies of his country, or to thoſe who have privately offended, the American is implacable. He conceals his ſentiments, he appears reconciled, until by ſome treachery or ſurpriſe he has an opportunity of executing a horrible revenge. No length of time is ſufficient to allay his reſentment; no diſtance of place great enough to protect the object: he croſſes the ſteepeſt mountains, he pierces the moſt impracticable foreſts, and traverſes the moſt hideous bogs and deſerts for ſeveral hundreds of miles; bearing the inclemency of the ſeaſons, the fatigue of the expedition, the extremes of hunger and thirſt, with patience and cheerfulneſs, in hopes of ſurpriſing his enemy, on whom he exerciſes the moſt ſhocking barbarities, even to the eating of his fleſh. To ſuch extremes do the Indians puſh their friendſhip or their enmity; and ſuch indeed, in general, is the character of all ſtrong and uncultivated minds.

31 Treatment of their dead friends.

But what we have ſaid reſpecting the Indians would be a faint picture, did we omit obſerving the force of their friendſhip, which principally appears by the treatment of their dead. When any one of the ſociety is cut off, he is lamented by the whole. On this occaſion a thouſand ceremonies are practiſed, denoting the moſt lively ſorrow. No buſineſs is tranſacted, however preſſing, till all the pious ceremonies due to the dead are performed. The body is waſhed, anointed, and painted. Then the women lament the loſs with hideous howlings, intermixed with ſongs which celebrate the great actions of the deceaſed and his anceſtors. The men mourn in a leſs extravagant manner. The whole village is preſent at the interment, and the corpſe is habited in their moſt ſumptuous ornaments. Cloſe to the body of the defunct are placed his bows and arrows, with whatever he valued moſt in his life, and a quantity of proviſions for his ſubſiſtence on the journey which he is ſuppoſed to take. This ſolemnity, like every other, is attended with feaſting. The funeral being ended, the relations of the deceaſed confine themſelves to their huts for a conſiderable time to indulge their grief. After an interval of ſome weeks they viſit the grave, repeat their ſorrow, new clothe the remains of the body, and act over again all the ſolemnities of the funeral. America.

Among the various tokens of their regard for their deceaſed friends, the moſt remarkable is what they call the *feaſt of the dead*, or the *feaſt of ſouls*. The day for this ceremony is appointed in the council of their chiefs, who give orders for every thing which may enable them to celebrate it with pomp and magnificence; and the neighbouring nations are invited to partake of the entertainment. At this time, all who have died ſince the preceding feaſt of the kind are taken out of their graves. Even thoſe who have been interred at the greateſt diſtance from the villages are diligently ſought for, and conducted to this rendezvous of the dead, which exhibits a ſcene of horror beyond the power of deſcription. When the feaſt is concluded, the bodies are dreſſed in the fineſt ſkins which can be procured, and after being expoſed for ſome time in this pomp, are again committed to the earth with great ſolemnity, which is ſucceeded by funeral games.

32 Superſtitions.

Their taſte for war, which forms the chief ingredient in their character, gives a ſtrong bias to their religion. Areſkoui, or the god of battle, is revered as the great god of the Indians. Him they invoke before they go into the field; and according as his diſpoſition is more or leſs favourable to them, they conclude they will be more or leſs ſucceſsful. Some nations worſhip the ſun and moon; among others there are a number of traditions, relative to the creation of the world and the hiſtory of the gods: traditions which reſemble the Grecian fables, but which are ſtill more abſurd and inconſiſtent. But religion is not the prevailing character of the Indians; and except when they have ſome immediate occaſion for the aſſiſtance of their gods, they pay them no ſort of worſhip. Like all rude nations, however, they are ſtrongly addicted to ſuperſtition. They believe in the exiſtence of a number of good and bad genii or ſpirits, who interfere in the affairs of mortals, and pruduce all our happineſs or miſery. It is from the evil genii, in particular, that our diſeaſes proceed; and it is to the good genii we are indebted for a cure. The miniſters of the genii are the jugglers, who are alſo the only phyſicians among the ſavages. Theſe jugglers are ſuppoſed to be inſpired by the good genii, moſt commonly in their dreams, with the knowledge of future events; they are called in to the aſſiſtance of the ſick, and are ſuppoſed to be informed by the genii whether they will get over the diſeaſe, and in what way they muſt be treated. But theſe ſpirits are extremely ſimple in their ſyſtem of phyſic, and, in almoſt every diſeaſe, direct the juggler to the ſame remedy. The patient is encloſed in a narrow cabin, in the midſt of which is a ſtone red hot: on this they throw water, until he is well ſoaked with the warm vapour and his own ſweat. Then they hurry him from this bagnio, and plunge him ſuddenly into the next river. This coarſe method, which coſts many their lives, often performs very extraordinary cures. The jugglers have likewiſe the uſe of ſome ſpecifics of wonderful efficacy; and all the ſavages are dexterous in curing wounds by the application of herbs. But the power of theſe remedies is al-

America.

ways attributed to the magical ceremonies with which they are adminiſtered.

33 Condition of their women.

Though the women generally bear the laborious part of domeſtic economy, their condition is far from being ſo ſlaviſh as it appears. On the contrary, the greateſt reſpect is paid by the men to the female ſex. The women even hold their councils, and have their ſhare in all deliberations which concern the ſtate. Polygamy is practiſed by ſome nations, but is not general. In moſt, they content themſelves with one wife; but a divorce is admitted in caſe of adultery. No nation of the Americans is without a regular marriage, in which there are many ceremonies; the principal of which is, the bride's preſenting the bridegroom with a plate of their corn. The women, though before incontinent, are remarkable for chaſtity after marriage.

34 Their ardent love of liberty.

Liberty, in its full extent, being the darling paſſion of the Indians, their education is directed in ſuch a manner as to cheriſh this diſpoſition to the utmoſt. Hence children are never upon any account chaſtiſed with blows, and they are ſeldom even reprimanded. Reaſon, they ſay, will guide their children when they come to the uſe of it, and before that time their faults cannot be very great; but blows might damp their free and martial ſpirit, by the habit of a ſlaviſh motive to action. When grown up, they experience nothing like command, dependence, or ſubordination; even ſtrong perſuaſion is induſtriouſly withheld by thoſe who have influence among them.—No man is held in great eſteem, unleſs he has increaſed the ſtrength of his country with a captive, or adorned his hut with a ſcalp of one of his enemies.

Controverſies among the Indians are few, and quickly decided. When any criminal matter is ſo flagrant as to become a national concern, it is brought under the juriſdiction of the great council; but in ordinary caſes, the crime is either revenged or compromiſed by the parties concerned. If a murder be committed, the

35 Crimes and puniſhments.

family which has loſt a relation prepares to retaliate on that of the offender. They often kill the murderer; and when this happens, the kindred of the laſt perſon ſlain look upon themſelves to be as much injured, and to have the ſame right to vengeance, as the other party. In general, however, the offender abſents himſelf; the friends ſend compliments of condolence to thoſe of the perſon that has been murdered. The head of the family at length appears with a number of preſents, the delivery of which he accompanies with a formal ſpeech. The whole ends, as uſual, in mutual feaſtings, ſongs, and dances. If the murder is committed by one of the ſame family or cabin, that cabin has the full right of judgment within itſelf, either to puniſh the guilty with death, or to pardon him, or to oblige him to give ſome recompenſe to the wife or children of the ſlain. Inſtances of ſuch a crime, however, very ſeldom happen; for their attachment to thoſe of the ſame family is remarkably ſtrong, and is ſaid to produce ſuch friendſhips as may vie with the moſt celebrated in fabulous antiquity.

36 Peculiar manners of different nations.

Such, in general, are the manners and cuſtoms of the Indian nations; but every tribe has ſomething peculiar to itſelf. Among the Hurons and Natches, the dignity of the chief is hereditary, and the right of ſucceſſion in the female line. When this happens to be extinct, the moſt reſpectable matron of the tribe makes choice of whom ſhe pleaſes to ſucceed. America.

The Cherokees are governed by ſeveral ſachems or chiefs, elected by the different villages; as are alſo the Creeks and Chactaws. The two latter puniſh adultery in a woman by cutting off her hair, which they will not ſuffer to grow till the corn is ripe the next ſeaſon; but the Illinois, for the ſame crime, cut off the women's noſes and ears.

The Indians on the lakes are formed into a ſort of empire; and the emperor is elected from the eldeſt tribe, which is that of the Ottowawaws. He has the greateſt authority of any chief that has appeared on the continent ſince our acquaintance with it. A few years ago, the perſon who held this rank formed a deſign of uniting all the Indian nations under his ſovereignty; but he miſcarried in the attempt.

37 Longevity of the Indians.

In general, the American Indians live to a great age, although it is not poſſible to know from themſelves the exact number of their years. It was aſked of an Indian, who appeared to be extremely old, what age he was of? I am above twenty, was his reply. Upon putting the queſtion in a different form, by reminding him of certain circumſtances in former times, My machu, ſaid he, ſpoke to me when I was young of the Incas; and he had ſeen theſe princes. According to this reply, there muſt have elapſed, from the date of his machu's (his grandfather's) remembrance to that time, a period of at leaſt 232 years. The man who made this reply appeared to be 120 years of age: for, beſides the whiteneſs of his hair and beard, his body was almoſt bent to the ground; without, however, ſhowing any other marks of debility or ſuffering. This happened in 1764. This longevity, attended in general with uninterrupted health, is probably the conſequence in part of their vacancy from all ſerious thought and employment, joined alſo with the robuſt texture and conformation of their bodily organs. If the Indians did not deſtroy one another in their almoſt perpetual wars, and if their habits of intoxication were not ſo univerſal and incurable, they would be, of all the races of men who inhabit the globe, the moſt likely to prolong, not only the bounds, but the enjoyments, of animal life to their utmoſt duration.

38 Other pictures of the Americans.

Let us now attend to other pictures which have been given of the aboriginal inhabitants of the new world. The vices and defects of the American Indians have by ſeveral writers been moſt unaccountably aggravated, and every virtue and good quality denied them. Their cruelties have been already deſcribed and accounted for. The following anecdote of an Algonquin woman we find adduced as a remarkable proof of their innate thirſt of blood. That nation being at war with the Iroquois, ſhe happened to be made priſoner, and was carried to one of the villages belonging to them. Here ſhe was ſtripped naked, and her hands and feet bound with ropes in one of their cabins. In this condition ſhe remained ten days, the ſavages ſleeping round her every night. The eleventh night, while they were aſleep, ſhe found means to diſengage one of her hands, with which ſhe immediately freed herſelf from the ropes, and went to the door. Though ſhe had now an opportunity of eſcaping unperceived,

39 Anecdotes of an Algonquin woman.

America. ceived, her revengeful temper could not let ſlip ſo favourable an opportunity of killing one of her enemies. The attempt was manifeſtly at the hazard of her own life; yet, ſnatching up a hatchet, ſhe killed the ſavage that lay next her; and, ſpringing out of the cabin, concealed herſelf in a hollow tree which ſhe had obſerved the day before. The groans of the dying perſon ſoon alarmed the other ſavages, and the young ones immediately ſet out in purſuit of her.—Perceiving from her tree, that they all directed their courſe one way, and that no ſavage was near her, ſhe left her ſanctuary, and, flying in an oppoſite direction, ran into a foreſt without being perceived. The ſecond day after this happened, her footſteps were diſcovered, and they purſued her with ſuch expedition, that the third day ſhe diſcovered her enemies at her heels. Upon this ſhe threw herſelf into a pond of water; and, diving among ſome weeds and bulruſhes, ſhe could juſt breathe above water without being perceived. Her purſuers, after making the moſt diligent ſearch, were forced to return.—For 35 days this woman held on her courſe through woods and deſerts, without any other ſuſtenance than roots and wild berries. When ſhe came to the river St Lawrence, ſhe made with her own hands a kind of a wicker raft, on which ſhe croſſed it. As ſhe went by the French fort Trois Rivieres, without well knowing where ſhe was, ſhe perceived a canoe full of ſavages; and, fearing they might be Iroquois, ran again into the woods, where ſhe remained till ſunſet.—Continuing her courſe, ſoon after ſhe ſaw the Trois Rivieres; and was then diſcovered by a party whom ſhe knew to be Hurons, a nation in alliance with the Algonquins. She then ſquatted down behind a buſh, calling out to them that ſhe was not in a condition to be ſeen, becauſe ſhe was naked. They immediately threw her a blanket, and then conducted her to the fort, where ſhe recounted her ſtory.

40 Reproached with puſillanimity.

Perſonal courage has been denied them. In proof of their puſillanimity, the following incidents are quoted from Charlevoix by Lord Kames, in his Sketches of the Hiſtory of Man. "The fort de Vercheres in Canada, belonging to the French, was, in the year 1690, attacked by ſome Iroquois. They approached ſilently, preparing to ſcale the paliſade, when ſome muſket ſhot made them retire. Advancing a ſecond time, they were again repulſed, wondering that they could diſcover none but a woman who was ſeen everywhere. This was Madame de Vercheres, who appeared as reſolute as if ſupported by a numerous garriſon. The hopes of ſtorming a place without men to defend it occaſioned reiterated attacks. After two days ſiege, they retired, fearing to be intercepted in their retreat. Two years after, a party of the ſame nation appeared before the fort ſo unexpectedly, that a girl of fourteen, daughter of the proprietor, had but time to ſhut the gate. With the young woman there was not a ſoul but one raw ſoldier. She ſhowed herſelf with her aſſiſtant, ſometimes in one place and ſometimes in another; changing her dreſs frequently, in order to give ſome appearance of a garriſon; and always fired opportunely. The faint-hearted Iroquois decamped without ſucceſs."

There is no inſtance, it is ſaid, either of a ſingle Indian facing an individual of any other nation in fair and open combat, or of their jointly venturing to try the fate of battle with an equal number of any foes. Even with the greateſt ſuperiority of numbers, they dare not meet an open attack. Yet, notwithſtanding this want of courage, they are ſtill formidable; nay, it has been known, that a ſmall party of them has routed a much ſuperior body of regular troops: but this can only happen when they have ſurpriſed them in the faſtneſſes of their foreſts, where the covert of the wood may conceal them until they take their aim with the utmoſt certainty. After one ſuch diſcharge they immediately retreat, without leaving the ſmalleſt trace of their route. It may eaſily be ſuppoſed, that an onſet of this kind muſt produce confuſion even among the ſteadieſt troops, when they can neither know the number of their enemies, nor perceive the place where they lie in ambuſh. America.

41 Accuſed of perfidy.

Perfidy combined with cruelty has been alſo made a part of their character. Don Ulloa relates, That the Indians of the country called *Natches*, in Louiſiana, laid a plot for maſſacring in one night every individual belonging to the French colony eſtabliſhed there. This plot they actually executed, notwithſtanding the ſeeming good underſtanding that ſubſiſted between them and theſe European neighbours. Such was the ſecrecy which they obſerved, that no perſon had the leaſt ſuſpicion of their deſign until the blow was ſtruck. One Frenchman alone eſcaped, by favour of the darkneſs, to relate the diſaſter of his countrymen. The compaſſion of a female Indian contributed alſo in ſome meaſure to his exemption from the general maſſacre. The tribe of Natches had invited the Indians of other countries, even to a conſiderable diſtance, to join in the ſame conſpiracy. The day, or rather the night, was fixed, on which they were to make an united attack on the French coloniſts. It was intimated by ſending a parcel of rods, more or leſs numerous according to the local diſtance of each tribe, with an injunction to abſtract one rod daily; the day on which the laſt fell to be taken away being that fixed for the execution of their plan. The women were partners of the bloody ſecret. The parcels of rods being thus diſtributed, that belonging to the tribe of Natches happened to remain in the cuſtody of a female. This woman, either moved by her own feelings of compaſſion, or by the commiſeration expreſſed by her female acquaintances in the view of the propoſed ſcene of bloodſhed, abſtracted one day three or four of the rods, and thus anticipated the term of her tribe's proceeding to the execution of the general conſpiracy. The conſequence of this was, that the Natches were the only actors in this carnage; their diſtant aſſociates having ſtill ſeveral rods remaining at the time when the former made the attack. An opportunity was thereby given to the coloniſts in thoſe quarters to take meaſures for their defence, and for preventing a more extenſive execution of the deſign.

It was by conſpiracies ſimilar to this that the Indians of the province of Macas, in the kingdom of Quito, deſtroyed the opulent city of Logrogno, the colony of Guambaya, and its capital Sevilla del Oro; and that ſo completely, that it is no longer known in what place theſe ſettlements exiſted, or where that abundance of gold was found from which the laſt mentioned city took the addition to its name. Like ravages have been committed upon l'Imperiale in Chili, the colonies of the Miſſions of Chuncas, thoſe of Darien in Terra Firma,

and

America. and many other places which have afforded ſcenes of this barbarous ferocity. Theſe conſpiracies are always carried on in the ſame manner. The ſecret is inviolably kept, the actors aſſemble at the preciſe hour appointed, and every individual is animated with the ſame ſanguinary purpoſes. The males that fall into their hands are put to death with every ſhocking circumſtance that can be ſuggeſted by a cool and determined cruelty. The females are carried off, and preſerved as monuments of their victory, to be employed as their occaſions require.

Nor can this odious cruelty and treachery, it is ſaid, be juſtly aſcribed to their ſubjection to a foreign yoke, ſeeing the ſame character belongs equally to all the original inhabitants of this vaſt continent, even thoſe who have preſerved their independence moſt completely. Certain it is, continues he, that theſe people, with the moſt limited capacities for every thing elſe, diſplay an aſtoniſhing degree of penetration and ſubtlety with reſpect to every object that involves treachery, bloodſhed, and rapine. As to theſe, they ſeem to have been all educated at one ſchool; and a ſecret, referring to any ſuch plan, no conſideration on earth can extort from them.

42 Their underſtanding repreſented as weak.

Their underſtandings alſo have been repreſented as not leſs contemptible than their manners are groſs and brutal. Many nations are neither capable of forming an arrangement for futurity; nor do their ſolicitude or foreſight extend ſo far. They ſet no value upon thoſe things of which they are not in ſome immediate want. In the evening, when a Carib is going to reſt, no conſideration will tempt him to ſell his hammock; but in the morning he will part with it for the ſlighteſt trifle. At the cloſe of winter, a North American, mindful of what he has ſuffered from the cold, ſets himſelf with vigour to prepare materials for erecting a comfortable hut to protect him againſt the inclemency of the ſucceeding ſeaſon: but as ſoon as the weather becomes mild, he abandons his work, and never thinks of it more till the return of the cold compels him to reſume it.—In ſhort, to be free from labour ſeems to be the utmoſt wiſh of an American. They will continue whole days ſtretched in their hammocks, or ſeated on the earth, without changing their poſture, raiſing their eyes, or uttering a ſingle word. They cannot compute the ſucceſſion of days nor of weeks. The different aſpects of the moon alone engage

43 Alleged indolence and ſtupidity.

their attention as a meaſure of time. Of the year they have no other conception than what is ſuggeſted to them by the alternate heat of ſummer and cold of winter; nor have they the leaſt idea of applying to this period the obvious computation of the months which it contains. When it is aſked of any old man in Peru, even the moſt civilized, what age he is of; the only anſwer he can give is the number of caciques he has ſeen. It often happens, too, that they only recollect the moſt diſtant of theſe princes in whoſe time certain circumſtances had happened peculiarly memorable, while of thoſe that lived in a more recent period they have loſt all remembrance.

The ſame groſs ſtupidity is alleged to be obſervable in thoſe Indians who have retained their original liberty. They are never known to fix the dates of any events in their minds, or to trace the ſucceſſion of circumſtances that have ariſen from ſuch events. Their imagination takes in only the preſent, and in that only what intimately concerns themſelves. Nor can diſcipline or inſtruction overcome this natural defect of apprehenſion. In fact, the ſubjected Indians in Peru, who have a continual intercourſe with the Spaniards, who are furniſhed with curates perpetually occupied in given them leſſons of religion and morality, and who mix with all ranks of the civilized ſociety eſtabliſhed among them, are almoſt as ſtupid and barbarous as their countrymen who have had no ſuch advantages. The Peruvians, while they lived under the government of their Incas, preſerved the records of certain remarkable events. They had alſo a kind of regular government, deſcribed by the hiſtorians of the conqueſt of Peru. This government originated entirely from the attention and abilities of their princes, and from the regulations enacted by them for directing the conduct of their ſubjects. This ancient degree of civilization among them gives ground to preſume, that their legiſlators ſprung from ſome race more enlightened than the other tribes of Indians; a race of which no individual ſeems to remain in the preſent times. America.

Vanity and conceit are ſaid to be blended with their ignorance and treachery. Notwithſtanding all they ſuffer from Europeans, they ſtill, it is ſaid, conſider themſelves as a race of men far ſuperior to their conquerors. This proud belief, ariſing from their perverted ideas of excellence, is univerſal over the whole known continent of America. They do not think it poſſible that any people can be ſo intelligent as themſelves, When they are detected in any of their plots, it is their common obſervation, that the Spaniards, or *Viracochas*, want to be as knowing as they are. Thoſe of Louiſiana, and the countries adjacent, are equally vain of their ſuperior underſtanding, confounding that quality with the cunning which they themſelves conſtantly practiſe. The whole object of their tranſactions is to overreach thoſe with whom they deal. Yet though faithleſs themſelves, they never forgive the breach of promiſe on the part of others. While the Europeans ſeek their amity by preſents, they give themſelves no concern to ſecure a reciprocal friendſhip. Hence, probably, ariſes their idea, that they muſt be a ſuperior race of men, in ability and intelligence, to thoſe who are at ſuch pains to court their alliance and avert their enmity. 44 Their vanity and conceit.

Their natural eloquence has alſo been decried. The free tribes of ſavages who enter into conventions with the Europeans, it is obſerved, are accuſtomed to make long, pompous, and, according to their own notions, ſublime harangues, but without any method or connection. The whole is a collection of diſjointed metaphors and compariſons. The light, heat, and courſe of the ſun, form the principal topic of their diſcourſe; and theſe unintelligible reaſonings are always accompanied with violent and ridiculous geſtures. Numberleſs repetitions prolong the oration, which, if not interrupted, would laſt whole days: At the ſame time, they meditate very accurately beforehand, in order to avoid mentioning any thing but what they are deſirous to obtain. This pompous faculty of making ſpeeches is alſo one of the grounds on which they conceive themſelves to be ſuperior to the nations of Europe: They imagine that it is their eloquence that procures them the favours they aſk. The ſubjected Indians converſe 45 Their eloquence diſparaged.

preciſely

America. precisely in the same style. Prolix and tedious, they never know when to stop; so that, excepting by the difference in language, it would be impossible, in this respect, to distinguish a civilized Peruvian from an inhabitant of the most savage districts to the northward.

46 All these views partial, and not free from misrepresentation.

But such partial and detached views as the above, were they even free from misrepresentation, are not the just ground upon which to form an estimate of their character. Their qualities, good and bad (for they certainly possess both), their way of life, the state of society among them, with all the circumstances of their condition, ought to be considered in connexion, and in regard to their mutual influence. Such a view has been given in the preceding part of this article: from which, it is hoped, their real character may be easily deduced.

Many of the disagreeable traits exhibited in the anecdotes just quoted, are indeed extracted from Don Ulloa, an author of credit and reputation, but a Spaniard, and evidently biassed in some degree by a desire to palliate the enormities of his countrymen in that quarter of the globe. And with regard to the worst and least equivocal parts of the American character, cruelty and revenge, it may be fairly questioned, whether the instances of these, either in respect of their cause or their atrocity, be at all comparable to those exhibited in European history, and staining the annals of Christendom: —to those, for instance, of the Spaniards themselves, at their first discovery of America; to those indicated by the engines found on board their mighty Armada; to those which, in cold blood, were perpetrated by the Dutch at Amboyna; to the dragoonings of the French; to their religious massacres; or even to the *tender mercies* of the Inquisition!

47 The physical descriptions of Buffon and De Paw refuted. *Hist. of Mexico*, vol. ii. p. 328.

Still harsher, however, are the descriptions given by *Buffon* and *De Paw* of the natives of this whole continent, in which the most mortifying degeneracy of the human race, as well as of all the inferior animals, is asserted to be conspicuous. Against those philosophers, or rather theorists, the Americans have found an able advocate in the Abbé *Clavigero;* an historian whose situation and long residence in America afforded him the best means of information, and who, though himself a subject of Spain, appears superior to prejudice, and disdains in his description the glosses of policy.

Concerning the stature of the Americans, M. de Paw says in general, that although it is not equal to the stature of the Castilians, there is but little difference between them. But the Abbé Clavigero evinces that the Indians who inhabit those countries lying between 9 and 40 degrees of north latitude, which are the limits of the discoveries of the Spaniards, are more than five Parisian feet in height, and that those who do not reach that stature are as few in number among the Indians as they are amongst the Spaniards. It is besides certain, that many of those nations, as the *Apaches*, the *Hiaquese*, the *Pimese*, and *Cochimies*, are at least as tall as the tallest Europeans; and that, in all the vast extent of the new world, no race of people has been found, except the Esquimaux, so diminutive in stature as the Laplanders, the Samojeds, and Tartars, in the north of the old continent. In this respect, therefore, the inhabitants of the two continents are upon an equality. America.

48 Stature, shape, &c.

Of the shape and character of the Mexican Indians the Abbé gives a most advantageous description; which he asserts no one who reads it in America will contradict, unless he views them with the eye of a prejudiced mind. It is true, that Ulloa says, in speaking of the Indians of Quito, he had observed, "that imperfect people abounded among them; that they were either irregularly diminutive, or monstrous in some other respect; that they became either insensible, dumb, or blind, or wanted some limb of their body." Having therefore made some inquiry respecting this singularity of the Quitans, the Abbé found that such defects were neither caused by bad humours, nor by the climate, but by the mistaken and blind humanity of their parents, who, in order to free their children from the hardships and toils to which the healthy Indians are subjected by the Spaniards, fix some deformity or weakness upon them that they may become useless: a circumstance of misery which does not happen in other countries of America, nor in those places of the same kingdom of Quito, where the Indians are under no such oppression. M. de Paw, and, in agreement with him, Dr Robertson, says, that no deformed persons are to be found among the savages of America; because, like the ancient Lacedemonians, they put to death those children which are born hunch-backed, blind, or defective in any limb; but that in those countries where they are formed into societies, and the vigilance of their rulers prevents the murder of such infants, the number of their deformed individuals is greater than it is in any country of Europe. This would make an exceeding good solution of the difficulty if it were true; but if, possibly, there has been in America a tribe of savages who have imitated the barbarous example of the celebrated Lacedemonians, it is certain that those authors have no grounds to impute such inhumanity to the rest of the Americans; for that it has not been the practice, at least with the far greater part of those nations, is to be demonstrated from the attestations of authors the best acquainted with their customs.

49 Errors concerning their want of beard, &c.

No argument against the new world can be drawn from the colour of the Americans; for their colour is less distant from the white of the Europeans than it is from the black of the Africans, and a great part of the Asiatics. The hair of the Mexicans, and of the greater part of the Indians, is, as we have already said, coarse and thick; on their face they appear to have little, and in general none on their arms and legs: but it is an error to say, as M. de Paw does, that they are entirely destitute of hair on all the other parts of their body. This is one of the many passages of the Philosophical Researches, at which the Mexicans, and all the other nations, must smile to find an European philosopher so eager to divest them of the dress they had from nature. Don Ulloa, indeed, in the description which he gives of the Indians of Quito, says, that hair neither grows upon the men nor upon the women when they arrive at puberty, as it does on the rest of mankind; but, whatever singularity may attend the Quitans, or occasion this circumstance, there is no doubt that among the Americans in general, the period of puberty is accompanied with the same symptoms as it is among

other

America. other nations of the world. In fact, with the North Americans, it is disgraceful to be hairy on the body. They say it likens them to hogs. They therefore pluck out the hair as fast as it appears. But the traders who marry their women, and prevail on them to discontinue this practice, say, that nature is the same with them as with the whites. As to the beards of the men, had Buffon or De Paw known the pains and trouble it costs them to pluck out by the roots the hair that grows on their faces, they would have seen that nature had not been deficient in that respect. Every nation has its customs. "I have seen an Indian beau, with a looking-glass in his hand (says Mr Jefferson), examining his face for hours together, and plucking out by the roots every hair he could discover, with a kind of tweezer made of a piece of fine brass wire, that had been twisted round a stick, and which he used with great dexterity.

50 Their forms and aspect contrasted with those of some other nations.

The very aspect of an Angolan, Mandingan, or Congan, would have shocked M. de Paw, and made him recall that censure which he passes on the colour, the make, and hair, of the Americans. What can be imagined more contrary to the idea we have of beauty, and the perfection of the human frame, than a man whose body emits a rank smell, whose skin is as black as ink, whose head and face are covered with black wool instead of hair, whose eyes are yellow and bloody, whose lips are thick and blackish, and whose nose is flat? Such are the inhabitants of a very large portion of Africa, and of many islands of Asia. What men can be more imperfect than those who measure no more than four feet in stature, whose faces are long and flat, the nose compressed, the irides yellowish black, the eyelids turned back towards the temples, the cheeks extraordinarily elevated, their mouths monstrously large, their lips thick and prominent, and the lower part of their visages extremely narrow? Such, according to Count de Buffon, are the Laplanders, the Zemblans, the Borandines, the Samojeds, and Tartars in the east. What objects more deformed than men whose faces are too long and wrinkled even in their youth, their noses thick and compressed, their eyes small and sunk, their cheeks very much raised, their upper jaw low, their teeth long and disunited, eyebrows so thick that they shade their eyes; the eyelids thick, some bristles on their faces instead of beard, large thighs and small legs? Such is the picture Count de Buffon gives of the Tartars; that is, of those people who, as he says, inhabit a tract of land in Asia 1200 leagues long and upwards, and more than 750 broad. Amongst these the Calmucks are the most remarkable for their deformity; which is so great, that, according to Tavernier, they are the most brutal men of all the universe. Their faces are so broad, that there is a space of five or six inches between their eyes, according as Count de Buffon himself affirms. In Calicut, in Ceylon, and other countries of India, there is, say Pyrard and other writers on these regions, a race of men who have one or both of their legs as thick as the body of a man; and that this deformity among them is almost hereditary. The Hottentots, besides other gross imperfections, have that monstrous irregularity attending them of a callous appendage extending from the os pubis downwards, according to the testimony of the historians of the Cape of Good Hope. Struys, Gemelli, and other travellers affirm, that in the kingdom of Lambry, in the islands of Formosa and of Mindoro, men have been found with tails. Bomare says, that a thing of this kind in men is nothing else than an elongation of the os coccygis; but what is a tail in quadrupeds but the elongation of that bone, though divided into distinct articulations? However it may be, it is certain, that that elongation renders those Asiatics fully as irregular as if it was a real tail. America.

If we were, in like manner, to go through the nations of Asia and Africa, we should hardly find any extensive country where the colour of men is not darker, where there are not stronger irregularities observed, and grosser defects to be found in them, than M. de Paw finds fault with in the Americans. The colour of the latter is a good deal clearer than that of almost all the Africans and the inhabitants of southern Asia. Even their alleged scantiness of beard is common to the inhabitants of the Philippine islands, and of all the Indian Archipelago, to the famous Chinese, Japanese, Tartars, and many other nations of the old continent. The imperfections of the Americans, however great they may be represented to be, are certainly not comparable with the defects of that immense people, whose character we have sketched, and others whom we omit.

51 Their constitution and corporal abilities.

M. de Paw represents the Americans to be a feeble and diseased set of nations; and, in order to demonstrate the weakness and disorder of their physical constitution, adduces several proofs equally ridiculous and ill-founded, and which it will not be expected we should enumerate. He alleges, among other particulars, that they were overcome in wrestling by all the Europeans, and that they sunk under a moderate burden; that by a computation made, 200,000 Americans were found to have perished in one year from carrying of baggage, With respect to the first point, the Abbé Clavigero observes, it would be necessary that the experiment of wrestling was made between many individuals of each continent, and that the victory should be attested by the Americans as well as the Europeans. It is not, however meant to insist, that the Americans are stronger than the Europeans. They may be less strong, without the human species having degenerated in them. The Swiss are stronger than the Italians; and still we do not believe the Italians are degenerated, nor do we tax the climate of Italy. The instance of 200,000 Americans having died in one year under the weight of baggage, were it true, would not convince us so much of the weakness of the Americans, as of the inhumanity of the Europeans. In the same manner that those 200,000 Americans perished, 200,000 Prussians would also have perished, had they been obliged to make a journey of between 300 and 400 miles, with 100 pounds of burden upon their backs; if they had collars of iron about their necks, and were obliged to carry that load over rocks and mountains; if those who became exhausted with fatigue, or wounded their feet so as to impede their progress, had their heads cut off that they might not retard the pace of the rest; and if they were not allowed but a small morsel of bread to enable them to support so severe a toil. Las Casas, from whom M. de Paw got the account of the 200,000 Americans who died under the fatigue of carrying baggage, relates also all the above-mentioned circumstances. If

that

America. that author therefore is to be credited in the laſt, he is alſo to be credited in the firſt. But a philoſopher who vaunts the phyſical and moral qualities of Europeans over thoſe of the Americans, would have done better, we think, to have ſuppreſſed facts ſo opprobrious to the Europeans themſelves.

52 Their labour and induſtry.

Nothing in fact demonſtrates ſo clearly the robuſtneſs of the Americans as thoſe various and laſting fatigues in which they are continually engaged. M. de Paw ſays, that when the new world was diſcovered, nothing was to be ſeen but thick woods; that at preſent there are ſome lands cultivated, not by the Americans, however, but by the Africans and Europeans; and that the ſoil in cultivation is to the ſoil which is uncultivated as 2000 to 2,000,090. Theſe three aſſertions the Abbé demonſtrates to be preciſely as many errors. Since the conqueſt, the Americans alone have been the people who have ſupported all the fatigues of agriculture in all the vaſt countries of the continent of South America, and in the greater part of thoſe of North America ſubject to the crown of Spain. No European is ever to be ſeen employed in the labours of the field. The Moors who, in compariſon of the Americans, are very few in number in the kingdom of New Spain, are charged with the culture of the ſugar cane and tobacco, and the making of ſugar; but the ſoil deſtined for the cultivation of thoſe plants is not with reſpect to all the cultivated land of that country in the proportion of one to two thouſand. The Americans are the people who labour on the ſoil. They are the tillers, the ſowers, the weeders, and the reapers of the wheat, of the maize, of the rice, of the beans, and other kinds of grain and pulſe; of the cacao, of the vanilla, of the cotton, of the indigo, and all other plants uſeful to the ſuſtenance, the clothing, and commerce of thoſe provinces; and without them ſo little can be done, that in the year 1762, the harveſt of wheat was abandoned in many places on account of a ſickneſs which prevailed, and prevented the Indians from reaping it. But this is not all; the Americans are they who cut and tranſport all the neceſſary timber from the woods; who cut, tranſport, and work the ſtones; who make lime, plaſter, and tiles; who conſtruct all the buildings of that kingdom, except a few places where none of them inhabit; who open and repair all the roads, who make the canals and ſluices, and clean the cities. They work in many mines of gold, of ſilver, of copper, &c. they are the ſhepherds, herdſmen, weavers, potters, baſket-makers, bakers, couriers, day-labourers, &c.; in a word, they are the perſons who bear all the burden of public labours. Theſe, ſays our juſtly indignant author, are the employments of the weak, daſtardly, and uſeleſs Americans; while the vigorous M. de Paw, and other indefatigable Europeans, are occupied in writing invectives againſt them.

53 Theſe a ſufficient proof of their healthineſs & ſtrength.

Theſe labours, in which the Indians are continually employed, certainly atteſt their healthineſs and ſtrength; for if they are able to undergo ſuch fatigues, they cannot be diſeaſed, nor have an exhauſted ſtream of blood in their veins, as M. de Paw inſinuates. In order to make it believed that their conſtitutions are vitiated, he copies whatever he finds written by hiſtorians of America, whether true or falſe, reſpecting the diſeaſes which reign in ſome particular countries of that great continent. It is not to be denied, that in ſome countries in the wide compaſs of America, men are expoſed more than elſewhere to the diſtempers which are occaſioned by the intemperature of the air, or the pernicious quality of the aliments; but it is certain, according to the aſſertion of many reſpectable authors acquainted with the new world, that the American countries are, for the moſt part, healthy; and if the Americans were diſpoſed to retaliate on M. de Paw, and other European authors who write as he does, they would have abundant ſubject of materials to throw diſcredit on the clime of the old continent, and the conſtitution of its inhabitants, in the endemic diſtempers which prevail there. America.

Laſtly, The ſuppoſed feebleneſs and unſound bodily habit of the Americans do not correſpond with the length of their lives. Among thoſe Americans whoſe great fatigues and exceſſive toils do not anticipate their death, there are not a few who reach the age of 80, 90, and 100 or more years, as formerly mentioned; and what is more, without there being obſerved in them that decay which time commonly produces in the hair, in the teeth, in the ſkin, and in the muſcles of the human body. This phenomenon, ſo much admired by the Spaniards who reſide in Mexico, cannot be aſcribed to any other cauſe than the vigour of their conſtitutions, the temperance of their diet, and the ſalubrity of their clime. Hiſtorians, and other perſons who have ſojourned there for many years, report the ſame thing of other countries of the new world.

54 Their mental qualities.

As to the mental qualities of the Americans, M. de Paw has not been able to diſcover any other characters than a memory ſo feeble, that to-day they do not remember what they did yeſterday; a capacity ſo blunt, that they are incapable of thinking, or putting their ideas in order; a diſpoſition ſo cold, that they feel no excitement of love; a daſtardly ſpirit, and a genius that is torpid and indolent. Many other Europeans, indeed, and what is ſtill more wonderful, many of thoſe children or deſcendants of Europeans who are born in America, think as M. de Paw does; ſome from ignorance, ſome from want of reflection, and others from hereditary prejudice and prepoſſeſſion. But all this and more would not be ſufficient to invalidate the teſtimonies of other Europeans, whoſe authority has a great deal more weight, both becauſe they were men of great judgment, learning, and knowledge of theſe countries, and becauſe they gave their teſtimony in favour of ſtrangers againſt their own countrymen. In particular, Acoſta, whoſe natural and moral hiſtory even M. de Paw commends as *an excellent work*, employs the whole ſixth book in demonſtrating the good ſenſe of the Americans, by an explanation of their ancient government, their laws, their hiſtories in paintings and knots, kalendars, &c. M. de Paw thinks the Americans are beſtial; Acoſta, on the other hand, reputes thoſe perſons weak and preſumptuous who think them ſo. M. de Paw ſays, that the moſt acute Americans were inferior in induſtry and ſagacity to the rudeſt nations of the old continent; Acoſta extols the civil government of the Mexicans above many republics of Europe. M. de Paw finds, in the moral and political conduct of the Americans, nothing but barbarity, extravagance,

America. travagance, and brutality; and Acoſta finds there, laws that are admirable, and worthy of being preſerved for ever.

55 M. de Paw's proofs of American cowardice.

M. de Paw denies them courage, and alleges the conqueſt of Mexico as a proof of their cowardice. "Cortes (he ſays) conquered the empire of Mexico with 450 vagabonds and 15 horſes, badly armed; his miſerable artillery conſiſted of ſix falconets, which would not at the preſent day be capable of exciting the fears of a fortreſs defended by invalids. During his abſence the capital was held in awe by the half of his troops. What men! what events!—It is confirmed by the depoſitions of all hiſtorians, that the Spaniards entered the firſt time into Mexico without making one ſingle diſcharge of their artillery. If the title of hero is applicable to him who has the diſgrace to occaſion the death of a great number of rational animals, Ferdinand Cortes might pretend to it; otherwiſe I do not ſee what true glory he has acquired by the overthrow of a tottering monarchy, which might have been deſtroyed in the ſame manner by any other aſſaſſin of our continent."

56 Refuted.

Theſe paſſages indicate either M. de Paw's ignorance of the hiſtory of the conqueſt of Mexico, or a wilful ſuppreſſion of what would openly contradict his ſyſtem; ſince all who have read that hiſtory know well, that the conqueſt of Mexico was not made with 450 men, but with more than 200,000. Cortes himſelf, to whom it was of more importance than to M. de Paw to make his bravery conſpicuous, and his conqueſt appear glorious, confeſſes the exceſſive number of the allies who were under his command at the ſiege of the capital, and combated with more fury againſt the Mexicans than the Spaniards themſelves. According to the account which Cortes gave to the emperor Charles V. the ſiege of Mexico began with 87 horſes, 848 Spaniſh infantry, armed with guns, croſs-bows, ſwords, and lances, and upwards of 75,000 allies, of Tlaſcala, Huexotzinco, Cholula, and Chalco, equipped with various ſorts of arms; with three large pieces of iron cannon, 15 ſmall of copper, and 13 brigantines. In the courſe of the ſiege were aſſembled the numerous nations of the Otomies, the Cohuixcas, and Matlazincas, and the troops of the populous cities of the lakes; ſo that the army of the beſiegers not only exceeded 200,000, but amounted to 4,000,000, according to the letter from Cortes; and beſides theſe, 3000 boats and canoes came to their aſſiſtance. Did it betray cowardice to have ſuſtained, for full 75 days, the ſiege of an open city, engaging daily with an army ſo large, and in part provided with arms ſo ſuperior, and at the ſame time having to withſtand the ravages of famine? Can they merit the charge of cowardice, who, after having loſt ſeven of the eight parts of their city, and about 50,000 citizens, part cut off by the ſword, part by famine and ſickneſs, continued to defend themſelves until they were furiouſly aſſaulted in the laſt hold which was left them? See the article MEXICO. America.

57 Remarkable inſtance of calumny in M. de Paw.

According to M. de Paw, "the Americans at firſt were not believed to be men, but rather ſatyrs, or large apes, which might be murdered without remorſe or reproach. At laſt, in order to add inſult to the oppreſſion of thoſe times, a pope made an original bull, in which he declared, that being deſirous of founding biſhoprics in the richeſt countries of America, it pleaſed him and the Holy Spirit to acknowledge the Americans to be true men: in ſo far, that without this deciſion of an Italian, the inhabitants of the new world would have appeared, even at this day, to the eyes of the faithful, a race of equivocal men. There is no example of ſuch a deciſion ſince this globe has been inhabited by men and apes." Upon this paſſage the Abbé animadverts, as being a ſingular inſtance of calumny and miſrepreſentation; and gives the following hiſtory of the deciſion alluded to.

58 Occaſion of the famous bull of Paul III.

"Some of the firſt Europeans who eſtabliſhed themſelves in America, not leſs powerful than avaricious, deſirous of enriching themſelves to the detriment of the Americans, kept them continually employed, and made uſe of them as ſlaves; and in order to avoid the reproaches which were made them by the biſhops and miſſionaries who inculcated humanity, and the giving liberty to thoſe people to get themſelves inſtructed in religion, that they might do their duties towards the church and their families, alleged, that the Indians were by nature ſlaves, and incapable of being inſtructed; and many other falſehoods of which the chronicler Herrera makes mention againſt them. Thoſe zealous eccleſiaſtics being unable, either by their authority or preaching, to free thoſe unhappy converts from the tyranny of ſuch miſers, had recourſe to the Catholic kings, and at laſt obtained from their juſtice and clemency thoſe laws, as favourable to the Americans as honourable to the court of Spain, that compoſe the Indian code, which were chiefly due to the indefatigable zeal of the biſhop de las Caſas. On another ſide, Garces biſhop of Tlaſcala, knowing that thoſe Spaniards bore, notwithſtanding their perverſity, a great reſpect to the deciſions of the vicar of Jeſus Chriſt, made application in the year 1586 to Pope Paul III. by that famous letter of which we have made mention; repreſenting to him the evils which the Indians ſuffered from the wicked Chriſtians, and praying him to interpoſe his authority in their behalf. The pope, moved by ſuch heavy remonſtrances, deſpatched the next year the original bull, a faithful copy of which we have here ſubjoined (A), which was not made, as is manifeſt, to declare the

(A) Paulus papa III. univerſis Chriſti Fidelibus preſentes Literas inſpecturis Salutem et Apoſtolicam Benedictionem—"Veritas ipſa, quæ nec falli nec fallere poteſt, cùm Prædicatores Fidei ad officium prædicationis deſtinaret, dixiſſe dignoſcitur: *Euntes docete omnes gentes:* omnes, dixit, abſque omni delectu, cum omnes Fidei diſciplina capaces exiſtant. Quod videns et invidens ipſius humani generis æmulus, qui bonis operibus, ut pereant, ſemper adverſatur, modum excogitavit hactenus inauditum, quo impediret, ne Verbum Dei Gentibus, ut ſalvæ fierent, prædicaretur: ut quoſdam ſuos ſatellites commovit, qui ſuam cupiditatem adimplere cupientes, Occidentales et Meridionales Indos, et alias Gentes, quæ temporibus iſtis ad noſtram notitiam pervenerunt, ſub prætextu quod Fidei Catholicæ expertes exiſtant, uti bruta animalia, ad noſtra obſequia redigendos eſſe, paſſim aſſerere præſumant, et eos in ſervitutem redigunt, tantis afflictionibus illos urgentes, quantis vix bruta animalia illis

America. the Americans true men; for ſuch a piece of weakneſs was very diſtant from that or any other pope: but ſolely to ſupport the natural rights of the Americans againſt the attempts of their oppreſſors, and to condemn the injuſtice and inhumanity of thoſe, who, under the pretence of ſuppoſing theſe people idolatrous, or incapable of being inſtructed, took from them their property and their liberty, and treated them as ſlaves and beaſts.

59 Repreſentation of Columbus. If at firſt the Americans were deemed ſatyrs, nobody can better prove it than Chriſtopher Columbus, their diſcoverer. Let us hear, therefore, how that celebrated admiral ſpeaks, in his account to the Catholic ſovereigns Ferdinand and Iſabella, of the firſt ſatyrs he ſaw in the iſland of Haiti or Hiſpaniola. "I ſwear," he ſays, "to your majeſties, that there is not a better people in the world than theſe, more affectionate, affable, or mild. They love their neighbours as themſelves: their language is the ſweeteſt, the ſofteſt, and the moſt cheerful; for they always ſpeak ſmiling; and although they go naked, let your majeſties believe me, their cuſtoms are very becoming; and their king, who is ſerved with great majeſty, has ſuch engaging manners, that it gives great pleaſure to ſee him, and alſo to conſider the retentive faculty of that people, and their deſire of knowledge, which incites them to aſk the cauſes and the effects of things."

60 Concluſions concerning the capacities of the Americans. "We have had intimate commerce with the Americans (continues the Abbé); have lived for ſome years in a ſeminary deſtined for their inſtruction; ſaw the erection and progreſs of the royal college of Guadaloupe, founded in Mexico by a Mexican Jeſuit, for the education of Indian children; had afterwards ſome Indians amongſt our pupils; had particular knowledge of many American rectors, many nobles, and numerous artiſts; attentively obſerved their character, their genius, their diſpoſition, and manner of thinking; and having examined beſides, with the utmoſt diligence, their ancient hiſtory, their religion, their government, their laws, and their cuſtoms: After ſuch long experience and ſtudy of them, from which we imagine ourſelves enabled to decide without danger of erring, we declare to M. de Paw, and to all Europe, that the mental qualities of the Americans are not in the leaſt inferior to thoſe of the Europeans; that they are capable of all, even the moſt abſtract ſciences; and that, if equal care was taken of their education, if they were brought up from childhood in ſeminaries under good maſters, were protected and ſtimulated by rewards, we ſhould ſee riſe among the Americans, philoſophers, mathematicians, and divines, who would rival the firſt in Europe."

But although we ſhould ſuppoſe, that, in the torrid climates of the new world, as well as in thoſe of the old, eſpecially under the additional depreſſion of ſlavery, there was an inferiority of the mental powers, the Chileſe and the North Americans have diſcovered higher rudiments of human excellence and ingenuity than have ever been known among tribes in a ſimilar ſtate of ſociety in any part of the world. America.

61 Their ingenuity, &c. aſſerted.

M. de Paw affirms, that the Americans were unacquainted with the uſe of money, and quotes the following well-known paſſage from Monteſquieu: "Imagine to yourſelf, that, by ſome accident, you are placed in an unknown country; if you find money there, do not doubt that you are arrived among a poliſhed people." But if by money we are to underſtand a piece of metal with the ſtamp of the prince or the public, the want of it in a nation is no token of barbarity. The Athenians employed oxen for money, as the Romans did ſheep. The Romans had no coined money till the time of Servius Tullius, nor the Perſians until the reign of Darius Hyſtaſpes. But if by money is underſtood a ſign repreſenting the value of merchandiſe, the Mexicans, and other nations of Anahuac, employed money in their commerce. The cacao, of which they made conſtant uſe in the market to purchaſe whatever they wanted, was employed for this purpoſe, as ſalt is in Abyſſinia.

It has been affirmed that ſtone bridges were unknown in America when it was firſt diſcovered; and that the natives did not know how to form arches. But theſe aſſertions are erroneous. The remains of the ancient palaces of Tezcuco, and ſtill more their vapour baths, ſhow the ancient uſe of arches and vaults among the Mexicans. But the ignorance of this art would have been no proof of barbarity. Neither the Egyptians nor Babylonians underſtood the conſtruction of arches.

M. de Paw affirms, that the palace of Montezuma was nothing elſe than a hut. But it is certain, from the affirmation of all the hiſtorians of Mexico, that the army under Cortes, conſiſting of 6400 men, was all lodged in the palace; and there remained ſtill ſufficient room for Montezuma and his attendants.

62 Tokens of ſcience. The advances which the Mexicans had made in the ſtudy of aſtronomy is perhaps the moſt ſurpriſing proof of their attention and ſagacity; for it appears from Abbé Clavigero's hiſtory, that they not only counted 365 days to the year, but alſo knew of the exceſs of about ſix hours in the ſolar over the civil year, and remedied the difference by means of intercalary days.

Of American morality, the following exhortation of

illis ſervientia urgeant. Nos igitur, qui ejuſdem Domini noſtri vices, licet indigni, gerimus in terris, et Oves gregis ſui nobis commiſſas, quæ extra ejus Ovile ſunt, ad ipſum Ovile toto nixu exquirimus, attendentes Indos ipſos, utpote veros homines, non ſolum Chriſtianæ Fidei capaces exiſtere, ſed, ut nobis innotuit, ad Fidem ipſam promptiſſime currere, ac volentes ſuper his congruis remediis providere, prædictos Indos et omnes alias gentes ad notitiam Chriſtianorum in poſterum deventuras, licet extra fidem Chriſti exiſtant, ſua libertate et dominio hujuſmodi uti, et potiri, et gaudere libere, et licite poſſe, nec in ſervitutem redigi debere, ac quicquid ſecus fieri contigerit irritum et inane, ipſoſque Indos, et alias Gentes Verbi Dei prædicatione, et exemplo bonæ vitæ ad dictam Fidem Chriſti invitandos fore. Auctoritate Apoſtolica per præſentes literas decernimus, et declaramus, non obſtantibus premiſſis, cæteriſque contrariis quibuſcunque." Datum Romæ anno 1537. IV. Non. Iun. Pontificatus noſtri anno III. Quæſta, è non altra è quella famoſa bolla, per la quale s' è fatto un ſi grande ſchiamazzo.

America.

63 Specimen of their morality.

a Mexican to his ſon may ſerve as a ſpecimen. "My ſon, who art come into the light from the womb of thy mother like a chicken from the egg, and like it art preparing to fly through the world, we know not how long Heaven will grant to us the enjoyment of that precious gem which we poſſeſs in thee; but however ſhort the period, endeavour to live exactly, praying God continually to aſſiſt thee. He created thee: thou art his property. He is thy father, and loves thee ſtill more than I do: repoſe in him thy thoughts, and day and night direct thy ſighs to him. Reverence and ſalute thy elders, and hold no one in contempt. To the poor and diſtreſſed be not dumb, but rather uſe words of comfort. Honour all perſons, particularly thy parents, to whom thou oweſt obedience, reſpect, and ſervice. Guard againſt imitating the example of thoſe wicked ſons, who, like brutes that are deprived of reaſon, neither reverence their parents, liſten to their inſtruction, nor ſubmit to their correction; becauſe whoever follows their ſteps will have an unhappy end, will die in a deſperate or ſudden manner, or will be killed and devoured by wild beaſts.

"Mock not, my ſon, the aged or the imperfect. Scorn not him whom you ſee fall into ſome folly or tranſgreſſion, nor make him reproaches; but reſtrain thyſelf, and beware leſt thou fall into the ſame error which offends thee in another. Go not where thou art not called, nor interfere in that which does not concern thee. Endeavour to manifeſt thy good breeding in all thy words and actions. In converſation, do not lay thy hands upon another, nor ſpeak too much, nor interrupt or diſturb another's diſcourſe. When any one diſcourſes with thee, hear him attentively, and hold thyſelf in an eaſy attitude, neither playing with thy feet, nor putting thy mantle to thy mouth, nor ſpitting too often, nor looking about you here and there, nor riſing up frequently, if thou art ſitting; for ſuch actions are indications of levity and low breeding."—He proceeds to mention ſeveral particular vices which are to be avoided, and concludes,—"Steal not, nor give thyſelf to gaming; otherwiſe thou wilt be a diſgrace to thy parents, whom thou oughteſt rather to honour for the education they have given thee. If thou wilt be virtuous, thy example will put the wicked to ſhame. No more, my ſon; enough hath been ſaid in diſcharge of the duties of a father. With theſe counſels I wiſh to fortify thy mind. Refuſe them not, nor act in contradiction to them; for on them thy life and all thy happineſs depend."

64 Notions of M. de Buffon concerning the degeneracy of animal nature in America.

As ranging on the ſame ſide with the Abbé Clavigero, the ingenious Mr Jefferſon deſerves particular attention. This gentleman, in his Notes on the State of Virginia, &c. has taken occaſion to combat the opinions of Buffon; and ſeems to have fully refuted them both by argument and facts. The French philoſopher aſſerts, "That living nature is leſs active, leſs energetic, in the new world than in the old." He affirms, 1. That the animals common to both continents are ſmaller in America. 2. That thoſe peculiar to the new are on an inferior ſcale. 3. That thoſe which have been domeſticated in both have degenerated in America. And, 4. That it exhibits fewer ſpecies of living creatures. The cauſe of this he aſcribes to the diminution of heat in America, and to the prevalence of humidity from the extenſion of its lakes and waters over a prodigious ſurface. In other words, he aſſirms, that *heat* is friendly and *moiſture* adverſe to the production and developement of the larger quadrupeds. America.

65 The hypotheſis, that moiſture is unfriendly to animal growth, conſidered.

The hypotheſis, that moiſture is unfriendly to animal growth, Mr Jefferſon ſhows to be contradicted by obſervation and experience. It is by the aſſiſtance of heat and moiſture that vegetables are elaborated from the elements. Accordingly we find, that the more humid climates produce plants in greater profuſion than the dry. Vegetables are immediately or remotely the food of every animal; and, from the uniform operation of Nature's laws we diſcern, that, in proportion to the quantity of food, animals are not only multiplied in their numbers, but improved in their ſize. Of this laſt opinion is the count de Buffon himſelf, in another part of his work: "En general, il paroit que les pays un peu *froids* conviennent mieux à nos bœufs que les pays chauds, et qu'ils ſont d'autant plus gros et plus grands que le climat eſt plus *humide* et plus abondans en paturages. Les bœufs de Danemarc, de la Podolie, de l'Ukraine, et de la Tartarie qu'habitent les Calmouques, ſont les plus grands de tous."

66 The contrary maintained by Mr Jefferſon.

Here, then, a race of animals, and one of the largeſt too, has been increaſed in its dimenſions by cold and moiſture, in direct oppoſition to the hypotheſis, which ſuppoſes that theſe two circumſtances diminiſh animal bulk, and that it is their contraries, heat and dryneſs, which enlarge it. But to try the queſtion on more general ground, let us take two portions of the earth, Europe and America for inſtance, ſufficiently extenſive to give operation to general cauſes; let us conſider the circumſtances peculiar to each, and obſerve their effect on animal nature. America, running through the torrid as well as temperate zone, has more heat collectively taken, than Europe. But Europe, according to our hypotheſis, is the drieſt. They are equally adapted then to animal productions; each being endowed with one of thoſe cauſes which befriend animal growth, and with one which oppoſes it. Let us, then, take a comparative view of the quadrupeds of Europe and America, preſenting them to the eye in three different tables; in one of which ſhall be enumerated thoſe found in both countries; in a ſecond, thoſe found in one only; in a third, thoſe which have been domeſticated in both. To facilitate the compariſon, let thoſe of each table be arranged in gradation, according to their ſizes, from the greateſt to the ſmalleſt, ſo far as their ſizes can be conjectured. The weights of the large animals ſhall be expreſſed in the Engliſh avoirdupois pound and its decimals; thoſe of the ſmaller in the ounce and its decimals. Thoſe which are marked thus *, are actual weights of particular ſubjects, deemed among the largeſt of their ſpecies. Thoſe marked thus †, are furniſhed by judicious perſons, well acquainted with the ſpecies, and ſaying, from conjecture only, what the largeſt individual they had ſeen would probably have weighed. The other weights are taken from Meſſrs Buffon and D'Aubenton, and are of ſuch ſubjects as came caſually to their hands for diſſection.

"Comparative

America.

"Comparative View of the Quadrupeds of Europe and of America.

Table I. *Aboriginals of both.*	Europe.	America.
	lb.	lb.
Mammoth		
Buffalo. Biſon		*1800
White bear. Ours blanc		
Caribou. Renne		
Bear. Ours	153.7	*410
Elk. Elan. Original, palmated		
Red deer. Cerf.	288.8	*273
Fallow deer. Daim	167.8	
Wolf. Loup	69.8	
Roe. Chevreuil	56.7	
Glutton. Glouton. Carcajou		
Wild cat. Chat ſauvage		†30
Lynx. Loup cervier	25.	
Beaver. Caſtor	18.5	*45
Badger. Blaireau	13.6	
Red fox. Renard	13.5	
Gray fox. Iſatis	-	
Otter. Loutre	8.9	†12
Monax. Marmotte	6.5	
Viſon. Fouine	2.8	
Hedgehog. Heriſſon	2.2	
Martin. Marte	1.9	†6
	oz.	
Water rat. Rat d'eau	7.5	
Weaſel. Belette	2.2	oz.
Flying ſquirrel. Polatouche	2.2	†4
Shrew mouſe. Muſaraigne	1.	

Table II. *Aboriginals of one only.*

EUROPE.		AMERICA.	
	lb.		lb.
Sanglier. Wild boar	280.	Tapir	534.
Mouflon. Wild ſheep	56.	Elk, round horned	†450.
Bouquetin. Wild goat		Puma	
Lievre. Hare	7.6	Jaguar	218.
Lapin. Rabbit	3.4	Cabiai	109.
Putois. Polecat	3.3	Tamanoir	109.
Genette	3.1	Tamandua	65.4
Deſman. Muſk rat	oz.	Cougar of N. Amer.	75.
Ecureuil. Squirrel	12.	Cougar of S. Amer.	59.4
Hermine. Ermine	8.2	Ocelot	
Rat. Rat	7.5	Pecari	46.3
Loirs	3.1	Jaguaret	43.6
Lerot. Dormouſe	1.8	Alco	
Toupe. Mole	1.2	Lama	
Hamſter	.9	Paco	
Ziſel		Paca	32.7
Leming		Serval	
Souris. Mouſe	.6	Sloth. Unau	27¼
		Saricovienne	
		Kincajou	
		Tatou Kabaſſou	21.8
		Urſon. Urchin	

America.

Table II. *continued.*

EUROPE.	AMERICA.	
		lb.
	Raccoon. Raton	16.5
	Coati	
	Coendou	16.3
	Sloth. Aï	13.
	Sapajou Ouarini	
	Sapajou Coaita	9.8
	Tatou Encubert	
	Tatou Apar	
	Tatou Cachica	7.
	Little Coendou	6.5
	Opoſſum. Sarigue	
	Tapeti	
	Margay	
	Crabier	
	Agouti	4.2
	Sapajou Saï	3.5
	Tatou Cirquinçon	
	Tatou Tatouate	3.3
	Mouffette Squaſh	
	Mouffette Chiche	
	Mouffette Conepate. Scunk	
	Mouffette. Zorilla	
	Whabus. Hare. Rabbit	
	Aperea	
	Akouchi	
	Ondatra. Muſk rat	
	Pilori	
	Great gray ſquirrel	†2.7
	Fox ſquirrel of Virginia	†2.625
	Surikate	2.
	Mink	†2.
	Sapajou. Sajou	1.8
	Indian pig. Cochon d'Inde	1.6
	Sapajou. Saïmiri	1.5
	Phalanger	
	Coquallin	
	Leſſer gray ſquirrel	†1.5
	Black ſquirrel	†1.5
	Red ſquirrel	10.oz.
	Sagoin Saki	
	Sagoin Pinche	
	Sagoin Tamarin	oz.
	Sagoin Ouiſtiti	4.4
	Sagoin Marikine	
	Sagoin Mico	
	Cayopollin	
	Fourmillier	
	Marmoſe	
	Sarigue of Cayenne	
	Tucan	
	Red mole	oz.
	Ground ſquirrel	4.

America.

TABLE III. *Domeſticated in both.*

	Europe.	America.
	lb.	lb.
Cow	763.	*2500
Horſe		*1366
Aſs		
Hog		*1200
Sheep		*125
Goat		*80
Dog	67.6	
Cat	7.	

67 Reſult of the firſt table.

" The reſult of this view is, that of 26 quadrupeds common to both countries, ſeven are ſaid to be larger in America, ſeven of equal ſize, and 12 not ſufficiently examined. So that the firſt table impeaches the firſt member of the aſſertion, that of the animals common to both countries the American are ſmalleſt, " Et cela ſans aucune exception." It ſhows it not juſt, in all the latitude in which its author has advanced it, and probably not to ſuch a degree as to found a diſtinction between the two countries.

68 Explanation and reſult of the ſecond table.

" Proceeding to the ſecond table, which arranges the animals found in one of the two countries only, M. de Buffon obſerves, that the tapir, the elephant of America, is but of the ſize of a ſmall cow. To preſerve our compariſon, Mr Jefferſon ſtates the wild boar, the elephant of Europe, as little more than half that ſize. He has made an elk with round or cylindrical horns an animal of America, and peculiar to it; becauſe he has ſeen many of them himſelf, and more of their horns; and becauſe, from the beſt information, it is certain that in Virginia this kind of elk has abounded much, and ſtill exiſts in ſmaller numbers. He makes the American hare or rabbit peculiar, believing it to be different from both the European animals of theſe denominations, and calling it therefore by its Algonquin name *whabus*, to keep it diſtinct from theſe. Kalm is of the ſame opinion. The ſquirrels are denominated from a knowledge derived from daily ſight of them, becauſe with that the European appellations and deſcriptions ſeem irreconcilable, Theſe are the only inſtances in which Mr Jefferſon departs from the authority of M. de Buffon in the conſtruction of this table; whom he takes for his ground-work, becauſe he thinks him the beſt informed of any naturaliſt who has ever written. The reſult is, that there are 18 quadrupeds peculiar to Europe; more than four times as many, to wit 74, peculiar to America; that the firſt of theſe 74, the tapir, the largeſt of the animals peculiar to America, weighs more than the whole column of Europeans; and conſequently this ſecond table diſproves the ſecond member of the aſſertion, that the animals peculiar to the new world are on a ſmaller ſcale, ſo far as that aſſertion relied on European animals for ſupport: and it is in full oppoſition to the theory which makes the animal volume to depend on the circumſtances of heat and moiſture.

69 Of the third table.

" The third table comprehends thoſe quadrupeds only which are domeſtic in both countries. That ſome of theſe, in ſome parts of America, have become leſs than their original ſtock, is doubtleſs true; and the reaſon is very obvious. In a thinly peopled country, the ſpontaneous productions of the foreſts and waſte fields are ſufficient to ſupport indifferently the domeſtic animals of the farmer, with a very little aid from him in the ſevereſt and ſcarceſt ſeaſon. He therefore finds it more convenient to receive them from the hand of Nature in that indifferent ſtate, than to keep up their ſize by a care and nouriſhment which would coſt him much labour. If, on this low fare, theſe animals dwindle, it is no more than they do in thoſe parts of Europe where the poverty of the ſoil, or poverty of the owner, reduces them to the ſame ſcanty ſubſiſtence. It is the uniform effect of one and the ſame cauſe, whether acting on this or that ſide of the globe. It would be erring, therefore, againſt that rule of philoſophy, which teaches us to aſcribe like effects to like cauſes, ſhould we impute this diminution of ſize in America to any imbecility or want of uniformity in the operations of nature. It may be affirmed with truth, that in thoſe countries, and with thoſe individuals of America, where neceſſity or curioſity has produced equal attention as in Europe to the nouriſhment of animals, the horſes, cattle, ſheep, and hogs, of the one continent are as large as thoſe of the other. There are particular inſtances, well atteſted, where individuals of America have imported good breeders from England, and have improved their ſize by care in the courſe of ſome years. And the weights actually known and ſtated in the third table, will ſuffice to ſhow, that we may conclude, on probable grounds, that, with equal food and care, the climate of America will preſerve the races of domeſtic animals as large as the European ſtock from which they are derived; and conſequently that the third member of Monſ. de Buffon's aſſertion, that the domeſtic animals are ſubject to degeneration from the climate of America, is as probably wrong as the firſt and ſecond were certainly ſo.

America.

That the laſt part of it is erroneous, which affirms, that the ſpecies of American quadrupeds are comparatively few, is evident from the tables taken all together; to which may be added the proof adduced by the Abbé Clavigero. According to Buffon's lateſt calculation, in his *Epoques de la Nature*, there are 300 ſpecies of quadrupeds; and America, though it does not make more than a third part of the globe, contains, according to Clavigero, almoſt one half of the different ſpecies of its animals.

70 The human inhabitants comprehended in the ſame hypotheſis of degeneracy.

Of the human inhabitants of America, to whom the ſame hypotheſis of degeneracy is extended, M. Buffon gives the following deſcription: " Though the American ſavage be nearly of the ſame ſtature with men in poliſhed ſocieties; yet this is not a ſufficient exception to the general contraction of animated nature throughout the whole continent. In the ſavage, the organs of generation are ſmall and feeble. He has no hair, no beard, no ardour for the female. Though nimbler than the European, becauſe more accuſtomed to running, his ſtrength is not ſo great. His ſenſations are leſs acute; and yet he is more timid and cowardly. He has no vivacity, no activity of mind. The activity of his body is not ſo much an exerciſe or ſpontaneous motion, as a neceſſary action produced by want. Deſtroy his appetite for victuals and drink, and you will at once annihilate the active principle of all his movements: He remains in ſtupid repoſe, on his limbs or couch, for whole days. It is eaſy to diſcover the cauſe of the

ſcattered

America. scattered life of savages, and of their estrangement from society. They have been refused the most precious spark of Nature's fire: They have no ardour for women, and, of course, no love to mankind. Unacquainted with the most lively and most tender of all attachments, their other sensations of this nature are cold and languid. Their love to parents and children is extremely weak. The bounds of the most intimate of all societies, that of the same family, are feeble; and one family has no attachment to another. Hence no union, no republic, no social state, can take place among them. The physical cause of love gives rise to the morality of their manners. Their heart is frozen, their society cold, and their empire cruel. They regard their females as servants destined to labour, or as beasts of burden, whom they load unmercifully with the produce of their hunting, and oblige, without pity or gratitude, to perform labours which often exceed their strength. They have few children, and pay little attention to them. Every thing must be referred to the first cause: They are indifferent, because they are weak; and this indifference to the sex is the original stain which disgraces Nature, prevents her from expanding, and, by destroying the germs of life, cuts the root of society. Hence man makes no exception to what has been advanced. Nature, by denying him the faculty of love, has abused and contracted him more than any other animal."

71 Observations by Mr Jefferson.

A humiliating picture indeed! but than which, Mr Jefferson assures us, never one was more unlike the original. M. Buffon grants, that their stature is the same as that of the men of Europe; and he might have admitted, that the Iroquois were larger, and the Lenopi or Delawares taller, than people in Europe generally are: But he says their organs of generation are smaller and weaker than those of Europeans; which is not a fact. And as to their want of beard, this error has been already noticed (N° 49. *supra.*)

72 Seeming coldness of the Americans to the sex accounted for.

"They have no ardour for their females." It is true, they do not indulge those excesses, nor discover that fondness, which are customary in Europe; but this is not owing to a defect in nature, but to manners. Their soul is wholly bent upon war. This is what procures them glory among the men, and makes them the admiration of the women. To this they are educated from their earliest youth. When they pursue game with ardour, when they bear the fatigues of the chase, when they sustain and suffer patiently hunger and cold, it is not so much for the sake of the game they pursue, as to convince their parents and the council of the nation, that they are fit to be enrolled in the number of the warriors. The songs of the women, the dance of the warriors, the sage counsel of the chiefs, the tales of the old, the triumphant entry of the warriors returning with success from battle, and the respect paid to those who distinguish themselves in battle, and in subduing their enemies; in short, every thing they see or hear tends to inspire them with an ardent desire for military fame. If a young man were to discover a fondness for women before he has been to war, he would become the contempt of the men, and the scorn and ridicule of the women: or were he to indulge himself with a captive taken in war, and much more were he to offer violence in order to gratify his lust, he would incur indelible disgrace. The seeming frigidity of the men, therefore, is the effect of manners, and not a defect of nature. They are neither more defective in ardour, nor more impotent with the female, than are the whites reduced to the same diet and exercise. America.

73 Why they have few children.

"They raise few children."—They indeed raise fewer children than we do; the causes of which are to be found, not in a difference of nature, but of circumstance. The women very frequently attending the men in their parties of war and of hunting, childbearing becomes extremely inconvenient to them. It is said, therefore, that they have learned the practice of procuring abortion by the use of some vegetable; and that it even extends to prevent conception for a considerable time after. During these parties they are exposed to numerous hazards, to excessive exertions, to the greatest extremities of hunger. Even at their homes, the nation depends for food, through a certain part of every year, on the gleanings of the forest; that is, they experience a famine once in every year. With all animals, if the female be badly fed, or not fed at all, her young perish; and if both male and female be reduced to like want, generation becomes less active, less productive. To the obstacles, then, of want and hazard, which Nature has opposed to the multiplication of wild animals, for the purpose of restraining their numbers within certain bounds, those of labour and of voluntary abortion are added with the Indian. No wonder, then, if they multiply less than we do. Where food is regularly supplied, a single farm will show more of cattle than a whole country of forests can of buffaloes. The same Indian women, when married to white traders, who feed them and their children plentifully and regularly, who exempt them from excessive drudgery, who keep them stationary and unexposed to accident, produce and raise as many children as the white women. Instances are known, under these circumstances, of their rearing a dozen children.

74 Of their sensibility, &c.

Neither do they seem to be "deficient in natural affection." On the contrary, their sensibility is keen, even the warriors weeping most bitterly on the loss of their children; though in general they endeavour to appear superior to human events.

Their friendships are strong, and faithful to the uttermost extremity. A remarkable instance of this appeared in the case of the late Col. Byrd, who was sent to the Cherokee nation to transact some business with them. It happened that some of our disorderly people had just killed one or two of that nation. It was therefore proposed in the council of the Cherokees, that Col. Byrd should be put to death, in revenge for the loss of their countrymen. Among them was a chief, called *Silòuee*, who, on some former occasion, had contracted an acquaintance and friendship with Col. Byrd: He came to him every night in his tent, and told him not to be afraid, they should not kill him. After many days deliberation, however, the determination was, contrary to Silòuee's expectation, that Byrd should be put to death, and some warriors were despatched as executioners. Silòuee attended them; and when they entered the tent, he threw himself between them and Byrd, and said to the warriors, "This man is my friend: before you get at him, you must kill

America. kill me." On which they returned; and the council reſpected the principle ſo much as to recede from their determination.

That "they are timorous and cowardly," is a character with which there is little reaſon to charge them, when we recollect the manner in which the Iroquois met Monſ. ———, who marched into their country; in which the old men, who ſcorned to fly, or to ſurvive the capture of their town, braved death like the old Romans in the time of the Gauls, and in which they ſoon after revenged themſelves by ſacking and deſtroying Montreal. In ſhort, the Indian is brave, when an enterpriſe depends on bravery; education with him making the point of honour conſiſt in the deſtruction of an enemy by ſtratagem, and in the preſervation of his own perſon free from injury: or perhaps this is nature, while it is education which teaches us to honour force more than fineſſe. He will defend himſelf againſt an hoſt of enemies, always chooſing to be killed rather than to ſurrender, though it be to the whites, who he knows will treat him well. In other ſituations alſo, he meets death with more deliberation, and endures tortures with a firmneſs unknown almoſt to religious enthuſiaſm among us.

75 Of their courage. (See alſo Nos 54, 55. *ſupra*)

Much leſs are they to be characterized as a people of no vivacity, and who are excited to action or motion only by the calls of hunger and thirſt. Their dances, in which they ſo much delight, and which to a European would be the moſt ſevere exerciſe, fully contradict this; not to mention their fatiguing marches, and the toil they voluntarily and cheerfully undergo in their military expeditions. It is true, that when at home they do not employ themſelves in labour or the culture of the ſoil: but this, again, is the effect of cuſtoms and manners which have aſſigned that to the province of the women. But it is ſaid, "they are averſe to ſociety and a ſocial life." Can any thing be more inapplicable than this to people who always live in towns or in clans? Or can they be ſaid to have no *republique*, who conduct all their affairs in national councils; who pride themſelves in their national character; who conſider an inſult or injury done to an individual by a ſtranger as done to the whole, and reſent it accordingly?

To form a juſt eſtimate of their genius and mental powers, Mr Jefferſon obſerves, more facts are wanting, and great allowance is to be made for thoſe circumſtances of their ſituation which call for a diſplay of particular talents only. This done, we ſhall probably find that the Americans are formed, in mind as well as in body, on the ſame model with the *homo ſapiens Europæus*. The principles of their ſociety forbidding all compulſion, they are to be led to duty and to enterpriſe by perſonal influence and perſuaſion. Hence eloquence in council, bravery and addreſs in war, become the foundations of all conſequence with them. To theſe acquirements all their faculties are directed. Of their bravery and addreſs in war we have multiplied proofs, becauſe we have been the ſubjects on which they were exerciſed. Of their eminence in oratory we have fewer examples, becauſe it is diſplayed chiefly in their own councils. Some, however, we have of very ſuperior luſtre. We may challenge the whole orations of Demoſthenes and Cicero, and of any more eminent orator, if Europe has furniſhed more eminent, to produce a ſingle paſſage ſuperior to the ſpeech of Logan, a Mingo chief, to Lord Dunmore when governor of this ſtate. The ſtory is as follows; of which, and of the ſpeech, the authenticity is unqueſtionable. In the ſpring of the year 1774, a robbery and murder were committed on an inhabitant of the frontiers of Virginia by two Indians of the Shawanee tribe. The neighbouring whites, according to their cuſtom, undertook to puniſh this outrage in a ſummary way. Colonel Creſap, a man infamous for the many murders he had committed on thoſe much-injured people, collected a party, and proceeded down the Kanhaway in queſt of vengeance. Unfortunately a canoe of women and children, with one man only, was ſeen coming from the oppoſite ſhore, unarmed, and unſuſpecting any hoſtile attack from the whites. Creſap and his party concealed themſelves on the bank of the river; and the moment the canoe reached the ſhore, ſingled out their objects, and at one fire killed every perſon in it. This happened to be the family of Logan, who had long been diſtinguiſhed as a friend of the whites. This unworthy return provoked his vengeance. He accordingly ſignalized himſelf in the war which enſued. In the autumn of the ſame year, a deciſive battle was fought at the mouth of the Great Kanhaway, between the collected forces of the Shawanees, Mingoes, and Delawares, and a detachment of the Virginian militia. The Indians were defeated, and ſued for peace. Logan, however, diſdained to be ſeen among the ſuppliants; but, leſt the ſincerity of a treaty ſhould be diſtruſted from which ſo diſtinguiſhed a chief abſented himſelf, he ſent by a meſſenger the following ſpeech, to be delivered to Lord Dunmore:—I appeal to any white man to ſay if ever he entered Logan's cabin hungry, and he gave him not meat: if ever he came cold and naked, and he clothed him not. During the courſe of the laſt long and bloody war, Logan remained idle in his cabin, an advocate for peace. Such was my love for the whites, that my countrymen pointed as they paſſed, and ſaid, *Logan is the friend of white men.* I had even thought to have lived with you, but for the injuries of one man. Colonel Creſap, the laſt ſpring, in cold blood, and unprovoked, murdered all the relations of Logan, not ſparing even my women and children. There runs not a drop of my blood in the veins of any living creature. This called on me for revenge. I have ſought it; I have killed many; I have fully glutted my vengeance. For my country, I rejoice at the beams of peace; but do not harbour a thought that mine is the joy of fear. Logan never felt fear. He will not turn on his heel to ſave his life. Who is there to mourn for Logan? Not one."

America. 76 Story of Logan. 77 Specimen of Indian eloquence.

To the preceding anecdotes in favour of the American character, may be added the following by Dr Benjamin Franklin. The Indian men, when young, are hunters and warriors: when old, counſellors; for all their government is by the counſel or advice of the ſages. Hence they generally ſtudy oratory; the beſt ſpeaker having the moſt influence. The Indian women till the ground, dreſs the food, nurſe and bring up the children, and preſerve and hand down to poſterity the memory of public tranſactions. Theſe employments of men and women are accounted natural and honourable. Having few artificial wants, they have abundance of leiſure for improvement by converſation. Our laborious manner of life, compared with theirs, they eſteem

78 Other anecdotes.

America. esteem slavish and base; and the learning on which we value ourselves, they regard as frivolous and useless.

Having frequent occasions to hold public councils, they have acquired great order and decency in conducting them. The old men sit in the foremost ranks, the warriors in the next, and the women and children in the hindmost. The business of the women is to take exact notice of what passes; imprint it in their memories, for they have no writing, and communicate it to their children. They are the records of the council, and they preserve tradition of the stipulations in treaties a hundred years back; which, when we compare with our writings, we always find exact. He that would speak rises. The rest observe a profound silence. When he has finished, and sits down, they leave him five or six minutes to recollect, that if he has omitted any thing he intended to say, or has any thing to add, he may rise again and deliver it. To interrupt another, even in common conversation, is reckoned highly indecent.

79 Politeness and civility of the American Indians. The politeness of these savages in conversation is, indeed, carried to excess; since it does not permit them to contradict or deny the truth of what is asserted in their presence. By this means they indeed avoid disputes; but then it becomes difficult to know their minds, or what impression you make upon them. The missionaries who have attempted to convert them to Christianity, all complain of this as one of the greatest difficulties of their mission. The Indians hear with patience the truths of the gospel explained to them, and give their usual tokens of assent and approbation; but this by no means implies conviction; it is mere civility.

When any of them come into our towns, our people are apt to crowd round them, gaze upon them, and incommode them where they desire to be private; this they esteem great rudeness, and the effect of the want of instruction in the rules of civility and good manners. "We have (say they) as much curiosity as you; and when you come into our towns, we wish for opportunities of looking at you; but for this purpose we hide ourselves behind bushes where you are to pass, and never intrude ourselves into your company."

80 Their hospitality. Their manner of entering one another's villages has likewise its rules. It is reckoned uncivil in travelling strangers to enter a village abruptly, without giving notice of their approach. Therefore, as soon as they arrive within hearing, they stop and holla, remaining there till invited to enter. Two old men usually come out to them and lead them in. There is in every village a vacant dwelling, called the *strangers house*. Here they are placed, while the old men go round from hut to hut, acquainting the inhabitants that strangers are arrived, who are probably hungry and weary; and every one sends them what he can spare of victuals, and skins to repose on. When the strangers are refreshed, pipes and tobacco are brought; and then, but not before, conversation begins, with inquiries who they are, whither bound, what news, &c. and it usually ends with offers of service; if the strangers have occasion for guides, or any necessaries for continuing their journey; and nothing is exacted for the entertainment.

The same hospitality, esteemed among them as a principal virtue, is practised by private persons; of America. which Conrad Weiser, the interpreter, gave Dr Franklin the following instance: He had been naturalized among the Six Nations, and spoke well the Mohock language. In going through the Indian country to carry a message from our governor to the council at Onondaga, he called at the habitation of Canassetego, an old acquaintance, who embraced him, spread furs for him to sit on, placed before him some boiled beans and venison, and mixed some rum and water for his drink. When he was well refreshed, and had lit his pipe, Canassetego began to converse with him; asked how he had fared the many years since they had seen each other, whence he then came, what had occasioned the journey, &c. Conrad answered all his questions, and when the discourse began to flag, the Indian, to continue it, said, "Conrad, you have lived long among the white people, and know something of their customs; I have been sometimes at Albany, and have observed, that once in seven days they shut up their shops, and assemble all in the great house; tell me what it is for!—What do they do there?" "They meet there (says Conrad) to hear and learn *good things*." "I do not doubt (says the Indian) that they tell you so; they have told me the same: but I doubt the truth of what they say, and I will tell you my reasons. I went lately to Albany to sell my skins, and buy blankets, knives, powder, rum, &c. You know I generally used to deal with Hans Hanson; but I was a little inclined this time to try some other merchants. However, I called first upon Hans, and asked him what he would give for beaver. He said he could not give more than 4s. a-pound; but (says he) I cannot talk on business now; this is the day when we meet together to learn *good things*, and I am going to the meeting. So I thought to myself, since I cannot do any business to-day, I may as well go to the meeting too; and I went with him. —There stood up a man in black, and began to talk to the people very angrily. I did not understand what he said; but perceiving that he looked much at me and at Hanson, I imagined he was angry at seeing me there: so I went out, sat down near the house, struck fire, and lit my pipe, waiting till the meeting should break up. I thought too, that the man had mentioned something of beaver, and I suspected that it might be the subject of their meeting. So when they came out, I accosted my merchant.—Well Hans (says I), I hope you have agreed to give more than 4s. a-pound?" "No (says he), I cannot give so much, I cannot give more than 3s. 6d." "I then spoke to several other dealers, but they all sung the same song, three and sixpence, three and sixpence. This made it clear to me that my suspicion was right; and that whatever they pretended of meeting to learn *good things*, the real purpose was, to consult how to cheat Indians in the price of beaver. Consider but a little, Conrad, and you must be of my opinion. If they met so often to learn *good things*, they certainly would have learned some before this time. But they are still ignorant. You know our practice. If a white man, in travelling through our country, enters one of our cabins, we all treat him as I treat you; we dry him if he is wet, we warm him if he is cold, and give him meat and drink, that he may allay his thirst and hunger; and we spread soft

America. furs for him to reſt and ſleep on: we demand nothing in return. But if I go into a white man's houſe at Albany, and aſk for victuals and drink, they ſay, Where is your money? And if I have none, they ſay, Get out, you Indian dog. You ſee they have not yet learned thoſe little *good things* that we need no meeting to be inſtructed in; becauſe our mothers taught them to us when we were children; and therefore it is impoſſible their meetings ſhould be, as they ſay, for any ſuch purpoſe, or have any ſuch effect; they are only to contrive *the cheating of Indians in the price of beaver.*"

THE next queſtion that occurs is, Whether the peculiarities of the Americans, or the diſparity between them and the inhabitants of Europe, afford ſufficient grounds for determining them, as ſome have done, to be a race of men radically different from all others?

In this queſtion, to avoid being tedious, we ſhall confine ourſelves to what has been advanced by Lord Kames; who is of opinion, that there are many different ſpecies of men, as well as of other animals; and gives a hypotheſis, whereby he pretends his opinion may be maintained in a conſiſtency with revelation. "If (ſays he) the only rule afforded by nature for claſſing animals can be depended on, there are different races of men as well as of dogs: a maſtiff differs not more from a ſpaniel, than a white man from a negro, or a Laplander from a Dane. And if we have any faith in Providence, it ought to be ſo. Plants were created of different kinds, to fit them for different climates; and ſo were brute animals. Certain it is, that all men are not fitted equally for every climate. There is ſcarce a climate but what is natural to ſome men, where they proſper and flouriſh; and there is not a climate but where ſome men degenerate. Doth not then analogy lead us to conclude, that, as there are different climates on the face of this globe, ſo there are different races of men fitted for theſe different climates?

81 Lord Kames's arguments for different ſpecies.

"M. Buffon, from the rule, That animals which can procreate together, and whoſe progeny can alſo procreate, are of one ſpecies; concludes, that all men are of one race or ſpecies; and endeavours to ſupport that favourite opinion, by aſcribing to the climate, to food, or to other accidental cauſes, all the varieties that are found among men. But is he ſeriouſly of opinion, that any operation of climate, or of other accidental cauſe, can account for the copper colour and ſmooth chin univerſal among the Americans; the prominence of the pudenda univerſal among the Hottentot women; or the black nipple no leſs univerſal among the female Samoiedes?—It is in vain to aſcribe to the climate the low ſtature of the Eſquimaux, the ſmallneſs of their feet, or the overgrown ſize of their heads. It is equally in vain to aſcribe to climate the low ſtature of the Laplanders, or their ugly viſage. The black colour of negroes, thick lips, flat noſe, criſped woolly hair, and rank ſmell, diſtinguiſh them from every other race of men. The Abyſſinians, on the contrary, are tall and well made, their complexion a brown olive, features well proportioned, eyes large and of a ſparkling black, thin lips, a noſe rather high than flat. There is no ſuch difference of climate between Abyſſinia and Negroland as to produce theſe ſtriking differences.

"Nor ſhall our author's ingenious hypotheſis concerning the extremities of heat and cold, purchaſe him impunity with reſpect to the ſallow complexion of the Samoiedes, Laplanders, and Greenlanders. The Finlanders, and northern Norwegians, live in a climate not leſs cold than that of the people mentioned; and yet are fair beyond other Europeans. I ſay more, there are many inſtances of races of people preſerving their original colour, in climates very different from their own; but not a ſingle inſtance of the contrary, as far as I can learn. There have been four complete generations of negroes in Pennſylvania, without any viſible change of colour; they continue jet black, as originally. Thoſe who aſcribe all to the ſun, ought to conſider how little probable it is, that the colour it impreſſes on the parents ſhould be communicated to their infant children, who never ſaw the ſun: I ſhould be as ſoon induced to believe with a German naturaliſt, whoſe name has eſcaped me, that the negro colour is owing to an ancient cuſtom in Africa, of dyeing the ſkin black. Let a European, for years, expoſe himſelf to the ſun in a hot climate, till he be quite brown; his children will nevertheleſs have the ſame complexion with thoſe in Europe. From the action of the ſun, is it poſſible to explain, why a negro, like a European, is born with a ruddy ſkin, which turns jet black the eighth or ninth day?" America.

Our author next proceeds to draw ſome arguments for the exiſtence of different races of men, from the various tempers and diſpoſitions of different nations; which he reckons to be *ſpecific* differences, as well as thoſe of colour, ſtature, &c. and having ſummed up his evidence he concludes thus: "Upon ſumming up the whole particulars mentioned above, would one heſitate a moment to adopt the following opinion, were there no counterbalancing evidence, *viz.* 'That God created many pairs of the human race, differing from each other, both externally and internally; that he fitted thoſe pairs for different climates, and placed each pair in its proper climate; that the peculiarities of the original pairs were preſerved entire in their deſcendants; who, having no aſſiſtance but their natural talents, were left to gather knowledge from experience: and, in particular, were left (each tribe) to form a language for itſelf; that ſigns were ſufficient for the original pairs, without any language but what nature ſuggeſts; and that a language was formed gradually as a tribe increaſed in numbers, and in different occupations, to make ſpeech neceſſary?' But this opinion, however plauſible, we are not permitted to adopt; being taught a different leſſon by revelation, *viz.* That God created but a ſingle pair of the human ſpecies. Though we cannot doubt the authority of Moſes, yet his account of the creation of man is not a little puzzling, as it ſeems to contradict every one of the facts mentioned above. According to that account, different races of men were not formed, nor were men formed originally for different climates. All men muſt have ſpoken the ſame language, *viz.* that of our firſt parents. And what of all ſeems the moſt contradictory to that account, is the ſavage ſtate: Adam, as Moſes informs us, was endued by his Maker with an eminent degree of knowledge; and he certainly was an excellent preceptor to his children and their progeny, among whom he lived many generations. Whence then the degeneracy of all men into the ſavage ſtate? To account for that diſmal cataſtrophe,

America. taſtrophe, mankind muſt have ſuffered ſome terrible convulſion. That terrible convulſion is revealed to us in the hiſtory of the tower of Babel contained in the 11th chapter of Geneſis, which is, 'That, for many centuries after the deluge, the whole earth was of one language, and of one ſpeech; that they united to build a city on a plain in the land of Shinar, with a tower, whoſe top might reach unto heaven; that the Lord, beholding the people to be one, and to have all one language, and that nothing would be reſtrained from them which they imagined to do, confounded their language that they might not underſtand one another, and ſcattered them abroad upon the face of all the earth.' Here light breaks forth in the midſt of darkneſs. By confounding the language of men, and ſcattering them abroad upon the face of all the earth, they were rendered ſavages. And to harden them for their new habitations, it was neceſſary that they ſhould be divided into different kinds, fitted for different climates. Without an immediate change of conſtitution, the builders of Babel could not poſſibly have ſubſiſted in the burning region of Guinea, nor in the frozen region of Lapland; houſes not being prepared, nor any other convenience to protect them againſt a deſtructive climate."

82 His hypotheſis concerning the origin of the different ſpecies,

83 Incomplete. We may firſt remark, on his Lordſhip's hypotheſis, that it is evidently incomplete; for, allowing the human race to have been divided into different ſpecies at the confuſion of languages, and that each ſpecies was adapted to a particular climate; by what means were they to get to the climates proper for them, or how were they to know that ſuch climates exiſted? How was an American, for inſtance, when languiſhing in an improper climate at Babel, to get to the land of the Amazons, or the banks of the Oroonoko, in his own country? or how was he to know that theſe places were more proper for him than others?—If, indeed we take the Scripture phraſe, "The Lord *ſcattered them abroad* upon the face of all the earth," in a certain ſenſe, we may account for it. If we ſuppoſe that the different ſpecies were immediately carried off by a whirlwind, or other ſupernatural means, to their proper countries, the difficulty will vaniſh: but if this is his Lordſhip's interpretation, it is certainly a very ſingular one.

84 General principles to be kept in view in reaſoning on this ſubject. Before entering upon a conſideration of the particular arguments uſed by our author for proving the diverſity of ſpecies in the human race, it will be proper to lay down the following general principles, which may ſerve as axioms. (1.) When we aſſert a multiplicity of ſpecies in the human race; we bring in a ſupernatural cauſe to ſolve a natural phenomenon: for theſe ſpecies are ſuppoſed to be the immediate work of the Deity. (2.) No perſon has a right to call any thing the immediate effect of omnipotence, unleſs by expreſs revelation from the Deity, or from a certainty that no natural cauſe is ſufficient to produce the effect. The reaſon is plain. The Deity is inviſible, and ſo are many natural cauſes; when we ſee an effect therefore, of which the cauſe does not manifeſt itſelf, we cannot know whether the immediate cauſe is the Deity or an inviſible natural power. An example of this we have in the phenomena of thunder and earthquakes, which were often aſcribed immediately to the Deity, but are now diſcovered to be the effects of electricity.

(3.) No perſon can aſſert natural cauſes to be inſufficient to produce ſuch and ſuch effects, unleſs he perfectly knows all theſe cauſes and the limits of their power in all poſſible caſes; and this no man has ever known or can know. America.

By keeping in view theſe principles, which we hope are ſelf-evident, we will eaſily ſee Lord Kames's arguments to conſiſt entirely in a *petitio principii*.—In ſubſtance they are all reduced to this ſingle ſentence: "Natural philoſophers have been hitherto unſucceſsful in their endeavours to account for the differences obſerved among mankind, therefore theſe differences cannot be accounted for from natural cauſes."

85 Inconſiſtency in Lord Kames's argument. His Lordſhip, however, tells us in the paſſages already quoted, that "a maſtiff differs not more from a ſpaniel, than a Laplander from a Dane;" that "it is vain to aſcribe to climate the low ſtature of the Laplanders, or their ugly viſage."—Yet, in a note on the word *Laplanders*, he ſubjoins, that, "by late accounts it appears, that the Laplanders are only degenerated Tartars; and that they and the Hungarians originally ſprung from the ſame breed of men, and from the ſame country."—The Hungarians are generally handſome and well made, like Danes, or like other people. The Laplanders, he tells us, differ as much from them as a maſtiff from a ſpaniel. Natural cauſes, therefore, according to Lord Kames himſelf, may cauſe two individuals of the ſame ſpecies of mankind differ from each other as much as a maſtiff does from a ſpaniel.

86 Remarkable difference of colour from accidental cauſes. While we are treating this ſubject of colour, it may not be amiſs to obſerve, that a very remarkable difference of colour may accidentally happen to individuals of the ſame ſpecies. In the iſthmus of Darien, a ſingular race of men has been diſcovered.—They are of low ſtature, of a feeble make, and incapable of enduring fatigue. Their colour is a dead milk white; not reſembling that of fair people among Europeans, but without any bluſh or ſanguine complexion. Their ſkin is covered with a fine hairy down of a chalky white; the hair of their heads, their eyebrows, and eyelaſhes, are of the ſame hue. Their eyes are of a ſingular form, and ſo weak, that they can hardly bear the light of the ſun; but they ſee clearly by moonlight, and are moſt active and gay in the night. Among the negroes of Africa, as well as the natives of the Indian iſlands, a ſmall number of theſe people are produced. They are called *Albinos* by the Portugueſe, and *Kackerlakes* by the Dutch.

87 Colour no characteriſtic of a different ſpecies; This race of men is not indeed permanent; but it is ſufficient to ſhow, that mere *colour* is by no means the characteriſtic of a certain ſpecies of mankind. The difference of colour in theſe individuals is undoubtedly owing to a natural cauſe. To conſtitute, then, a race of men of this colour, it would only be neceſſary that this cauſe, which at preſent is merely accidental, ſhould become permanent, and we cannot know but it may be ſo in ſome parts of the world.

88 nor ſtature. If a difference in colour is no characteriſtic of a different ſpecies of mankind, much leſs can a difference in ſtature be thought ſo. In the ſouthern parts of America, there are ſaid to be a race of men exceeding the common ſize in height and ſtrength *. This account, however, is doubted of by ſome: but be that as it will, it is certain that the Eſquimaux are as much under the common ſize, as the Patagonians are ſaid to

* See *Patagonia*.

America. be above it. Nevertheleſs we are not to imagine, that either of theſe are ſpecific differences; ſeeing the Laplanders and Hungarians are both of the ſame ſpecies, and yet the former are generally almoſt a foot ſhorter than the latter; and if a difference of climate, or other accidental cauſes, can make the people of one country a foot ſhorter than the common ſize of mankind, undoubtedly accidental cauſes of a contrary nature may make thoſe of another country a foot taller than other men.

89 Different cauſes contribute towards an alteration in colour.

Though the ſun has undoubtedly a ſhare in the production of the ſwarthy colour of thoſe nations which are moſt expoſed to his influence; yet the manner of living to which people are accuſtomed, their victuals, their employment, &c. muſt contribute very much to a difference of complexion. There are ſome kinds of colouring roots, which if mixed with the food of certain animals, will tinge even their bones of a yellow colour. It cannot be thought any great degree of credulity to infer from this, that if theſe roots were mixed with the food of a white man, they might, without a miracle, tinge his ſkin of a yellow colour. If a man and woman were both to uſe food of this kind for a length of time, till they became as it were *radically dyed*, it is impoſſible, without the intervention of divine power, or of ſome extraordinary natural cauſe, but their children muſt be of the ſame colour: and was the ſame kind of food to be continued for ſeveral generations, it is more than probable that this colour might reſiſt the continued uſe of any kind of food whatever. See further the article COMPLEXION.

90 Habit capable of altering the inſtinct of animals.

Of this indeed we have no examples, but we have an example of changes much more wonderful. It is allowed on all hands, that it is more eaſy to work a change upon the body of a man, or any other animal, than upon his mind. A man that is naturally choleric may indeed learn to prevent the bad effects of his paſſion by reaſon, but the paſſion itſelf will remain as immutable as his colour. But to reaſon in a manner ſimilar to Lord Kames; though a man ſhould be naturally choleric, or ſubject to any other paſſion, why ſhould his children be ſo?—This way of reaſoning, however plauſible, is by no means concluſive, as will appear from the following paſſage in Mr Forſter's Voyage.

Voyage round the World, vol. i. p. 234.

June 9th. "The officers who could not yet reliſh their ſalt proviſions after the refreſhments of New Zealand, had ordered their black dog, mentioned p. 135. to be killed: this day, therefore, we dined for the firſt time on a leg of it roaſted; which taſted ſo exactly like mutton, that it was abſolutely undiſtinguiſhable. In our cold countries, where animal food is ſo much uſed, and where to be carnivorous perhaps lies in the nature of men, or is indiſpenſably neceſſary to the preſervation of their health and ſtrength, it is ſtrange that there ſhould exiſt a Jewiſh averſion to dogs fleſh, when hogs, the moſt uncleanly of all animals, are eaten without ſcruple. Nature ſeems expreſsly to have intended them for this uſe, by making their offspring ſo very numerous, and their increaſe ſo quick and frequent. It may be objected, that the exalted degree of inſtinct which we obſerve in our dogs, inſpires us with great unwillingneſs to kill and eat them. But it is owing to the time we ſpend on the education of dogs, that they acquire thoſe eminent qualities which attach them ſo much to us. The natural qualities of our dogs may receive a wonderful improvement; but education muſt give its aſſiſtance, without which the human mind itſelf, though capable of an immenſe expanſion, remains in a very contracted ſtate. In New Zealand, and (according to former accounts of voyages) in the tropical iſles of the South ſea, the dogs are the moſt ſtupid dull animals imaginable, and do not ſeem to have the leaſt advantage in point of ſagacity over our ſheep, which are commonly made the emblems of ſillineſs. In the former country they are fed upon fiſh, in the latter on vegetables, and both theſe diets may have ſerved to alter their diſpoſition. Education may perhaps likewiſe graft new inſtincts; the New Zealand dogs are fed on the remains of their maſter's meals; they eat the bones of other dogs; and the puppies become true cannibals from their birth. We had a young New Zealand puppy on board, which had certainly had no opportunity of taſting any thing but the mother's milk before we purchaſed it: however, it eagerly devoured a portion of the fleſh and bones of the dog on which we dined to-day; while ſeveral others of the European breed taken on board at the Cape, turned from it without touching it. America.

"On the 4th of Auguſt, a young bitch, of the terrier breed, taken on board at the Cape of Good Hope, and covered by a ſpaniel, brought ten young ones, one of which was dead. The New Zealand dog mentioned above, which devoured the bones of the roaſted dog, now fell upon the dead puppy, and ate of it with a ravenous appetite. This is a proof how far education may go in producing and propagating new inſtincts in animals. European dogs are never fed on the meat of their own ſpecies, but rather ſeem to abhor it. The New Zealand dogs, in all likelihood, are trained up from their earlieſt age to eat the remains of their maſter's meals: they are therefore uſed to feed upon fiſh, their own ſpecies, and perhaps human fleſh; and what was only owing to a habit at firſt, may have become inſtinct by length of time. This was remarkable in our cannibal dog; for he came on board ſo young, that he could not have been weaned long enough to have acquired a habit of devouring his own ſpecies, and much leſs of eating human fleſh; however, one of our ſeamen having cut his finger, held it out to the dog, who fell to greedily, licked it, and then began to bite it." *Ibid.* p. 243.

From this account it appears, that even the inſtincts of animals are not unchangeable by natural cauſes; and if theſe cauſes are powerful enough to change the diſpoſitions of ſucceeding generations, much more may we ſuppoſe them capable of making any poſſible alteration in the external appearance.

91 Confirmed by an obſervation on the Franks.

We are not here neceſſitated to confine ourſelves to obſervations made on brute animals. The Franks are an example of the production of one general character, formed by ſome natural cauſe from a mixture of many different nations.—They were a motley multitude, conſiſting of various German nations dwelling beyond the Rhine: who, uniting in defence of their common liberty, took thence the name of *Franks*; the word *frank* ſignifying in their language, as it ſtill does in ours, *free*. Among them the following nations were mentioned, viz. the Actuarii, Chamavi, Bructeri, Salii, Friſii, Chauſi, Amſwarii, and Catti. We cannot ſuppoſe

America. suppoſe one character to belong to ſo many different nations; yet it is certain, that the Franks were nationally characterized as treacherous; and ſo deeply ſeems this quality to have been rooted in their nature, that their deſcendants have not got quite free of it in 1500 years. It is in vain, then to talk of different races of men, either from their colour, ſize, or prevailing diſpoſitions, ſeeing we have undeniable proofs that all theſe may be changed, in the moſt remarkable manner, by natural cauſes, without any miraculous interpoſition of the Deity.

THE next queſtion, then, which preſents itſelf is, From what part of the old world America has moſt probably been peopled?

92 Of the peopling of America.

Diſcoveries long ago made inform us, that an intercourſe between the old continent and America might be carried on with facility from the north weſt extremities of Europe and the north-eaſt boundaries of Aſia. In the ninth century the Norwegians diſcovered Greenland, and planted a colony there. The communication with that country was renewed in the laſt century by Moravian miſſionaries, in order to propagate their doctrines in that bleak and uncultivated region. By them we are informed that the north-weſt coaſt of Greenland is ſeparated from America by a very narrow ſtrait; that at the bottom of the bay it is highly probable that they are united; that the Eſquimaux of America perfectly reſemble the Greenlanders in their aſpect, dreſs, and mode of living; and that a Moravian miſſionary, well acquainted with the language of Greenland, having viſited the country of the Eſquimaux, found, to his aſtoniſhment, that they ſpoke the ſame language with the Greenlanders, and were in every reſpect the ſame people. The ſame ſpecies of animals, too, are found in the contiguous regions. The bear, the wolf, the fox, the hare, the deer, the roebuck, the elk, frequent the foreſts of North America, as well as thoſe in the north of Europe.

93 A communication between the old and new continents by two ways.

Other diſcoveries have proved, that if the two continents of Aſia and America be ſeparated at all, it is only by a narrow ſtrait. From this part of the old continent, alſo, inhabitants may have paſſed into the new; and the reſemblance between the Indians of America and the eaſtern inhabitants of Aſia, would induce us to conjecture that they have a common origin. This is the opinion adopted by Dr Robertſon in his Hiſtory of America *, where we find it accompanied with the following narrative.

* *Hiſtory of America*, vol. i. p. 273.

"While thoſe immenſe regions which ſtretched eaſtward from the river Oby to the ſea of Kamtſchatka were unknown, or imperfectly explored, the north-eaſt extremities of our hemiſphere were ſuppoſed to be ſo far diſtant from any part of the new world, that it was not eaſy to conceive how any communication ſhould have been carried on between them. But the Ruſſians, having ſubjected the weſtern part of Siberia to their empire, gradually extended their knowledge of that vaſt country, by advancing towards the eaſt into unknown provinces. Theſe were diſcovered by hunters in their excurſions after game, or by ſoldiers employed in levying the taxes; and the court of Moſcow eſtimated the importance of thoſe countries only by the ſmall addition which they made to its revenue. At length, Peter the Great aſcended the Ruſſian throne: His enlightened comprehenſive mind, intent upon every circumſtance that could aggrandiſe his empire, or render his reign illuſtrious, diſcerned conſequences of theſe diſcoveries, which had eſcaped the obſervation of his ignorant predeceſſors. He perceived that, in proportion as the regions of Aſia extended towards the eaſt, they muſt approach nearer to America; that the communication between the continents, which had long been ſearched for in vain, would probably be found in this quarter; and that, by opening this intercourſe, ſome part of the wealth and commerce of the weſtern world might be made to flow into his dominions by a new channel. Such an object ſuited a genius that delighted in grand ſchemes. Peter drew up inſtructions with his own hands for proſecuting this deſign, and gave orders for carrying it into execution. America.

"His ſucceſſors adopted his ideas, and purſued his plan. The officers whom the Ruſſian court employed in this ſervice, had to ſtruggle with ſo many difficulties, that their progreſs was extremely ſlow. Encouraged by ſome faint traditions among the people of Siberia concerning a ſucceſsful voyage in the year 1648 round the north-eaſt promontory of Aſia, they attempted to follow the ſame courſe. Veſſels were fitted out, with this view, at different times, from the rivers Lena and Kolyma; but in a frozen ocean, which nature ſeems not to have deſtined for navigation, they were expoſed to many diſaſters, without being able to accompliſh their purpoſe. No veſſel fitted out by the Ruſſian court ever doubled this formidable cape; we are indebted for what is known of thoſe extreme regions of Aſia, to the diſcoveries made in excurſions by land. In all thoſe provinces, an opinion prevails, that countries of great extent and fertility lie at no conſiderable diſtance from their own coaſts. Theſe the Ruſſians imagined to be part of America; and ſeveral circumſtances concurred not only in confirming them in this belief, but in perſuading them that ſome portion of that continent could not be very remote. Trees of various kinds, unknown in thoſe naked regions of Aſia, are driven upon the coaſt by an eaſterly wind. By the ſame wind floating ice is brought thither in a few days; flights of birds arrive annually from the ſame quarter; and a tradition obtains among the inhabitants, of an intercourſe formerly carried on with ſome countries ſituated to the eaſt.

"After weighing all theſe particulars, and comparing the poſition of the countries in Aſia which they had diſcovered, with ſuch parts in the north-weſt of America as were already known; the Ruſſian court formed a plan, which would have hardly occurred to any nation leſs accuſtomed to engage in arduous undertakings and to contend with great difficulties. Orders were iſſued to build two veſſels at Ochotz, in the ſea of Kamtſchatka, to ſail on a voyage of diſcovery. Though that dreary uncultivated region furniſhed nothing that could be of uſe in conſtructing them but ſome larch trees: though not only the iron, the cordage, the ſails, and all the numerous articles requiſite for their equipment, but the proviſions for victualling them, were to be carried through the immenſe deſerts of Siberia, along rivers of difficult navigation, and roads almoſt impaſſable, the mandate of the ſovereign, and the perſeverance of the people, at laſt ſurmounted every obſtacle. Two veſſels were finiſhed; and, under the command

America. command of the captains Behring and Tſchirikow, ſailed from Kamtſchatka in queſt of the new world, in a quarter where it had never been approached. They ſhaped their courſe towards the eaſt; and though a ſtorm ſoon ſeparated the veſſels, which never rejoined, and many diſaſters befel them, the expectations from the voyage were not altogether fruſtrated. Each of the commanders diſcovered land, which to them appeared to be part of the American continent; and, according to their obſervations, it ſeems to be ſituated within a few degrees of the north-weſt coaſt of California. Each ſet ſome of his people aſhore: but in one place the inhabitants fled as the Ruſſians approached; in another, they carried off thoſe who landed, and deſtroyed their boats. The violence of the weather, and the diſtreſs of their crews, obliged both to quit this inhoſpitable coaſt. In their return they touched at ſeveral iſlands, which ſtretch in a chain from eaſt to weſt between the country which they had diſcovered and the coaſt of Aſia. They had ſome intercourſe with the natives, who ſeemed to them to reſemble the North Americans. They preſented to the Ruſſians the calumet, or pipe of peace, which is a ſymbol of friendſhip univerſal among the people of North America, and a uſage of arbitrary inſtitution peculiar to them."

94 Reaſons for ſuppoſing the two continents to have been once joined.

The more recent and accurate diſcoveries of the illuſtrious navigator Cook, and his ſucceſſor Clerke, have brought the matter ſtill nearer to certainty. The ſea, from the ſouth of Behring's ſtraits to the creſcent of iſles between Aſia and America, is very ſhallow. It deepens from theſe ſtraits (as the Britiſh ſeas do from thoſe of Dover) till ſoundings are loſt in the Pacific ocean; but that does not take place but to the ſouth of the iſles. Between them and the ſtraits is an increaſe from twelve to fifty-four fathom, except only off St Thaddeus Noſs, where there is a channel of greater depth. From the volcanic diſpoſition, it has been judged probable, not only that there was a ſeparation of the continents at the ſtraits of Behring, but that the whole ſpace from the iſles to that ſmall opening had once been occupied by land; and that the fury of the watery element, actuated by that of fire, had, in moſt remote times, ſubverted and overwhelmed the tract, and left the iſlands monumental fragments.

95 Probable cauſe of their ſubſequent ſeparation.

Without adopting all the fancies of Buffon, there can be no doubt, as the Abbé Clavigero obſerves, that our planet has been ſubject to great viciſſitudes, ſince the deluge. Ancient and modern hiſtories confirm the truth which Ovid has ſung in the name of Pythagoras:

Video ego quod fuerat quondam ſolidiſſima tellus,
Eſſe fretum; vidi factas ex æquore terras.

At preſent they plough thoſe lands over which ſhips formerly ſailed, and now they ſail over lands which were formerly cultivated; earthquakes have ſwallowed ſome lands, and ſubterraneous fires have thrown up others: the rivers have formed new ſoil with their mud; the ſea retreating from the ſhores has lengthened the land in ſome places, and advancing in others has diminiſhed it; it has ſeparated ſome territories which were formerly united, and formed new ſtraits and gulfs. We have examples of all theſe revolutions in the paſt century. Sicily was united to the continent of Naples, as the iſland Eubœa to Bœotia. Diodorus, Strabo, and other ancient authors, ſay the ſame thing of Spain and Africa, and affirm, that by a violent irruption of the ocean upon the land between the mountains Abyla and Calpé, that communication was broken, and the Mediterranean ſea was formed. Among the people of Ceylon there is a tradition that a ſimilar irruption of the ſea ſeparated their iſland from the peninſula of India. The ſame thing is believed by thoſe of Malabar with reſpect to the iſles of Maldivia, and with the Malayans with reſpect to Sumatra. It is certain, ſays the count de Buffon, that in Ceylon the earth has loſt thirty or forty leagues, which the ſea has taken from it; on the contrary, Tongres, a place of the Low Countries, has gained 30 leagues of land from the ſea. The northern part of Egypt owes its exiſtence to inundations of the Nile. The earth which this river has brought from the inland countries of Africa, and depoſited in its inundations, has formed a ſoil of more than 25 cubits in depth. In like manner, adds the above author, the province of the Yellow River in China, and that of Louiſiana, have only been formed of the mud of rivers. Pliny, Seneca, Diodorus, and Strabo, report innumerable examples of ſimilar revolutions, which we omit, that our diſſertation may not become too prolix; as alſo many modern revolutions, which are related in the theory of the earth of the count de Buffon and other authors. In South America, all thoſe who have obſerved with philoſophic eyes the peninſula of Yucatan, do not doubt that that country has once been the bed of the ſea; and, on the contrary, in the channel of Bahama many indications ſhow the iſland of Cuba to have been once united to the continent of Florida. In the ſtrait which ſeparates America from Aſia many iſlands are found, which probably were the mountains belonging to that tract of land which we ſuppoſe to have been ſwallowed up by earthquakes; which is made more probable by the multitude of volcanoes which we know of in the peninſula of Kamtſchatka. It is imagined, however, that the ſinking of that land, and the ſeparation of the two continents, has been occaſioned by thoſe great and extraordinary earthquakes mentioned in the hiſtories of the Americans, which formed an era almoſt as memorable as that of the deluge. The hiſtories of the Toltecas fix ſuch earthquakes in the year I Tecpatl; but as we know not to what century that belonged, we can form no conjecture of the time that great calamity happened. If a great earthquake ſhould overwhelm the iſthmus of Suez, and there ſhould be at the ſame time as great a ſcarcity of hiſtorians as there were in the firſt ages after the deluge, it would be doubted, in 300 or 400 years after, whether Aſia had ever been united by that part to Africa; and many would firmly deny it. America.

96 Separated only by a narrow ſtrait.

Whether that great event, the ſeparation of the continents, took place before or after the population of America, is as impoſſible as it is of little moment for us to know; but we are indebted to the above-mentioned navigators for ſettling the long diſpute about the point from which it was effected. Their obſervations prove, that in one place the diſtance between continent and continent is only 39 miles, not (as the author of the *Recherches Philoſophiques ſur les Americains* would have it) 800 leagues. This narrow ſtrait has alſo in the middle two iſlands, which would greatly facilitate the migration of the Aſiatics into the new world, ſuppoſing

97 Eaſineſs of the paſſage between them.

America.

fing that it took place in canoes after the convulſion which rent the two continents aſunder. Beſides, it may be added, that theſe ſtraits are, even in the ſummer, often filled with ice; in winter, often frozen. In either caſe mankind might find an eaſy paſſage; in the laſt, the way was extremely ready for quadrupeds to croſs and ſtock the continent of America. But where, from the vaſt expanſe of the north-eaſtern world, to fix on the firſt tribes who contributed to people the new continent, now inhabited almoſt from end to end, is a matter that baffles human reaſon. The learned may make bold and ingenious conjectures, but plain good ſenſe cannot always accede to them.

98 Conjectures concerning the firſt migrations into the new continent.

As mankind increaſed in numbers, they naturally protruded one another forward. Wars might be another cauſe of migrations. There appears no reaſon why the Aſiatic north might not be an *officina virorum*, as well as the European. The overteeming country, to the eaſt of the Riphæan mountains, muſt find it neceſſary to diſcharge its inhabitants: the firſt great wave of people was forced forward by the next to it, more tumid and more powerful than itſelf; ſucceſſive and new impulſes continually arriving, ſhort reſt was given to that which ſpread over a more eaſtern tract; diſturbed again and again, it covered freſh regions; at length, reaching the fartheſt limits of the old world, found a new one, with ample ſpace to occupy unmoleſted for ages; till Columbus curſed them by a diſcovery, which brought again new ſins and new deaths to both worlds.

99 Mr Pennant's opinion.

"The inhabitants of the new world (Mr Pennant obſerves) do not conſiſt of the offspring of a ſingle nation; different peoples, at ſeveral periods, arrived there; and it is impoſſible to ſay, that any one is now to be found on the original ſpot of its colonization. It is impoſſible, with the lights which we have ſo recently received, to admit that America could receive its inhabitants (at leaſt the bulk of them) from any other place than eaſtern Aſia. A few proofs may be added, taken from cuſtoms or dreſſes common to the inhabitants of both worlds; ſome have been long extinct in the old, others remain in both in full force.

100 The bulk of its inhabitants probably firſt received from the eaſtern part of Aſia.

"The cuſtom of ſcalping was a barbariſm in uſe with the Scythians, who carried about them at all times this ſavage mark of triumph: they cut a circle round the neck, and ſtripped off the ſkin, as they would that of an ox. A little image found among the Calmucks, of a Tartarian deity, mounted on a horſe, and ſitting on a human ſkin, with ſcalps pendent from the breaſt, fully illuſtrates the cuſtom of their Scythian progenitors, as deſcribed by the Greek hiſtorian. This uſage, as the Europeans know by horrid experience, is continued to this day in America. The ferocity of the Scythians to their priſoners extended to the remoteſt part of Aſia. The Kamtſchatkans, even at the time of their diſcovery by the Ruſſians, put their priſoners to death by the moſt lingering and excruciating inventions; a practice in full force to this very day among the aboriginal Americans. A race of the Scythians were ſtyled *Anthropophagi*, from their feeding on human fleſh. The people of Nootka Sound ſtill make a repaſt on their fellow-creatures: but what is more wonderful, the ſavage allies of the Britiſh army have been known to throw the mangled limbs of the French priſoners into the horrible caldron, and devour them with the ſame reliſh as thoſe of a quadruped.

101 Proofs from a ſimilarity of cuſtoms, &c.

America.

"The Scythians were ſaid, for a certain time, annually to transform themſelves into wolves, and again to reſume the human ſhape. The new-diſcovered Americans about Nootka Sound at this time diſguiſe themſelves in dreſſes made of the ſkins of wolves and other wild beaſts, and wear even the heads fitted to their own. Theſe habits they uſe in the chaſe, to circumvent the animals of the field. But would not ignorance or ſuperſtition aſcribe to a ſupernatural metamorphoſis theſe temporary expedients to deceive the brute creation?

102 Cuſtom and dreſſes common to the eaſtern Aſiatics and the Americans.

"In their marches, the Kamtſchatkans never went abreaſt, but followed one another in the ſame track. The ſame cuſtom is exactly obſerved by the Americans.

"The Tunguſi, the moſt numerous nation reſident in Siberia, prick their faces with ſmall punctures, with a needle, in various ſhapes; then rub into them charcoal, ſo that the marks become indelible. This cuſtom is ſtill obſerved in ſeveral parts of America. The Indians on the back of Hudſon's bay, to this day, perform the operation exactly in the ſame manner, and puncture the ſkin into various figures; as the natives of New Zealand do at preſent, and as the ancient Britons did with the herb glaſtum, or woad; and the Virginians, on the firſt diſcovery of that country by the Engliſh.

"The Tunguſi uſe canoes made of birch bark, diſtended over ribs of wood, and nicely ſewed together. The Canadians, and many other American nations, uſe no other ſort of boats. The paddles of the Tunguſi are broad at each end; thoſe of the people near Cook's river, and of Oonalaſcha, are of the ſame form.

"In burying of the dead, many of the American nations place the corpſe at full length, after preparing it according to their cuſtoms; others place it in a ſitting poſture, and lay by it the moſt valuable clothing, wampum, and other matters. The Tartars did the ſame; and both people agree in covering the whole with earth, ſo as to form a tumulus, barrow, or carnedd.

"Some of the American nations hang their dead in trees. Certain of the Tunguſi obſerve a ſimilar cuſtom.

"We can draw ſome analogy from dreſs: convenience in that article muſt have been conſulted on both continents, and originally the materials muſt have been the ſame, the ſkins of birds and beaſts. It is ſingular, that the conic bonnet of the Chineſe ſhould be found among the people of Nootka. I cannot give into the notion, that the Chineſe contributed to the population of the new world; but we can readily admit, that a ſhipwreck might furniſh thoſe Americans with a pattern for that part of the dreſs.

103 Other reſemblance.

"In reſpect to the features and form of the human body, almoſt every tribe found along the weſtern coaſt has ſome ſimilitude to the Tartar nations, and ſtill retain the little eyes, ſmall noſes, high cheeks, and broad faces. They vary in ſize, from the luſty Calmucks to the little Nogaians. The internal Americans, ſuch as the Five Indian nations, who are tall of body,

America. body, robuſt of make, and of oblong faces, are derived from a variety among the Tartars themſelves. The fine race of Tſchutſki ſeem to be the ſtock from which thoſe Americans are derived. The Tſchutſki, again, from that fine race of Tartars the Kabardinſki, or inhabitants of Kabarda.

"But about Prince William's ſound begins a race chiefly diſtinguiſhed by their dreſs, their canoes, and their inſtruments of the chaſe, from the tribes to the ſouth of them. Here commences the Eſquimaux people, or the race known by that name in the high latitudes of the eaſtern ſide of the continent. They may be divided into two varieties. At this place they are of the largeſt ſize. As they advance northward, they decreaſe in height, till they dwindle into the dwarfiſh tribes which occupy ſome of the coaſts of the Icy ſea, and the maritime parts of Hudſon's bay, of Greenland, and Terra de Labrador. The famous Japaneſe map, places ſome iſlands ſeemingly within the ſtraits of Behring, on which is beſtowed the title of *Ya Sue*, or the Kingdom of the Dwarfs. Does not this in ſome manner authenticate the chart, and give us reaſon to ſuppoſe that America was not unknown to the Japaneſe; and that they had (as is mentioned by Kæmpfer and Charlevoix) made voyages of diſcovery, and according to the laſt, actually wintered on the continent? That they might have met with the Eſquimaux is very probable: whom, in compariſon of themſelves, they might juſtly diſtinguiſh by the name of *dwarfs*. The reaſon of their low ſtature is very obvious: theſe dwell in a moſt ſevere climate, amidſt penury of food; the former in one much more favourable, abundant in proviſions; circumſtances that tend to prevent the degeneracy of the human frame. At the iſland of Oonalaſcha, a dialect of the Eſquimaux is in uſe, which was continued along the whole coaſt from thence northward."

104 The brute creation migrated by the ſame route.

The continent which ſtocked America with the human race poured in the brute creation through the ſame paſſage. Very few quadrupeds continued in the peninſula of Kamſchatka; Mr Pennant enumerates only 25 which are inhabitants of land: all the reſt perſiſted in their migration, and fixed their reſidence in the new world. Seventeen of the Kamtſchatkan quadrupeds are found in America: others are common only to Siberia or Tartary, having, for unknown cauſes, entirely evacuated Kamtſchatka, and divided themſelves between America and the parts of Aſia above cited. Multitudes again have deſerted the old world even to an individual, and fixed their ſeats at diſtances moſt remote from the ſpot from which they took their departure; from Mount Ararat, the reſting-place of the ark, in a central part of the old world, and excellently adapted for the diſperſion of the animal creation to all its parts. We need not be ſtartled (ſays Mr Pennant) at the vaſt journeys many of the quadrupeds took to arrive at their preſent ſeats. Might not numbers of ſpecies have found a convenient abode in the vaſt Alps of Aſia, inſtead of wandering to the Cordilleras of Chili? or might not others have been contented with the boundleſs plains of Tartary, inſtead of travelling thouſands of miles to the extenſive flats of Pampas?—To endeavour to elucidate common difficulties is certainly a trouble worthy of the philoſopher and of the divine; not to attempt it would be America. a criminal indolence, a neglect to

Vindicate the ways of God to man.

But there are multitudes of points beyond the human ability to explain, and yet are truths undeniable: the facts are indiſputable, notwithſtanding the cauſes are concealed. In ſuch caſes, faith muſt be called in to our relief. It would certainly be the height of folly to deny to that Being who broke open the fountains of the great deep to effect the deluge—and afterwards, to compel the diſperſion of mankind to people the globe, directed the confuſion of languages—powers inferior in their nature to theſe. After theſe wondrous proofs of Omnipotency, it will be abſurd to deny the poſſibility of infuſing inſtinct into the brute creation. *Deus eſt anima brutorum;* "God himſelf is the ſoul of brutes:" His pleaſure muſt have determined their will, and directed ſeveral ſpecies, and even whole genera, by impulſe irreſiſtible, to move by ſlow progreſſion to their deſtined regions. But for that, the lama and the pacos might ſtill have inhabited the heights of Armenia and ſome more neighbouring Alps, inſtead of labouring to gain the diſtant Peruvian Andes; the whole genus of armadillos, ſlow of foot, would never have quitted the torrid zone of the old world for that of the new; and the whole tribe of monkeys would have gamboled together in the foreſts of India, inſtead of dividing their reſidence between the ſhades of Indoſtan and the deep foreſts of the Braſils. Lions and tigers might have infeſted the hot parts of the new world, as the firſt do the deſerts of Africa, and the laſt the provinces of Aſia; or the pantherine animals of South America might have remained additional ſcourges with the ſavage beaſts of thoſe ancient continents. The old world would have been overſtocked with animals; the new remained an unanimated waſte! or both have contained an equal portion of every beaſt of the earth. Let it not be objected, that animals bred in a ſouthern climate, after the deſcent of their parents from the ark, would be unable to bear the froſt and ſnow of the rigorous north, before they reached South America, the place of their final deſtination. It muſt be conſidered, that the migration muſt have been the work of ages; that in the courſe of their progreſs each generation grew hardened to the climate it had reached; and that after their arrival in America, they would again be gradually accuſtomed to warmer and warmer climates, in their removal from north to ſouth, as they had been in the reverſe, or from ſouth to north. Part of the tigers ſtill inhabit the eternal ſnows of Ararat; and multitudes of the very ſame ſpecies live, but with exalted rage, beneath the line, in the burning ſoil of Borneo or Sumatra; but neither lions nor tigers ever migrated into the new world. A few of the firſt are found in India and Perſia, but they are found in numbers only in Africa. The tiger extends as far north as Weſtern Tartary, in lat. 40. 50. but never has reached Africa."

In fine, the conjectures of the learned reſpecting the vicinity of the old and new worlds, are now, by the diſcoveries of our great navigators, loſt in conviction; and in the place of imaginary hypotheſes, the real place of migration is incontrovertibly pointed out.

Some

America. Some (from a paſſage in Plato) have extended over the Atlantic, from the ſtraits of Gibraltar to the coaſt of North and South America, an iſland equal in ſize to the continents of Aſia and Africa; over which had paſſed, as over a bridge, from the latter, men and animals, woolly-headed negroes, and lions and tigers, none of which ever exiſted in the new world. A mighty ſea aroſe, and in one day and night engulfed this ſtupendous tract, and with it every being which had not completed its migration into America. The whole negro race, and almoſt every quadruped, now inhabitants of Africa, periſhed in this critical day. Five only are to be found at preſent in America; and of theſe only one, the bear, in South America: Not a ſingle cuſtom, common to the natives of Africa and America, evince a common origin. Of the quadrupeds, the bear, ſtag, wolf, fox, and weaſel, are the only animals which we can pronounce with certainty to be found on each continent. The ſtag, fox, and weaſel, have made alſo no farther progreſs in Africa than the north; but on the ſame continent the wolf is ſpread over every part, yet is unknown in South America, as are the fox and weaſel. In Africa and South America the bear is very local, being met with only in the north of the firſt, and on the Andes in the laſt. Some cauſe unknown arreſted its progreſs in Africa, and impelled the migration of a few into the Chilian Alps, and induced them to leave unoccupied the vaſt tract from North America to the lofty Cordilleras.

105 Remains of antiquity in America.

Alluſions have often been made to ſome remains, on the continent of America, of a more poliſhed and cultivated people, when compared with the tribes which poſſeſſed it on its firſt diſcovery by Europeans. Mr Barton, in his *Obſervations on ſome parts of Natural Hiſtory*, Part I. has collected the ſcattered hints of Kalm, Carver, and ſome others, and has added a plan of a regular work, which has been diſcovered on the banks of the Muſkingum, near its junction with the Ohio. Theſe remains are principally ſtone walls, large mounds of earth, and a combination of theſe mounds with the walls, ſuſpected to have been fortifications. In ſome places the ditches and the fortreſs are ſaid to have been plainly ſeen: in others, furrows, as if the land had been ploughed.

The mounds of earth are of two kinds: they are artificial tumuli, deſigned as repoſitories for the dead; or they are of a greater ſize, for the purpoſe of defending the adjacent country; and with this view they are artificially conſtructed, or advantage is taken of the natural eminences, to raiſe them into a fortification.

The remains near the banks of the Muſkingum, are ſituated about one mile above the junction of that river with the Ohio, and 160 miles below Fort Pitt. They conſiſt of a number of walls and other elevations, of ditches, &c. altogether occupying a ſpace of ground about 300 perches in length, and from about 150 to 25 or 20 in breadth. The town, as it has been called, is a large level, encompaſſed by walls, nearly in the form of a ſquare, the ſides of which are from 96 to 86 perches in length. Theſe walls are, in general, about 10 feet in height above the level on which they ſtand, and about 20 feet in diameter at the baſe, but at the top they are much narrower; they are at preſent overgrown with vegetables of different kinds, and, among others, with trees of ſeveral feet diameter. The chaſms, or openings in the walls, were probably intended for gateways: they are three in number at each ſide, beſides the ſmaller openings in the angles. Within the walls there are three elevations, each about ſix feet in height, with regular aſcents to them: theſe elevations conſiderably reſemble ſome of the eminences already mentioned, which have been diſcovered near the river Miſſiſſippi. This author's opinion is, That the Toltecas, or ſome other Mexican nation, were the people to whom the mounts and fortifications, which he has deſcribed, owe their exiſtence; and that thoſe people were probably the deſcendants of the Danes. The former part of this conjecture is thought probable, from the ſimilarity of the Mexican mounts and fortifications deſcribed by the Abbé Clavigero, and other authors, to thoſe deſcribed by our author; and from the tradition of the Mexicans, that they came from the north-weſt; for, if we can rely on the teſtimony of late travellers, fortifications ſimilar to thoſe mentioned by Mr Barton, have been diſcovered as far to the north as Lake Pepin; and we find them, as we approach to the ſouth, even as low as the coaſts of Florida. The ſecond part of our author's conjecture appears not ſo well ſupported.

America.

106 The ancients ſuppoſed to have had ſome imperfect notion of a new world.

It is believed by many, that the ancients had ſome imperfect notions of a new world; and ſeveral ancient authors are quoted in confirmation of this. In a book aſcribed to the philoſopher Ariſtotle, we are told that the Carthaginians diſcovered an iſland far beyond the pillars of Hercules, large, fertile, and finely watered with navigable rivers, but uninhabited. This iſland was diſtant a few days ſailing from the continent; its beauty induced the diſcoverers to ſettle there; but the policy of Carthage diſlodged the colony, and laid ſtrict prohibition on all the ſubjects of the ſtate not to attempt any future eſtabliſhment. This account is alſo confirmed by an hiſtorian of no mean credit, who relates, that the Tyrians would have ſettled a colony on the new diſcovered iſland, but were oppoſed by the Carthaginians for ſtate reaſons. The following paſſage has alſo been quoted from Seneca's *Medea*, in confirmation of this notion.

> *——Venient annis*
> *Sæcula ſeris, quibus oceanus*
> *Vincula rerum laxet, et ingens*
> *Pateat tellus, Typhiſque novos*
> *Delegat orbes; nec ſit terris*
> *Ultima Thule.——*

Act. III. ver. 375.

Other authors are alſo quoted in ſupport of this belief. But however this may be, nobody ever believed the exiſtence of this continent ſo firmly as to go in queſt of it; at leaſt, there are no accounts well ſupported that America received any part of its firſt inhabitants from Europe prior to the 15th century. The Welſh fondly imagine that our country contributed, in 1170, to people the new world, by the adventure of Madoc, ſon of Owen Gwynedd, who, on the death of his father, ſailed there, and colonized part of the country. All that is advanced in proof is, a quotation from one of our poets, which proves no more than that he had diſtinguiſhed himſelf by ſea and land. It is pretended that he made two voyages: that ſailing weſt, he left

107 Pretenſions of the Welſh to the diſcovery of America in the 12th century.

America. Ireland ſo far to the north, that he came to a land unknown, where he ſaw many ſtrange things; that he returned home, and, making a report of the fruitfulneſs of the new-diſcovered country, prevailed on numbers of the Welſh of each ſex to accompany him on a ſecond voyage, from which he never returned. The favourers of this opinion aſſert, that ſeveral Welſh words, ſuch as *gwrando*, "to hearken or liſten;" the iſle of *Cræſo*, or "welcome;" *Cape Breton*, from the name of our own iſland; *gwynndwr*, or "the white water;" and *pengwin*, or "the bird with a white head;" are to be found in the American language. But likeneſs of ſound in a few words will not be deemed ſufficient to eſtabliſh the fact; eſpecially if the meaning has been evidently perverted: for example, the whole penguin tribe have unfortunately not only black heads, but are not inhabitants of the northern hemiſphere; the name was alſo beſtowed on them by the Dutch, *à pinguedine*, from their exceſſive fatneſs; but the inventor of this, thinking to do honour to our country, inconſiderately caught at a word of European origin, and unheard of in the new world. It may be added, that the Welſh were never a naval people; that the age in which Madoc lived was peculiarly ignorant in navigation; and the moſt which they could have attempted muſt have been a mere coaſting voyage.

108 Thoſe of the Norwegians better founded.

The Norwegians put in for a ſhare of the glory, on grounds rather better than the Welſh. By their ſettlements in Iceland and in Greenland, they had arrived within ſo ſmall a diſtance of the new world, that there is at leaſt a poſſibility of its having been touched at by a people ſo verſed in maritime affairs, and ſo adventurous, as the ancient Nortmans were. The proofs are much more numerous than thoſe produced by the Britiſh hiſtorians; for the diſcovery is mentioned in ſeveral of the Icelandic manuſcripts. The period was about the year 1002, when it was viſited by one Biorn; and the diſcovery purſued to greater effect by Lief, the ſon of Eric, the diſcoverer of Greenland. It does not appear that they reached farther than Labrador; on which coaſt they met with Eſquimaux, on whom they beſtowed the name of *Skrælingues*, or dwarfiſh people, from their ſmall ſtature. They were armed with bows and arrows, and had leathern canoes, ſuch as they have at preſent. All this is probable; nor ſhould the tale of the German, called *Turkil*, one of the crew, invalidate the account. He was one day miſſing; but ſoon returned, leaping and ſinging with all the extravagant marks of joy a *bon vivant* could ſhow, on diſcovering the inebriating fruit of his country, the grape: Torfæus even ſays, that he returned in a ſtate of intoxication. To convince his commander, he brought ſeveral bunches, who from that circumſtance named the country *Vinland*. It is not to be denied that North America produces the true vine; but it is found in far lower latitudes than our adventurers could reach in the time employed in their voyage, which was comprehended in a very ſmall ſpace. There appears no reaſon to doubt of the diſcovery; but as the land was never colonized, nor any advantages made of it, it may be fairly conjectured, that they reached no farther than the barren country of Labrador. In ſhort, it is from a much later period that we muſt date the real diſcovery of America.

Towards the cloſe of the 15th century, Venice and Genoa being rivals in commerce, in which the former had greatly the ſuperiority, Chriſtopher Columbus, a native of Genoa, whoſe knowledge of the true figure of the earth, however attained, was much ſuperior to the general notions of the age in which he lived, conceived a project of ſailing to the Eaſt Indies by directing his courſe weſtward. The deſign was founded upon a miſtake of the geographers of thoſe days, who placed the eaſtern parts of Aſia immenſely too far to the eaſtward; ſo that had they been in the right, the ſhorteſt way would have been to ſail directly weſtward. He applied firſt to his own countrymen; but being rejected by them, he applied to France, where he was laughed at and ridiculed. He next applied to Henry VII. of England; but meeting with a diſappointment there he made an application to Portugal, where he met with the ſame mortifying reception. Spain was his next reſource; where, after eight years attendance, he obtained, in 1492, a fleet of three ſhips. The largeſt, a ſhip of no conſiderable burden, was commanded by Columbus as admiral, who gave it the name of *Santa Maria*, out of reſpect for the bleſſed Virgin, whom he honoured with ſingular devotion. Of the ſecond, called the *Pinta*, Martin Pinzon was captain, and his brother Francis pilot. The third, named the *Nigna*, was under the command of Vincent Yanez Pinzon. Theſe two were light veſſels, hardly ſuperior in burden or force to large boats. This ſquadron, if it merits that name, was victualled for 12 months, and had on board 90 men, moſtly ſailors, together with a few adventurers who followed the fortune of Columbus, and ſome gentlemen of Iſabella's court, whom ſhe appointed to accompany him. Though the expence of the undertaking was one of the circumſtances which chiefly alarmed the court of Spain, and retarded ſo long the negotiation with Columbus, the ſum employed in fitting out this ſquadron did not exceed 4000l. But as Columbus was deeply impreſſed with ſentiments of religion, he would not ſet out upon an expedition ſo arduous, and of which one great object was to extend the knowledge of the Chriſtian faith, without imploring publicly the guidance and protection of Heaven. With this view, he, together with all the perſons under his command, marched in ſolemn proceſſion to the monaſtery of Rabida. After confeſſing their ſins, and obtaining abſolution, they received the holy ſacrament from the hands of the guardian, who joined his prayers to theirs for the ſucceſs of an enterpriſe which he had ſo zealouſly patroniſed.

America. 109 The projects of Chriſtopher Columbus.

110 His voyage.

Next morning, being Friday the third day of Auguſt, in the year 1492, Columbus ſet ſail a little before ſunriſe, in preſence of a vaſt crowd of ſpectators, who ſent up their ſupplications to Heaven for the proſperous iſſue of the voyage, which they wiſhed rather than expected. Columbus ſteered directly for the Canary iſlands, and arrived there without any occurrence that would have deſerved notice on any other occaſion: but in a voyage of ſuch expectation and importance, every circumſtance was the object of attention. The rudder of the Pinta broke looſe the day after ſhe left the harbour, and that accident alarmed the crew, no leſs ſuperſtitious than unſkilful, as a certain omen of the unfortunate deſtiny of the expedition. Even in the ſhort run to the Canaries, the ſhips were found to be ſo crazy and ill appointed, as to be very improper

for

America. for a navigation which was expected to be both long and dangerous. Columbus refitted them, however, to the beſt of his power; and having ſupplied himſelf with freſh proviſions, he took his departure from Gomera, one of the moſt weſterly of the Canary iſlands, on the ſixth day of September.

Here the voyage of diſcovery may properly be ſaid to begin; for Columbus, holding his courſe due weſt, left immediately the uſual track of navigation, and ſtretched into unfrequented and unknown ſeas. The firſt day, as it was very calm, he made but little way; but on the ſecond, he loſt ſight of the Canaries; and many of the ſailors, dejected already and diſmayed, when they contemplated the boldneſs of the undertaking, began to beat their breaſts, and to ſhed tears, as if they were never more to behold land. Columbus comforted them with aſſurances of ſucceſs, and the proſpect of vaſt wealth, in thoſe opulent regions whither he was conducting them. He regulated every thing by his ſole authority; he ſuperintended the execution of every order; and allowing himſelf only a few hours for ſleep, he was at all other times upon deck. As his courſe lay through ſeas which had not formerly been viſited, the ſounding line or inſtruments for obſervation, were continually in his hands. After the example of the Portugueſe diſcoverers, he attended to the motion of tides and currents, watched the flight of birds, the appearance of fiſhes, of ſea-weeds, and of every thing that floated on the waves, and entered every occurrence with a minute exactneſs, in the journal which he kept. As the length of the voyage could not fail of alarming ſailors habituated only to ſhort excurſions, Columbus endeavoured to conceal from them the real progreſs which they made. With this view, though they run 18 leagues on the ſecond day after they left Gomera, he gave out that they had advanced only 15: and he uniformly employed the ſame artifice of reckoning ſhort during the whole voyage. By the 14th of September, the fleet was above 200 leagues to the weſt of the Canary iſles, at a greater diſtance from land than any Spaniard had been before that time. There they were ſtruck with an appearance no leſs aſtoniſhing than new. They obſerved that the magnetic needle, in their compaſſes, did not point exactly to the polar ſtar, but varied towards the weſt; and as they proceeded this variation increaſed. This appearance, which is now familiar, though it ſtill remains one of the myſteries of nature, into the cauſe of which the ſagacity of man hath not been able to penetrate, filled the companions of Columbus with terror. They were now in a boundleſs unknown ocean, far from the uſual courſe of navigation; nature itſelf ſeemed to be altered, and the only guide which they had left was about to fail them. Columbus, with no leſs quickneſs than ingenuity, invented a reaſon for this appearance, which, though it did not ſatisfy himſelf, ſeemed ſo plauſible to them, that it diſpelled their fears, or ſilenced their murmurs.

III
Aſtoniſhment occaſioned by obſerving the variation of the compaſs.

He ſtill continued to ſteer due weſt, nearly in the ſame latitude with the Canary iſlands. In this courſe he came within the ſphere of the trade wind, which blows invariably from eaſt to weſt between the tropics, and a few degrees beyond them. He advanced before this ſteady gale with ſuch uniform rapidity, that it was ſeldom neceſſary to ſhift a ſail. When about 400 leagues to the weſt of the Canaries, he found the ſea ſo covered with weeds, that it reſembled a meadow of vaſt extent; and in ſome places they were ſo thick as to retard the motion of the veſſels. This ſtrange appearance occaſioned new alarm and diſquiet. The ſailors imagined that they were now arrived at the utmoſt boundary of the navigable ocean; that theſe floating weeds would obſtruct their farther progreſs, and concealed dangerous rocks, or ſome large tract of land, which had ſunk, they knew not how, in that place. Columbus endeavoured to perſuade them, that what had alarmed, ought rather to have encouraged them, and was to be conſidered as a ſign of approaching land. At the ſame time, a briſk gale aroſe, and carried them forward. Several birds were ſeen hovering about the ſhip, and directed their flight towards the weſt. The deſponding crew reſumed ſome degree of ſpirit, and began to entertain freſh hopes. America.

Upon the firſt of October, they were, according to the admiral's reckoning, 770 leagues to the weſt of the Canaries; but leſt his men ſhould be intimidated by the prodigious length of the navigation, he gave out that they had proceeded only 584 leagues; and, fortunately for Columbus, neither his own pilot, nor thoſe of the other ſhips, had ſkill ſufficient to correct this error, and diſcover the deceit. They had now been above three weeks at ſea; they had proceeded far beyond what former navigators had attempted or deemed poſſible: all their prognoſtics of diſcovery, drawn from the flight of birds and other circumſtances, had proved fallacious; the appearances of land, with which their own credulity or the artifice of their commander had from time to time flattered and amuſed them, had been altogether illuſive, and their proſpect of ſucceſs ſeemed now to be as diſtant as ever. Theſe reflections occurred often to men, who had no other object or occupation, than to reaſon and diſcourſe concerning the intention and circumſtances of their expedition. They made impreſſion at firſt upon the ignorant and timid, and extending by degrees to ſuch as were better informed or more reſolute, the contagion ſpread at length from ſhip to ſhip. From ſecret whiſpers or murmurings they proceeded to open cabals and public complaints. They taxed their ſovereign with inconſiderate credulity, in paying ſuch regard to the vain promiſes and raſh conjectures of an indigent foreigner, as to hazard the lives of ſo many of her own ſubjects, in proſecuting a chimerical ſcheme. They affirmed that they had fully performed their duty, by venturing ſo far in an unknown and hopeleſs courſe, and could incur no blame, for refuſing to follow, any longer, a deſperate adventurer to certain deſtruction. They contended, that it was neceſſary to think of returning to Spain, while their crazy veſſels were ſtill in a condition to keep the ſea, but expreſſed their fears that the attempt would prove vain, as the wind which had hitherto been ſo favourable to their courſe, muſt render it impoſſible to fail in the oppoſite direction. All agreed that Columbus ſhould be compelled by force to adopt a meaſure on which their common ſafety depended. Some of the more audacious propoſed, as the moſt expeditious and certain method for getting rid at once of his remonſtrances, to throw him into the ſea; being perſuaded

America. that, upon their return to Spain, the death of an unſucceſsful projector would excite little concern, and be inquired into with no curioſity.

112 Perilous ſituation of Columbus.

Columbus was fully ſenſible of his perilous ſituation. He had obſerved, with great uneaſineſs, the fatal operation of ignorance and of fear in producing diſaffection among his crew; and ſaw that it was now ready to burſt out into open mutiny. He retained, however, perfect preſence of mind. He affected to ſeem ignorant of their machinations. Notwithſtanding the agitation and ſolicitude of his own mind, he appeared with a cheerful countenance; like a man ſatisfied with the progreſs which he had made, and confident of ſucceſs. Sometimes he employed all the arts of inſinuation to ſooth his men. Sometimes he endeavoured to work upon their ambition or avarice, by magnificent deſcriptions of the fame and wealth which they were about to acquire. On other occaſions, he aſſumed a tone of authority, and threatened them with vengeance from their ſovereign, if, by their daſtardly behaviour, they ſhould defeat this noble effort to promote the glory of God, and to exalt the Spaniſh name above that of every other nation. Even with ſeditious ſailors, the words of a man whom they had been accuſtomed to reverence were weighty and perſuaſive; and not only reſtrained them from thoſe violent exceſſes which they meditated, but prevailed with them to accompany their admiral for ſome time longer.

As they proceeded, the indications of approaching land ſeemed to be more certain, and excited hope in proportion. The birds began to appear in flocks, making towards the ſouth-weſt. Columbus, in imitation of the Portugueſe navigators, who had been guided in ſeveral of their diſcoveries by the motion of birds, altered his courſe from due weſt towards that quarter whither they pointed their flight. But after holding on for ſeveral days in this new direction without any better ſucceſs than formerly, having ſeen no object during 30 days but the ſea and the ſky, the hopes of his companions ſubſided faſter than they had riſen; their fears revived with additional force; impatience, rage, and deſpair, appeared in every countenance. All ſenſe of ſubordination was loſt. The officers, who had hitherto concurred with Columbus in opinion, and ſupported his authority, now took part with the private men: they aſſembled tumultuouſly on the deck, expoſtulated with their commander, mingled threats with their expoſtulations, and required him inſtantly to tack about and to return to Europe. Columbus perceived that it would be of no avail to have recourſe to any of his former arts, which having been tried ſo often had loſt their effect; and that it was impoſſible to rekindle any zeal for the ſucceſs of the expedition among men in whoſe breaſts fear had extinguiſhed every generous ſentiment. He ſaw that it was no leſs vain to think of employing either gentle or ſevere meaſures, to quell a mutiny ſo general and ſo violent. It was neceſſary, on all theſe accounts, to ſooth paſſions which he could no longer command, and to give way to a torrent too impetuous to be checked. He promiſed ſolemnly to his men that he would comply with their requeſt, provided they would accompany him, and obey his commands for three days longer; and if, during that time, land were not diſcovered, he would then abandon the enterpriſe, and direct his courſe towards Spain.

113 His crews ready to mutiny.

Enraged as the ſailors were, and impatient to turn their faces again towards their native country, this propoſition did not appear to them unreaſonable. Nor did Columbus hazard much in confining himſelf to a term ſo ſhort. The preſages of diſcovering land were now ſo numerous and promiſing, that he deemed them infallible. For ſome days the ſounding line reached the bottom, and the ſoil which it brought up indicated land to be at no great diſtance. The flocks of birds increaſed; and were compoſed not only of ſea fowl, but of ſuch land birds as could not be ſuppoſed to fly far from the ſhore. The crew of the Pinta obſerved a cane floating which ſeemed to be newly cut, and likewiſe a piece of timber artificially carved. The ſailors aboard the Nigna took up the branch of a tree with red berries perfectly freſh. The clouds around the ſetting ſun aſſumed a new appearance; the air was more mild and warm; and, during night, the wind became unequal and variable. From all theſe ſymptoms, Columbus was ſo confident of being near land, that on the evening of the 11th of October, after public prayers for ſucceſs, he ordered the ſails to be furled, and the ſhips to lie by, keeping ſtrict watch, leſt they ſhould be driven aſhore in the night. During this interval of ſuſpenſe and expectation, no man ſhut his eyes, all kept upon deck, gazing intently towards that quarter, where they expected to diſcover the land which had been ſo long the object of their wiſhes. America.

114 Their joy on deſcrying the coaſt.

About two hours before midnight, Columbus ſtanding on the forecaſtle, obſerved a light at a diſtance, and privately pointed it out to Pedro Guttierez, a page of the queen's wardrobe. Guttierez perceived it; and calling to Salcedo comptroller of the fleet, all three ſaw it in motion, as if it were carried from place to place. A little after midnight the joyful ſound of *Land! land!* was heard from the Pinta, which kept always ahead of the other ſhips. But having been ſo often deceived by fallacious appearances, every man was now become ſlow of belief; and waited, in all the anguiſh of uncertainty and impatience, for the return of day. As ſoon as morning dawned, all doubts and fears were diſpelled. From every ſhip an iſland was ſeen about two leagues to the north, whoſe flat and verdant fields, well ſtored with wood, and watered with many rivulets, preſented the aſpect of a delightful country. The crew of the Pinta inſtantly began the *Te Deum*, as a hymn of thankſgiving to God; and were joined by thoſe of the other ſhips, with tears of joy and tranſports of congratulation. This office of gratitude to heaven was followed by an act of juſtice to their commander. They threw themſelves at the feet of Columbus, with feelings of ſelf-condemnation mingled with reverence. They implored him to pardon their ignorance, incredulity, and inſolence, which had created him ſo much unneceſſary diſquiet, and had ſo often obſtructed the proſecution of his well-concerted plan; and paſſing, in the warmth of their admiration, from one extreme to another, they now pronounced the man whom they had ſo lately reviled and threatened, to be a perſon inſpired by Heaven with ſagacity and fortitude more than human, in order to accompliſh a deſign ſo far beyond the ideas and conception of all former ages.

As ſoon as the ſun aroſe, all their boats were manned and armed. They rowed towards the iſland with their

America.

their colours displayed, with warlike music, and other martial pomp. As they approached the coast, they saw it covered with a multitude of people, whom the novelty of the spectacle had drawn together, whose attitudes and gestures expressed wonder and astonishment at the strange objects which presented themselves to their view. Columbus was the first European who set foot in the new world which he had discovered. He landed in a rich dress, and with a naked sword in his hand. His men followed; and, kneeling down, they all kissed the ground which they had so long desired to see. They next erected a crucifix; and, prostrating themselves before it, returned thanks to God for conducting their voyage to such a happy issue.

115 They land in one of the islands of the new world.

The above was one of the Bahama islands; to which he gave the name of *San Salvador*, and took possession of it in the name of their Catholic majesties. In this first voyage he discovered several other of the Lucayo or Bahama islands, with those of Cuba and Hispaniola. The natives considered the Spaniards as divinities, and the discharge of the artillery as their thunder: they fell prostrate at the sound. The women, however, offered their favours, and courted the embraces of their new guests as men. Their husbands were not jealous of them; and in the arms of these wantons the companions of Columbus are said to have caught that malady which directs its poison to the springs of life. In a second voyage many new islands were discovered. In a third, he attained the great object of his ambition, by discovering the continent of America, near the mouth of the river Oroonoko, on the first day of August 1498. His success produced a crowd of adventurers from all nations; but the year before this, the northern continent had been discovered by Sebastian Cabot in the service of Henry VII. of England.

116 The continent afterwards discovered.

Notwithstanding the many settlements of the Europeans in this continent, great part of America remains still unknown. The northern continent contains the British colonies of Hudson's Bay, Canada, Nova Scotia, New England, New York, New Jersey, Pennsylvania, Maryland, Virginia, North and South Carolina, Georgia, East and West Florida. It contains also the Spanish territories of Louisiana, New Mexico, California, and Mexico. Besides these, there are immense regions to the west and north, the boundaries of which have never yet been discovered. In such as are in any degree known, dwell the Esquimaux, the Algonquins, the Hurons, the Iroquois, the Cherokees, the Chikasaws, and many other tribes of Indians. In the southern continent lie the Spanish provinces of Terra Firma, Guiana, Peru, Paraguay, and Chili; together with that of Brasil, belonging to the Portuguese; and the country of Surinam, belonging to the Dutch. Vast tracts, however, in the inland parts, are unknown, being comprehended under the general name of *Amazonia*. A large district also, said to be the residence of a gigantic race of men, lies on the east side of the continent, between the straits of Magellan and the province of Paraguay. See PATAGONIA.

117 Division of America.

118 Its productions.

This vast country produces most of the metals, minerals, plants, fruits, trees, and wood, to be met with in the other parts of the world, and many of them in greater quantities and high perfection. The gold and silver of America have supplied Europe with such immense quantities of those valuable metals, that they are become vastly more common; so that the gold and silver of Europe now bear little proportion to the high price set upon them before the discovery of America. America.

It also produces diamonds, pearls, emeralds, amethysts, and other valuable stones, which, by being brought into Europe, have contributed likewise to lower their value. To these, which are chiefly the production of Spanish America, may be added a great number of other commodities, which, though of less price, are of much greater use; and many of them make the ornament and wealth of the British empire in this part of the world. Of these are the plentiful supplies of cochineal, indigo, anatto, logwood, brazil, fustic, pimento, lignum vitæ, rice, ginger, cocoa, or the chocolate nut, sugar, cotton, tobacco, banillas, red-wood, the balsams of Tolu, Peru, and Chili, that valuable article in medicine the Jesuit's bark, mechoacan, sassafras, sarsaparilla, cassia, tamarinds, hides, furs, ambergris, and a great variety of woods, roots, and plants; to which, before the discovery of America, we were either entire strangers, or forced to buy at an extravagant rate from Asia and Africa, through the hands of the Venetians and Genoese, who then engrossed the trade of the eastern world.

On this continent there grows also a variety of excellent fruits; as pine-apples, pomegranates, citrons, lemons, oranges, malicatons, cherries, pears, apples, figs, grapes; great numbers of culinary, medicinal, and other herbs, roots, and plants; with many exotic productions, which are nourished in as great perfection as in their native soil.

119 The different possessors of America.

Although the Indians still live in the quiet possession of many large tracts, America, so far as known, is chiefly claimed, and divided into colonies, by three European nations, the Spaniards, English, and Portuguese. The Spaniards, as they first discovered it, have the largest and richest portion, extending from New Mexico and Louisiana in North America, to the straits of Magellan in the South sea, excepting the large province of Brasil, which belongs to Portugal; for though the French and Dutch have some forts in Surinam and Guiana, they scarcely deserve to be considered as proprietors of any part of the southern continent.

Next to Spain, the most considerable proprietor of America was Great Britain, who derived her claim to North America from the first discovery of that continent by Sebastian Cabot in the name of Henry VII. *anno* 1497, about six years after the discovery of South America by Columbus in the name of the king of Spain. This country was in general called *Newfoundland*; a name which is now appropriated solely to an island upon its coast. It was a long time before we made an attempt to settle in this country. Sir Walter Raleigh, an uncommon genius and a brave commander, first showed the way, by planting a colony in the southern part, which he called *Virginia*, in honour of his mistress Queen Elizabeth.

The French indeed, from this period until the conclusion of the war before last, laid claim to, and actually possessed, Canada and Louisiana; comprehending all that extensive inland country reaching from Hudson's Bay on the north, to Mexico and the gulf of the same name on the south. But in that war, to which

America.

which their perfidy and ambition gave riſe, they were not only driven from Canada and its dependencies, but obliged to relinquiſh all that part of Louiſiana lying on the eaſt ſide of the Miſſiſſippi, as related under the *Hiſtory of* BRITAIN. And thus our colonies were preſerved, ſecured, and extended ſo far, as to render it difficult to aſcertain the preciſe bounds of our empire in North America. To the northward we might have extended our claims quite to the pole itſelf, nor did any nation ſeem inclined to diſpute the property of this northernmoſt country with us. From that extremity we had a territory extending ſouthward to Cape Florida in the gulf of Mexico, N. Lat. 25°. and conſequently near 4000 miles long in a direct line. And to the weſtward our boundaries reached to nations unknown even to the Indians of Canada.

120 Vaſt extent of the Britiſh poſſeſſions before the late revolution.

Of the revolution that has ſince taken place, by which a great part of thoſe territories have been ſeparated from the Britiſh empire, the hiſtory follows in the next article.

121 Riſe of the American republic.

AMERICA, United States of. Of the riſe and eſtabliſhment of this republic, which has given a new face to the weſtern world, a ſuccinct and impartial narrative ſhall in this article be attempted; in which, however, we cannot hope entirely to avoid errors, as they are perhaps unavoidable. The accounts from which the hiſtorian muſt derive his information are not yet cleared from the miſtakes of prejudice and the fabrications of party; when they differ, their comparative authenticity is with difficulty aſcertained; and they want above all that ſoftening which they can receive from time alone.

The beginning of every political eſtabliſhment is contemptible. Some few banditti taking refuge among the marſhes on the banks of the Tiber, laid the foundation of the Roman empire. The turbulence of ſome North Americans, and the blunders of ſome Britiſh ſtateſmen, gave birth to this new republic, which at a future period, it has been fancied, may perhaps ſurpaſs even the ſplendour of Rome.

122 State and character of the Britiſh colonies at the end of the war 1763.

The ſtate of the Britiſh colonies at the concluſion of the war in 1763, was ſuch as attracted the attention of all the politicians in Europe. Their flouriſhing condition at that period was remarkable and ſtriking: their trade had proſpered in the midſt of all the difficulties and diſtreſſes of a war in which they were ſo nearly and ſo immediately concerned. Their population continued on the increaſe, notwithſtanding the ravages and depredations that had been ſo fiercely carried on by the French, and the native Indians in their alliance. They abounded with ſpirited and active individuals of all denominations. They were fluſhed with the uncommon proſperity that had attended them in their commercial affairs and military tranſactions. Hence they were ready for all kind of undertakings, and ſaw no limits to their hopes and expectations.

As they entertained the higheſt opinion of their value and importance, and of the immenſe benefit that Britain derived from its connexion with them, their notions were adequately high in their own favour. They deemed themſelves, not without reaſon, entitled to every kindneſs and indulgence which the mother country could beſtow.

Although their pretenſions did not amount to a perfect equality of advantages and privileges in matters of commerce, yet in thoſe of government they thought themſelves fully competent to the taſk of conducting their domeſtic concerns with little or no interference from abroad. Though willing to admit the ſupremacy of Great Britain, they viewed it with a ſuſpicious eye, and with a marked deſire and intent ſpeedily to give it limitations.

America.

Their improvements in all the neceſſary and uſeful arts did honour to their induſtry and ingenuity. Though they did not live in the luxury of Europe, they had all the ſolid and ſubſtantial enjoyments of life, and were not unacquainted with many of its elegancies and refinements.

A circumſtance much to their praiſe is, that notwithſtanding their peculiar addiction to thoſe occupations of which lucre is the ſole object, they were duly attentive to cultivate the field of learning; and they have ever ſince their firſt foundation been particularly careful to provide for the education of the riſing progeny.

Their vaſt augmentation of internal trade and external commerce, was not merely owing to their poſition and facility of communication with other parts; it aroſe alſo from their natural turn and temper, full of ſchemes and projects; ever aiming at new diſcoveries, and continually employed in the ſearch of means of improving their condition.

Their condition carried them into every quarter from whence profit could be derived. There was ſcarcely any port of the American hemiſphere to which they had not extended their navigation. They were continually exploring new ſources of trade, and were found in every ſpot where buſineſs could be tranſacted.

To this extenſive and inceſſant application to commerce, they added an equal vigilance in the adminiſtration of their affairs at home. Whatever could conduce to the amelioration of the ſoil they poſſeſſed, to the progreſs of agriculture, or to the improvement of their domeſtic circumſtances, was attended to with ſo much labour and care, that it may be ſtrictly ſaid, that Nature had given them nothing of which they did not make the moſt.

In the midſt of this ſolicitude and toil in matters of buſineſs, the affairs of government were conducted with a ſteadineſs, prudence, and lenity, ſeldom experienced, and never exceeded, in the beſt regulated countries of Europe.

Such was the ſituation of the Britiſh colonies in general throughout North America, and of the New England provinces in particular, when the pacification above mentioned opened one of the moſt remarkable ſcenes that ever commanded the attention of the world.

123 Intrigues of the French.

The French, who have for many ages been the proteſſed and natural enemies of Britain, had long viewed, with equal envy and apprehenſion, the flouriſhing ſtate of thoſe colonies ſhe had founded in North America. No doubt at preſent ſubſiſts, that they began immediately after the peace of Paris to carry into execution the ſcheme they had formed for the ſeparation of the Britiſh colonies from the mother country.

Conſcious that, whilſt a good underſtanding laſted between them, the ſuperiority muſt henceforth remain

for

America. for ever on the ſide of Britain, it was only by their diſunion that France could hope to regain the ſtation and conſequence ſhe had formerly poſſeſſed in Europe.

The firſt ſteps ſhe took were to employ her ſecret emiſſaries in ſpreading diſſatisfaction among the Britiſh coloniſts; and the effects produced by her machinations were preciſely ſuch as they had intended and expected. The diſpoſition of the inhabitants of North America began gradually to alter from that warmth of attachment to the mother country which had ſo peculiarly characterized them. They began to view her rather in the light of a ſovereign than that of a parent; and to examine, with a ſcrupulous nicety, the nature of thoſe ties that rendered them parts of her empire.

124 Taxes laid on goods imported into the colonies, and other obnoxious acts framed; In March 1764, a bill was paſſed, by which heavy duties were laid on goods imported by the coloniſts from ſuch Weſt India iſlands as did not belong to Great Britain; at the ſame time that theſe duties were to be paid into the exchequer in ſpecie: and in the ſame ſeſſion, another bill was framed to reſtrain the currency of paper money in the colonies themſelves. Theſe acts coming ſo cloſe upon each other, threw the whole continent into the utmoſt ferment. Vehement remonſtrances were made to the miniſtry, and every argument made uſe of that reaſon or ingenuity could ſuggeſt; but to no purpoſe. Their reaſoning, however, convinced a great number of people at home; and thus the American cauſe came to be conſidered as the cauſe of liberty.

125 which exaſperate the Americans.

The Americans, finding all argumentation vain, at laſt united in an agreement to import no more of the manufactures of Great Britain, but to encourage to the utmoſt of their power every thing of that kind among themſelves. Thus the Britiſh manufacturers alſo became a party againſt miniſtry, and did not fail to expreſs their reſentment in the ſtrongeſt terms; but the miniſtry were not to be ſo eaſily daunted, and therefore proceeded to the laſt ſtep of their intended plan, which was to lay on ſtamp duties throughout the continent. Previous to this, indeed, ſeveral regulations were paſſed in favour of the commerce of the colonies; but they had now imbibed ſuch unfavourable ſentiments of the Britiſh miniſtry, that they paid very little regard to any thing pretended to be done in their favour; or if theſe acts made any favourable impreſſion, it was quickly obliterated by the news of the ſtamp act. The reaſon given for this act ſo exceedingly obnoxious was, that a ſum might be raiſed ſufficient for the defence of the colonies againſt a foreign enemy; but this pretence was ſo far from giving any ſatisfaction to the Americans, that it excited their indignation to the utmoſt degree. They not only aſſerted that they were abundantly able to defend themſelves againſt any foreign enemy, but denied that the Britiſh parliament had any right to tax them at all.

126 The ſtamp act framed.

It would be ſuperfluous to enter into any arguments uſed by the contending parties on this important occaſion. It was evident that the matter was not to be decided by argument but by force of arms; and the Britiſh miniſtry, too confident of the authority and power of this country, determined to carry on matters with a high hand, to terrify the coloniſts into an implicit ſubjection, or, if that would not do, to compel them to it by force. The ſtamp act, after a violent oppoſition to parliament, was paſſed, and its reception in America was ſuch as might have been expected. The news, and the act itſelf, firſt arrived at Boſton, were the bells were muffled and rung a funeral peal. The act was firſt hawked about the ſtreets, with a Death's head affixed to it, and ſtyled the "Folly of England, and the Ruin of America;" and afterwards publicly burnt by the enraged populace: The ſtamps themſelves were ſeized and deſtroyed, unleſs brought by men of war, or kept in fortified places; thoſe who were to receive the ſtamp duties were compelled to reſign their offices; and ſuch of the Americans as ſided with government on this occaſion had their houſes plundered and burnt. America.

127 Received with univerſal indignation in America.

Though theſe outrages were committed by the loweſt of the multitude, they were firſt connived at by thoſe of ſuperior rank, and the principles on which they were founded afterwards openly patroniſed by them; and the doctrine became general, and openly avowed, that Britain had no right whatever to tax the colonies without their own conſent.

It was now found abſolutely neceſſary either to yield to the Americans, by repealing the obnoxious ſtatutes, or to enforce them by arms. The ferment had diffuſed itſelf univerſally throughout the colonies. Virginia firſt, and after that all the reſt of the provinces, declared againſt the right of Britain to lay on taxes in America; and that every attempt to veſt others with this power beſides the king, or the governor of the province and his general aſſembly, was illegal, unconſtitutional, and unjuſt. Non-importation agreements were everywhere entered into; and it was even reſolved to prevent the ſale of any more Britiſh goods after the preſent year. American manufactures, though dearer, as well as inferior in quality to the Britiſh, were univerſally preferred. An aſſociation was entered into againſt eating of lamb, in order to promote the growth of wool; and the ladies with cheerfulneſs agreed to renounce the uſe of every ſpecies of ornament manufactured in Britain. Such a general and alarming confederacy determined the miniſtry to repeal ſome of the moſt obnoxious ſtatutes; and to this they were the more inclined by a petition from the firſt American congreſs, held at New York in the beginning of October 1765.

128 Repealed.

The ſtamp act was therefore repealed, to the univerſal joy of the Americans, and indeed to the general ſatisfaction of the Engliſh, whoſe manufactures had begun to ſuffer very ſeverely in conſequence of the American aſſociation againſt them. The diſputes on the ſubject without doors, however, were by no means ſilenced, but each party continued to argue the caſe as violently as ever. The celebrated Dr Benjamin Franklin was on this occaſion examined before the Houſe of Commons; and his opinion was in ſubſtance as follows:

129 Opinion of Dr Franklin on this ſubject.

"That the tax in queſtion was impracticable and ruinous. The very attempt had ſo far alienated the affection of the colonies, that they behaved in a leſs friendly manner towards the natives of England than before; conſidering the whole nation as conſpiring againſt their liberty, and the parliament as willing rather to oppreſs than to ſupport and aſſiſt them. America, in fact, did not ſtand in any need of Britiſh manufactures, having already begun to conſtruct ſuch as might be deemed abſolutely neceſſary, and that with ſuch

America. such ſucceſs, as left no doubt of their arriving in a ſhort time at perfection. The elegancies of dreſs had already been renounced for manufactures of the American kind, though much inferior; and the bulk of the people, conſiſting of farmers, were ſuch as could in no way be affected by the want of Britiſh commodities, as having every neceſſary within themſelves. Materials of all kinds were to be had in plenty: the wood was fine; flax grew in great abundance, and iron was everywhere to be met with."

The Doctor alſo inſiſted, "That the Americans had been greatly miſrepreſented; that they had been traduced as void of gratitude and affection to the parent ſtate; than which nothing could be more contrary to truth. In the war of 1755 they had at their own expence, raiſed an army of 25,000 men; and in that of 1739 they aſſiſted the Britiſh expeditions againſt South America with ſeveral thouſand men, and had made many brave exertions againſt the French in North America. It was ſaid, that the war of 1755 had been undertaken in defence of the colonies; but the truth was, that it originated from a conteſt about the limits between Canada and Nova Scotia, and in defence of the Engliſh rights to trade on the Ohio. The Americans, however, would ſtill continue to act with their uſual fidelity; and, were any war to break out in which they had no concern, would ſhow themſelves as ready as ever to aſſiſt the parent ſtate to the utmoſt of their power, and would never fail to manifeſt their readineſs in contributing to the emergencies of government, when called to do ſo in a regular and conſtitutional manner."

The miniſtry were conſcious, that in repealing this obnoxious act, they yielded to the Americans; and therefore, to ſupport, as they thought, the dignity of Great Britain, it was judged proper to publiſh a declaratory bill, ſetting forth the authority of the mother-country over her colonies, and her power to bind them by laws and ſtatutes *in all caſes whatever*. This much diminiſhed the joy with which the repeal of the ſtamp act was received in America. It was conſidered as a proper reaſon to enforce any claims equally prejudicial with the ſtamp act, which might hereafter be ſet up; ~~a ſpirit~~ of jealouſy pervaded the whole continent, and a ſtrong party was formed, watchful on every occaſion to guard againſt the ſuppoſed encroachments of the Britiſh power.

130 Declaratory bill gives offence in America.

131 Aſſembly of New York diſobeys an act of parliament.

It was not long before an occaſion offered, in which the Americans manifeſted a ſpirit of abſolute independency; and that, inſtead of being bound by the Britiſh legiſlature in all caſes, they would not be controlled by it in the moſt trivial affairs. The Rockingham miniſtry had paſſed an act, providing the troops ſtationed in different parts of the colonies with ſuch accommodation as were neceſſary for them. The aſſembly of New York, however, took upon them to alter the mode of execution preſcribed by the act of parliament, and to ſubſtitute one of their own. This gave very great offence to the new miniſtry, and rendered them, though compoſed of thoſe who had been active againſt the ſtamp bill, leſs favourable to the colonies than in all probability they would have otherwiſe been. An unlucky circumſtance at the ſame time occurred, which threw every thing once more into confuſion. One of the new miniſtry, Mr Charles Townſhend, having declared that he could find a way of taxing the Americans without giving them offence, was called upon to propoſe his plan. This was by impoſing a duty upon tea, paper, painters colours, and glaſs imported into America. The undutiful behaviour of the New York aſſembly, and that of Boſton, which had proceeded in a ſimilar manner, cauſed this bill to meet with leſs oppoſition than otherwiſe it might have done. As a puniſhment to the refractory aſſemblies, the legiſlative power was taken from that of New York, until it ſhould fully comply with the terms of the act. That of Boſton at laſt ſubmitted with reluctance. The bill for the new taxes was quickly paſſed, and ſent to America in 1768.

America.

132 Mr Townſhend's plan to tax America.

133 Is received there with ſtill greater indignation than even the ſtamp act.

A ferment much greater than that occaſioned by the ſtamp act now took place throughout the continent. The populace renewed their outrages, and thoſe of ſuperior ſtation entered into regular combinations againſt it. Circular letters were ſent from Maſſachuſets colony to all the reſt, ſetting forth the injuſtice and impropriety of the behaviour of the Britiſh legiſlature. Meetings were held in all the principal towns, in which it was propoſed to leſſen the conſumption of foreign manufactures, by giving proper encouragement to their own. Continual diſputes enſued betwixt the governors and general aſſemblies of their provinces, which were much heightened by a letter from Lord Shelburne to Governor Bamand of Maſſachuſets Bay, containing complaints of the people he governed. The aſſembly, exaſperated to the higheſt degree, charged their governor with having miſrepreſented them to the court of Britain, required him to produce copies of the letters he had ſent; and, on his refuſal, wrote letters to the Engliſh miniſtry, accuſing him of miſrepreſentation and partiality, complaining at the ſame time moſt grievouſly of the proceedings of parliament, as utterly ſubverſive of the liberties of America, and the rights of Britiſh ſubjects.

134 Quarrel between the people of Maſſachuſets Bay and their governor.

The governor, at a loſs how to defend himſelf, prorogued the aſſembly; and, in his ſpeech on the occaſion, gave a looſe to his reſentment, accuſing the members of ambitious deſigns, incompatible with thoſe of dutiful and loyal ſubjects. To counteract the circular letter of the province of Maſſachuſets Bay, Lord Hillſborough, ſecretary for the American department, ſent another to the governors of the different colonies, reprobating the other as full of miſrepreſentation, and tending to excite a rebellion againſt the authority of the parent ſtate.

Matters now haſtened to a criſis. The governor had been ordered to proceed with vigour, and by no means to ſhow any diſpoſition to yield to the people as formerly. In particular, they were required to reſcind that reſolution by which they had written the circular letter above mentioned; and, in caſe of a refuſal, it was told them that they would be diſſolved. As this letter had been framed by the reſolutions of a former Houſe, they deſired, after a week's conſultation, that a receſs might be granted to conſult with their conſtituents; but this being refuſed, they came to a determination, 92 againſt 17, to adhere to the reſolution which produced the circular letter. At the ſame time a letter was ſent to Lord Hillſborough, and a meſſage to the governor, in juſtification of their proceedings. In both they expreſſed themſelves with ſuch freedom

135 He requires the aſſembly to reſcind their circular letter;

136 which they refuſe.

America.

as was by no means calculated to accord with the ſentiments of thoſe in power. They inſiſted that they had a right to communicate their ſentiments to their fellow-ſubjects upon matters of ſuch importance; complained of the requiſition to reſcind the circular letter as unconſtitutional and unjuſt; and particularly inſiſted, that they were repreſented as harbouring ſeditious deſigns, when they were doing nothing but what was lawful and right. At the ſame time, they condemned the late acts of parliament as highly oppreſſive, and ſubverſive of liberty. The whole was concluded by a liſt of accuſations againſt their governor, repreſenting him as unfit to continue in his ſtation, and petitioning the king for his removal from it.

137 Accuſe their governor, and petition for his removal.

Theſe proceedings were followed by a violent tumult at Boſton. A veſſel belonging to a capital trader had been ſeized in conſequence of his having neglected ſome of the new regulations; and being taken under the protection of a man of war at that time lying in the harbour, the populace attacked the houſes of the commiſſioners of exciſe, broke their windows, deſtroyed the collector's boats, and obliged the cuſtomhouſe officers to take refuge in Caſtle William, ſituated at the entrance of the harbour.

138 A tumult at Boſton.

The governor now took the laſt ſtep in his power to put a ſtop to the violent proceedings of this aſſembly, by diſſolving it entirely; but this was of little moment. Their behaviour had been highly approved by the other colonies, who had written letters to them expreſſive of their approbation. After the diſſolution of the aſſembly, frequent meetings of the people were held in Boſton, which ended in a remonſtrance to the governor, to the ſame purpoſe as ſome of the former; but concluding with an extraordinary requeſt, that he would take upon him to order the king's ſhips out of the harbour.

139 The aſſembly diſſolved.

While the diſpoſition of the Boſtonians was thus going on from bad to worſe, news arrived that the agent for the colony had not been allowed to deliver their petition to the king; it having been objected, that the aſſembly without the governor was not ſufficient authority. This did not contribute to allay the ferment; and it was further augmented by the news that a number of troops had been ordered to repair to Boſton, to keep the inhabitants in awe.

140 The diſturbances ſtill increaſe.

141 Some troops ordered to Boſton.

A dreadful alarm now took place. The people called on the governor to convene a general aſſembly, in order to remove the fears of the military; who they ſaid were to be aſſembled to overthrow their liberties, and force obedience to laws to which they were entirely averſe. The governor replied that it was no longer in his power to call an aſſembly; having, in his laſt inſtructions from England, been required to wait the king's orders, the matter being then under conſideration at home. Being thus refuſed, the people took upon themſelves the formation of an aſſembly, which they called a *Convention*. The proceedings and reſolutions of this were conformable to their former behaviour; but now they went a ſtep farther, and, under pretence of an approaching rupture with France, ordered the inhabitants to put themſelves in a poſture of defence againſt any ſudden attack of an enemy; and circular letters were directed to all the towns in the province, acquainting them with the reſolutions that had been taken in the capital, and exhorting them to proceed in the ſame manner. The town of Hatfield alone refuſed its concurrence; but this ſerved only to expoſe them to the cenſure and contempt of the reſt. The convention, however, thought proper to aſſure the governor of their pacific intentions, and renewed their requeſt that an aſſembly might be called; but being refuſed any audience, and threatened with being treated as rebels, they at laſt thought proper to diſſolve of themſelves, and ſent over to Britain a circumſtantial account of their proceedings, with the reaſon of their having aſſembled in the manner already mentioned.

142 The people form an aſſembly called a *Convention*;

143 which diſſolves, and endeavours to vindicate its own conduct.

The expected troops arrived on the very day on which the convention broke up, and had ſome houſes in the town fitted up for their reception. Their arrival had a conſiderable influence on the people, and for ſome time ſeemed to put a ſtop to the diſturbances; but the ſeeds of diſcord had now taken ſuch deep root, that it was impoſſible to quench the flame. The late outrageous behaviour in Boſton had given the greateſt offence in England; and, notwithſtanding all the efforts of oppoſition, an addreſs from both houſes of parliament was preſented to the king; in which the audacious behaviour of the colony of Maſſachuſets Bay was ſet forth in the moſt ample manner, and the moſt vigorous meaſures recommended for reducing them to obedience. The Americans, however, continued ſtedfaſt in the ideas they had adopted. Though the troops had for ſome time quieted the diſturbances, yet the calm continued no longer than they appeared reſpectable on account of their number; but as ſoon as this was diminiſhed by the departure of a large detachment, the remainder were treated with contempt, and it was even reſolved to expel them altogether. The country people took up arms for this purpoſe, and were to have aſſiſted their friends in Boſton; but before the plot could be put in execution, an event happened which put an end to every idea of reconciliation betwixt the contending parties.

144 Both houſes of parliament addreſs the king againſt America.

On the 5th of March 1770, a ſcuffle happened between ſome ſoldiers and a party of the town's people. The inhabitants poured in from all quarters to the aſſiſtance of their fellow-citizens; a violent tumult enſued, during which the military fired among the mob, killing and wounding ſeveral of them. The whole province now roſe in arms, and the ſoldiers were obliged to retire to Caſtle William to prevent their being cut in pieces. In other reſpects, the determinations of the Americans continued, if poſſible, more firm than ever, until at laſt government, determined to act with vigour, and at the ſame time to behave with as much condeſcenſion as poſſible, repealed all the duties lately laid on, that of tea alone excepted. This was left on purpoſe to maintain the dignity of the crown of Britain; and it was thought that it could not be productive of any diſcontent in America, as being an affair of very little moment, the produce of which was not expected to exceed 16,000l. The oppoſition, however, were ſtrenuous in their endeavours to get this tax likewiſe abrogated; inſiſting, that the Americans would conſider it only as an inlet to others; and that the repeal of all the reſt, without this, would anſwer no great purpoſe. The event ſhowed that their opinion was well founded. The Americans oppoſed the tea tax with the ſame violence as they had done all the reſt;

145 Some people killed by the ſoldiers in a mob at Boſton.

146 All the duties excepting that on tea taken off;

147 which is as violently oppoſed as all the reſt.

America. reſt: and at laſt, on the news that ſalaries had been ſettled on the juſtices of the ſuperior court of Boſton, the governor was addreſſed on the ſubject; the meaſure was condemned in the ſtrongeſt terms; and a committee, ſelected out of the ſeveral diſtricts of the colony, appointed to inquire into it.

148 Aſſembly of Maſſachuſets Bay formally denies the Britiſh right of taxation.

The new aſſembly proceeded in the moſt formal manner to diſavow the ſupremacy of the Britiſh legiſlature; accuſed the parliament of Britain of having violated the natural rights of the Americans in a number of inſtances. Copies of the tranſactions of this aſſembly were tranſmitted to every town in Maſſachuſets, exhorting the inhabitants to rouſe themſelves, and exert every nerve in oppoſition to the iron hand of oppreſſion, which was daily tearing the choiceſt fruits from the fair tree of liberty. The diſturbances were alſo greatly heightened by an accidental diſcovery that Mr Hutchiſon, governor of Maſſachuſets Bay, had written ſeveral confidential letters to people in power in England, complaining of the behaviour of the province, recommending vigorous meaſures againſt them, and, among other things, aſſerting, that "there muſt be an abridgement of what is called Britiſh liberty." Letters of this kind had ſomehow or other fallen into the hands of the agent for the colony at London. They were immediately tranſmitted to Boſton, where the aſſembly was ſitting, by whom they were laid before the governor, who was thus reduced to a very mortifying ſituation. Loſing every idea of reſpect or friendſhip for him as their governor, they inſtantly deſpatched a petition to the king, requeſting him to remove the governor and deputy-governor from their places; but to this they not only received no favourable anſwer, but the petition itſelf was declared groundleſs and ſcandalous.

149 Gov. Hutchiſon's letters to Britiſh miniſtry diſcovered.

150 The petition againſt him refuſed.

151 Tea deſtroyed at Boſton;

Matters were now ripe for the utmoſt extremities on the part of the Americans; and they were brought on in the following manner: Though the coloniſts had entered into a non-importation agreement againſt tea as well as all other commodities from Britain, it had nevertheleſs found its way into America, though in ſmaller quantities than before. This was ſenſibly felt by the Eaſt India Company, who had now agreed to pay a large ſum annually to government; in recompenſe for which compliance, and to make up their loſſes in other reſpects, they were empowered to export their tea free from any duty payable in Britain; and in conſequence of this permiſſion, ſeveral ſhips freighted with the commodity were ſent to North America, and proper agents appointed for diſpoſing of it. The Americans now perceiving that the tax was thus likely to be enforced whether they would or not, determined to take every poſſible method to prevent the tea from being landed, as well knowing that it would be impoſſible to hinder the ſale ſhould the commodity once be brought on ſhore. For this purpoſe the people aſſembled in great numbers, forcing thoſe to whom the tea was conſigned to reſign their offices, and to promiſe ſolemnly never to reſume them; and committees were appointed to examine the accounts of merchants, and make public teſts, declaring ſuch as would not take them enemies to their country. Nor was this behaviour confined to the colony of Maſſachuſets Bay; the reſt of the provinces entered into the conteſt with the ſame warmth, and manifeſted the ſame reſolution to oppoſe the mother country. America.

In the midſt of this confuſion three ſhips laden with tea arrived at Boſton; but ſo much were the captains alarmed at the diſpoſition which ſeemed to prevail among the people, that they offered, providing they could obtain the proper diſcharges from the tea conſignees, cuſtomhouſe, and governor, to return to Britain without landing their cargoes. The parties concerned, however, though they durſt not order the tea to be landed, refuſed to grant the diſcharges required. The ſhips, therefore, would have been obliged to remain in the harbour; but the people, apprehenſive that if they remained there the tea would be landed in ſmall quantities, and diſpoſed of in ſpite of every endeavour to prevent it, reſolved to deſtroy it at once. This reſolution was executed with equal ſpeed and ſecrecy. The very evening after the above mentioned diſcharges had been refuſed, a number of people, dreſſed like Mohawk Indians, boarded the ſhips, and threw into the ſea their whole cargoes, conſiſting of 342 cheſts of tea; after which they retired without making any further diſturbance, or doing any more damage. No tea was deſtroyed in other places, though the ſame ſpirit was everywhere manifeſted. At Philadelphia the pilots were enjoined not to conduct the veſſels up the river; and at New York, though the governor cauſed ſome tea to be landed under the protection of a man of war, he was obliged to deliver it up to the cuſtody of the people, to prevent its being ſold.

152 and refuſed admittance in other places.

The deſtruction of the tea at Boſton, which happened in November 1773, was the immediate prelude to the diſaſters attending civil diſcord. Government finding themſelves everywhere inſulted and deſpiſed, reſolved to enforce their authority by all poſſible means; and as Boſton had been the principal ſcene of the riots and outrages, it was determined to puniſh that city in an exemplary manner. Parliament was acquainted by a meſſage from his majeſty with the undutiful behaviour of the city of Boſton, as well as of all the colonies, recommending at the ſame time the moſt vigorous and ſpirited exertions to reduce them to obedience. The parliament in its addreſs promiſed a ready compliance; and indeed the Americans, by their outrageous behaviour, had now loſt many of their partiſans. It was propoſed to lay a fine on the town of Boſton equal to the price of the tea which had been deſtroyed, and to ſhut up its port by armed veſſels until the refractory ſpirit of the inhabitants ſhould be ſubdued; which it was thought muſt quickly yield, as a total ſtop would thus be put to their trade. The bill was ſtrongly oppoſed on the ſame grounds that the other had been; and it was predicted, that inſtead of having any tendency to reconcile or ſubdue the Americans, it would infallibly exaſperate them beyond any poſſibility of reconciliation. The petitions againſt it, preſented by the colony's agent, pointed out the ſame conſequence in the ſtrongeſt terms, and in the moſt poſitive manner declared that the Americans never would ſubmit to it; but ſuch was the infatuation attending every rank and degree of men, that it never was imagined the Americans would dare to reſiſt the parent ſtate openly, but would in the end ſubmit implicitly to her commands. In this confidence a third bill was propoſed

153 Puniſhment of Boſton reſolved on.

154 Arguments and petitions againſt it,

America.

proposed for the impartial administration of justice on such persons as might be employed in the suppression of riots and tumults in the province of Massachusets Bay. By this act it was provided, that should any persons acting in that capacity be indicted for murder, and not able to obtain a fair trial in the province, they might be sent by the governor to England, or to some other colony, if necessary, to be tried for the supposed crime.

155 and for the impartial administration of justice.

156 Quebec bill.

These three bills having passed so easily, the ministry proposed a fourth, relative to the government of Canada; which it was said, had not yet been settled on any proper plan. By this bill the extent of that province was greatly enlarged; its affairs were put under the direction of a council into which Roman Catholics were to be admitted; the Roman Catholic clergy were secured in their possessions and the usual perquisites from those of their own profession. The council above mentioned were to be appointed by the crown, to be removable at its pleasure; and to be invested with every legislative power excepting that of taxation.

157 These acts exasperate the Americans.

No sooner were these laws made known in America, than they cemented the union of the colonies almost beyond any possibility of dissolving it. The assembly of Massachusets Bay had passed a vote against the judges accepting salaries from the crown, and put the question, Whether they would accept them as usual from the general assembly? Four answered in the affirmative; but Peter Oliver the chief justice refused. A petition against him, and an accusation, were brought before the governor; but the latter refused the accusation, and declined to interfere in the matter: but as they still insisted for what they called justice against Mr Oliver, the governor thought proper to put an end to the matter by dissolving the assembly.

158 Resentment occasioned by the port bill.

In this situation of affairs a new alarm was occasioned by the news of the port bill. This had been totally unexpected, and was received with the most extravagant expressions of displeasure among the populace; and while these continued the new governor, General Gage, arrived from England. He had been chosen to this office on account of his being well acquainted in America, and generally agreeable to the people; but human wisdom could not now point out a method by which the flame could be allayed. The first act of his office as governor was to remove the assembly to Salem, a town 17 miles distant, in consequence of the late act. When this was intimated to the assembly, they replied, by requesting him to appoint a day of public humiliation for deprecating the wrath of heaven, but met with a refusal. When met at Salem, they passed a resolution, declaring the necessity of a general congress composed of delegates from all the provinces, in order to take the affairs of the colonies at large into consideration; and five gentlemen, remarkable for their opposition to the British measures, were chosen to represent that of Massachusets Bay. They then proceeded with all expedition to draw up a declaration, containing a detail of the grievances they laboured under, and the necessity of exerting themselves against lawless power: they set forth the disregard shown to their petitions, and the attempts of Great Britain to destroy their ancient constitution; and concluded with exhorting the inhabitants of the colony to obstruct, by every method in their power, such evil designs, recommending at the same time a total renunciation of every thing imported from Great Britain till a redress of grievances could be procured.

159 Proceedings of the general assembly met at Salem.

America.

160 Generosity of the people of Salem to those of Boston.

Intelligence of this declaration was carried to the governor on the very day that it was completed; on which he dissolved the assembly. This was followed by an address from the inhabitants of Salem in favour of those of Boston, and concluding with these remarkable words: "By shutting up the port of Boston, some imagine that the course of trade might be turned hither, and to our benefit; but nature, in the formation of our harbour, forbids our becoming rivals in commerce with that convenient mart; and were it otherwise, we must be dead to every idea of justice, lost to all feelings of humanity, could we indulge one thought to seize on wealth, and raise our fortunes on the ruin of our suffering neighbours."

It had been fondly hoped by the ministerial party at home, that the advantages which other towns of the colony might derive from the annihilation of the trade of Boston would make them readily acquiesce in the measure of shutting up that port, and rather rejoice in it than otherwise; but the words of the address above mentioned seemed to preclude all hope of this kind; and subsequent transactions soon manifested it to be totally vain. No sooner did intelligence arrive of the remaining bills passed in the session of 1774, than the cause of Boston became the cause of all the colonies. The port bill had already occasioned violent commotions throughout them all. It had been reprobated in provincial meetings, and resistance even to the last had been recommended against such oppression. In Virginia, the first of June, the day on which the port of Boston was to be shut up, was held as a day of humiliation, and a public intercession in favour of America was enjoined. The style of the prayer enjoined at this time was, that "God would give the people one heart and one mind, firmly to oppose every invasion of the American rights." The Virginians, however, did not content themselves with acts of religion. They recommended in the strongest manner a general congress of all the colonies, as fully persuaded that an attempt to tax any colony in an arbitrary manner was in reality an attack upon them all, and must ultimately end in the ruin of them all.

161 The cause of Boston espoused by all the rest of the colonies.

162 The Americans firmly united in their opposition to Britain.

The provinces of New York and Pennsylvania, however, was less sanguine than the rest, being so closely connected in the way of trade with Great Britain, that the giving it up entirely appeared a matter of the most serious magnitude, and not to be thought of but after every other method had failed. The intelligence of the remaining bills respecting Boston, however, spread a fresh alarm throughout the continent, and fixed those who had seemed to be the most wavering. The proposal of giving up all commercial intercourse with Britain was again proposed; contributions for the inhabitants of Boston were raised in every quarter; and they every day received addresses commending them for the heroic courage with which they sustained their calamity.

The Bostonians on their part were not wanting in their endeavours to promote the general cause. An agreement was framed, which, in imitation of former

America.

times, they called a Solemn League and Covenant. By this the ſubſcribers moſt religiouſly bound themſelves to break off all communication with Britain after the expiration of the month of Auguſt enſuing, until the obnoxious acts were repealed; at the ſame time they engaged neither to purchaſe nor uſe any goods imported after that time, and to renounce all connexion with thoſe who did, or who refuſed to ſubſcribe to this covenant; threatening to publiſh the names of the refractory, which at this time was a puniſhment by no means to be deſpiſed. Agreements of a ſimilar kind were almoſt inſtantaneouſly entered into throughout all America. General Gage indeed attempted to counteract the covenant by a proclamation, wherein it was declared an illegal and traiterous combination, threatening with the pains of law ſuch as ſubſcribed or countenanced it. But matters were too far gone for his proclamations to have any effect. The Americans retorted the charge of illegality on his own proclamation, and inſiſted that the law allowed ſubjects to meet in order to conſider of their grievances, and aſſociate for relief from oppreſſion.

163 Solemn league and covenant formed at Boſton.

164 The governor attempts in vain to counteract it by proclamation.

Preparations were now made for holding the general congreſs ſo often propoſed. Philadelphia, as being the moſt centrical and conſiderable town, was pitched upon for the place of its meeting. The delegates of whom it was to be compoſed were choſen by the repreſentatives of each province, and were in number from two to ſeven for each colony, though no province had more than one vote. The firſt congreſs which met at Philadelphia, in the beginning of September 1774, conſiſted of 51 delegates. The novelty and importance of the meeting excited an univerſal attention; and their tranſactions were ſuch as could not but tend to render them reſpectable.

165 Congreſs meets at Philadelphia.

The firſt act of congreſs was an approbation of the conduct of Maſſachuſets Bay, and an exhortation to continue in the ſame ſpirit with which they had begun. Supplies for the ſuffering inhabitants (whom indeed the operation of the port bill had reduced to great diſtreſs) were ſtrongly recommended; and it was declared, that in caſe of attempts to enforce the obnoxious acts by arms, all America ſhould join to aſſiſt the town of Boſton; and ſhould the inhabitants be obliged, during the courſe of hoſtilities, to remove farther up the country, the loſſes they might ſuſtain ſhould be repaired at the public expence.

166 Account of its tranſactions.

They next addreſſed General Gage by letter; in which, having ſtated the grievances of the people of Maſſachuſets colony, they informed him of the fixed and unalterable determination of all the other provinces to ſupport their brethern, and to oppoſe the Britiſh acts of parliament; that they themſelves were appointed to watch over the liberties of America; and entreated him to deſiſt from military operations, leſt ſuch hoſtilities might be brought on as would fruſtrate all hopes of reconciliation with the parent ſtate.

The next ſtep was to publiſh a declaration of their rights. Theſe they ſummed up in the rights belonging to Engliſhmen; and particularly inſiſted, that as their diſtance rendered it impoſſible for them to be repreſented in the Britiſh parliament, their provincial aſſemblies, with the governor appointed by the king, conſtituted the only legiſlative power within each province. They would, however, conſent to ſuch acts of parliament as were evidently calculated merely for the regulation of commerce, and ſecuring to the parent ſtate the benefits of the American trade; but would never allow that they could impoſe any tax on the colonies, for the purpoſe of raiſing a revenue, without their conſent. They proceeded to reprobate the intention of each of the new acts of parliament; and inſiſted on all the rights they had enumerated as being unalienable, and what none could deprive them of. The Canada act they particularly pointed out as being extremely inimical to the colonies, by whoſe aſſiſtance it had been conquered; and they termed it, "An act for eſtabliſhing the Roman Catholic religion in Canada, aboliſhing the equitable ſyſtem of Engliſh laws, and eſtabliſhing a tyranny there." They further declared in favour of a non-importation and non-conſumption of Britiſh goods until the acts were repealed by which duties were impoſed upon tea, coffee, wine, ſugar, and molaſſes, imported into America, as well as the Boſton port act, and the three others paſſed in the preceding ſeſſion of parliament. The new regulations againſt the importation and conſumption of Britiſh commodities were then drawn up with great ſolemnity; and they concluded with returning the warmeſt thanks to thoſe members of parliament who had with ſo much zeal, though without any ſucceſs, oppoſed the obnoxious acts of parliament.

America.

Their next proceedings were to frame a petition to the king, an addreſs to the Britiſh nation, and another to the colonies; all of which were ſo much in the uſual ſtrain of American language for ſome time paſt, that it is needleſs to enter into any particular account of them. It is ſufficient to ſay, that they were all drawn up in a maſterly manner, and ought to have impreſſed the people of this country with a more favourable idea of the Americans than they could at that time be induced to entertain.

All this time the diſpoſition of the people had correſponded with the warmeſt wiſhes of congreſs. The firſt of June had been kept as a faſt, not only throughout Virginia where it was firſt propoſed, but through the whole continent. Contributions for the diſtreſſes of Boſton had been raiſed throughout America, and people of all ranks ſeemed to be particularly touched with them. Even thoſe who ſeemed to be moſt likely to derive advantages from them took no opportunity, as has been already inſtanced in the caſe of Salem. The inhabitants of Marblehead alſo ſhowed a noble example of magnanimity in the preſent caſe. Though ſituated in the neighbourhood of Boſton, and moſt likely to derive benefit from their diſtreſſes, they did not attempt to take any advantage, but generouſly offered the uſe of their harbour to the Boſtonians, as well as their wharfs and warehouſes, free of all expence. In the mean time the Britiſh forces at Boſton were continually increaſing in number, which greatly augmented the general jealouſy and diſaffection; the country were ready to riſe at a moment's warning: and the experiment was made by giving a falſe alarm that the communication between the town and country was to be cut off, in order to reduce the former by famine to a compliance with the acts of parliament. On this intelligence the country people aſſembled in great numbers, and could not be ſatisfied till they had ſent meſſengers into the city to inquire into the truth

167 Generoſity of the inhabitants of Marblehead to Boſton.

168 Extreme attachment of the country people to the Boſtonians.

America. truth of the report. These messengers were enjoined to inform the town's people, that if they should be so pusillanimous as to make a surrender of their liberties, the province would not think itself bound by such examples; and that Britain, by breaking their original charter, had annulled the contract subsisting between them, and left them to act as they thought proper.

The people in every other respect manifested their inflexible determination to adhere to the plan they had so long followed. The new counsellors and judges were obliged to resign their offices, in order to preserve their lives and properties from the fury of the multitude. In some places they shut up the avenues to the court houses; and when required to make way for the judges, replied, that they knew of none but such as were appointed by the ancient usage and custom of the province. Everywhere they manifested the most ardent desire of learning the art of war; and every individual who could bear arms, was most assiduous in procuring them, and learning their exercise.

169 Gen. Gage fortifies Boston Neck;

Matters at last proceeded to such a height, that General Gage thought proper to fortify the neck of land which joins the town of Boston to the continent. This, though undoubtedly a prudent measure in his situation, was exclaimed against by the Americans in the most vehement manner; but the general, instead of giving ear to their remonstrances, deprived them of all power of acting against himself, by seizing the provincial powder, ammunition, and military stores, at Cambridge and Charlestown. This excited such indignation, that it was with the utmost difficulty the people could be restrained from marching to Boston and attacking the troops. Even in the town itself, the company of cadets that used to attend him disbanded themselves, and returned the standard he had as usual presented them with on his accession to the government. This was occasioned by his having deprived the celebrated John Hancock, afterwards president of the congress, of his commission as colonel of the cadets. A similar instance happened of a provincial colonel having accepted a seat in the new council; upon which 24 officers of his regiment resigned their commissions in one day.

170 and seizes the military stores belonging to the province.

171 Opposition to the British parliament still increase.

In the mean time a meeting was held of the principal inhabitants of the towns adjacent to Boston. The purport of this was publicly to renounce all obedience to the late acts of parliament, and to form an engagement to indemnify such as should be prosecuted on that account; the members of the new council were declared violators of the rights of their country; all ranks and degrees were exhorted to learn the use of arms; and the receivers of the public revenue were ordered not to deliver it into the treasury, but retain it in their own hands till the constitution should be restored, or a provincial congress dispose of it otherwise.

A remonstrance against the fortifications on Boston Neck was next prepared; in which, however, they still pretended their unwillingness to proceed to any hostile measures; asserting only as usual their firm determination not to submit to the acts of parliament they had already so much complained of. The governor, to restore tranquillity, if possible, called a general assembly; but so many of the council had resigned their seats, that he was induced to countermand its sitting by proclamation. This measure, however, was deemed illegal; the assembly met at Salem; and after waiting a day for the governor, voted themselves into a provincial congress, of which Mr Hancock was chosen president. A committee was instantly appointed, who waited on the governor with a remonstrance concerning the fortifications on Boston Neck; but nothing of consequence took place, both parties mutually criminating each other. The winter was now coming on, and the governor, to avoid quartering the solders upon the inhabitants, proposed to erect barracks for them; but the select men of Boston compelled the workmen to desist. Carpenters were sent for to New York, but they were refused; and it was with the utmost difficulty that he could procure winter lodgings for his troops. Nor was the difficulty less in procuring clothes; as the merchants of New York told him, that "they would never supply any article for the benefit of men sent as enemies to their country."

172 A general assembly called and dissolved by proclamation.

America.

173 Gen. Gage meets with great difficulties in accommodating his troops.

174 The Americans make preparations for war.

This disposition, known to be almost universal throughout the continent, was in the highest degree satisfactory to congress. Every one saw that the ensuing spring was to be the season of commencing hostilities, and the most indefatigable diligence was used by the colonies to be well provided against such a formidable enemy. A list of all the fencible men in each colony was made out, and especially of those who had served in the former war; of whom they had the satisfaction to find that two-thirds were still alive and fit to bear arms. Magazines of arms were collected, and money was provided for the payment of troops. The governors in vain attempted to put a stop to these proceedings by proclamations; the fatal period was now arrived; and the more the servants of government attempted to repress the spirit of the Americans, the more violent it appeared.

175 Distress of the inhabitants of Boston.

In the mean time the inhabitants of Boston were reduced to great distress. The British troops, now distinguished by the name of the *enemy*, were absolutely in possession of it; the inhabitants were kept as prisoners, and might be made accountable for the conduct of the whole colonies; and various measures were contrived to relieve the latter from such a disagreeable situation. Sometimes it was thought expedient to remove the inhabitants altogether; but this was impracticable without the governor's consent. It was then proposed to set fire to the town at once, after valuing the houses and indemnifying the proprietors; but this being found equally impracticable, it was resolved to wait some other opportunity, as the garrison was not very numerous, and, not being supplied with necessaries by the inhabitants, might soon be obliged to leave the place. The friends of British government indeed attempted to do something in opposition to the general voice of the people; but after a few ineffectual meetings and resolutions they were utterly silenced, and obliged to yield to the superior number of their adversaries.

176 Military stores seized by the Americans.

Matters had now proceeded so far that every idea of reconciliation or friendship with Britain was lost. The Americans, therefore, without ceremony, began to seize on the military stores and ammunition belonging to government. This first commenced at Newport in Rhode Island, where the inhabitants carried off 40 pieces of cannon appointed for the protection of the

place;

America. place; and on being aſked the reaſon of this proceeding, they replied, that the people had ſeized them leſt they ſhould be made uſe of againſt themſelves. After this the aſſembly met, and reſolved that ammunition and warlike ſtores ſhould be purchaſed with the public money.

New Hampſhire followed the example of Rhode Iſland, and ſeized a ſmall fort for the ſake of the powder and military ſtores it contained. In Pennſylvania, however, a convention was held, which expreſſed an earneſt deſire of reconciliation with the mother country; though, at the ſame time, in the ſtrongeſt manner declaring, that they were reſolved to take up arms in defence of their juſt rights, and defend to the laſt their oppoſition to the late acts of parliament; and the people were exhorted to apply themſelves with the greateſt aſſiduity to the proſecution of ſuch manufactures as were neceſſary for their defence and ſubſiſtence, ſuch as ſalt, ſaltpetre, gunpowder, ſteel, &c. This was the univerſal voice of the colonies, New York only excepted. The aſſembly of that province, as yet ignorant of the fate of their laſt remonſtrance, refuſed to concur with the other colonies in their determination to throw off the Britiſh yoke: their attachment, however, was very faint, and by the event it appeared that a perſeverance in the meaſures which the miniſtry had adopted was ſufficient to unite them to the reſt.

As the diſturbances had originated in the province of Maſſachuſets Bay, and there continued all along with the greateſt violence, ſo this was the province where the firſt hoſtilities were formally commenced. In the beginning of February the provincial congreſs met at Cambridge; and as no friends to Britain could now find admittance to that aſſembly, the only conſideration was how to make proper preparations for war. Expertneſs in military diſcipline was recommended in the ſtrongeſt manner, and ſeveral military inſtitutions enacted; among which that of the *minute-men* was one of the moſt remarkable. Theſe were choſen from the moſt active and expert among the militia; and their buſineſs was to keep themſelves in conſtant readineſs at the call of their officers; from which perpetual vigilance they derived their title.—It was now eaſily ſeen that a ſlight occaſion would bring on hoſtilities, which could not but be attended with the moſt violent and certain deſtruction to the vanquiſhed party: for both were ſo much exaſperated by a long courſe of reproaches and literary warfare, that they ſeemed to be filled with the utmoſt inveteracy againſt each other.

177 Maſſachuſets aſſembly recommend preparations for war.

On the 26th of February, General Gage having been informed that a number of field-pieces had been brought to Salem, deſpatched a party to ſeize them. Their road was obſtructed by a river, over which was a drawbridge. This the people had pulled up, and refuſed to let down: upon which the ſoldiers ſeized a boat to ferry them over; but the people cut out her bottom. Hoſtilities would immediately have commenced, had it not been for the interpoſition of a clergyman, who repreſented to the military on the one hand, the folly of oppoſing ſuch numbers; and to the people on the other, that as the day was far ſpent the military could not execute their deſign, ſo that they might without any fear leave them the quiet poſſeſſion of the drawbridge. This was complied with; and the ſoldiers, after having remained for ſome time at the bridge, returned without executing their orders. America.

178 Skirmiſh at Lexington.

The next attempt, however, was attended with more ſerious conſequences. General Gage, having been informed that a large quantity of ammunition and military ſtores had been collected at Concord, about 20 miles from Boſton, and where the provincial congreſs was ſitting, ſent a detachment, under the command of Colonel Smith and Major Pitcairn, to deſtroy the ſtores, and, as was reported, to ſeize Meſſrs Hancock and Adams, the leading men of the congreſs. They ſet out before daybreak, on the 19th of April, marching with the utmoſt ſilence, and ſecuring every one they met on the road, that they might not be diſcovered. But notwithſtanding all their care, the continual ringing of bells and firing of guns as they went along, ſoon gave them notice that the country was alarmed. About five in the morning they had reached Lexington, 15 miles from Boſton, where the militia of the place were exerciſing. An officer called out to them to diſperſe; but ſome ſhots, it is ſaid, being at that moment fired from a houſe in the neighbourhood, the military made a diſcharge, which killed and wounded ſeveral of the militia. The detachment then proceeded to Concord, where, having deſtroyed the ſtores, they were encountered by the Americans; and a ſcuffle enſued, in which ſeveral fell on both ſides. The purpoſe of their expedition being thus accompliſhed, it was neceſſary for the king's troops to retreat, which they did through a continual fire keep upon them from Concord to Lexington. Here their ammunition was totally expended; and they would have been unavoidably cut off, had not a conſiderable reinforcement commanded by Lord Percy luckily met them. The Americans, however, continued their attack with great fury; and the Britiſh would ſtill have been in the utmoſt danger, had it not been for two field pieces which Lord Percy had brought with him. By theſe the impetuoſity of the Americans was checked, and the Britiſh made good their retreat to Boſton with the loſs of 250 killed and wounded: that of the Americans was about 60.

179 A great army aſſembles before Boſton.

By this engagement the ſpirits of the Americans were ſo raiſed, that they meditated nothing leſs than the total expulſion of the Britiſh troops from Boſton. An army of 20,000 men was aſſembled, who formed a line of encampment from Roxbury to Myſtic, through a ſpace of about 30 miles; and here they were ſoon after joined by a large body of Connecticut troops, under General Putnam, an old officer of great bravery and experience. By this formidable force was the town of Boſton now kept blocked up. General Gage, however, had ſo ſtrongly fortified it, that the enemy, powerful as they were, durſt not make an attack; while, on the other hand, his force was by far too inſignificant to meet ſuch an enemy in the field. But towards the end of May, a conſiderable reinforcement having arrived, with Generals Howe, Burgoyne, and Clinton, he was ſoon enabled to attempt ſomething of conſequence; and this the boaſts of the provincials, that they were beſieging thoſe who had been ſent to ſubdue them, ſeemed to render neceſſary. Some ſkirmiſhes in the mean time happened in the iſlands lying off Boſton harbour, in which the Americans had the advantage, and burnt an armed ſchooner, which her

people

America.

180 Battle at Bunker's Hill.

people had been obliged to abandon after ſhe was left aground by the tide. Nothing deciſive, however, took place till the 17th of June. In the neighbourhood of Charleſtown, a place on the northern ſhore of the peninſula on which Boſton ſtands, is a high ground called *Bunker's Hill*, which overlooks and commands the whole town of Boſton. In the night of the 16th the provincials took poſſeſſion of this place: and worked with ſuch indefatigable diligence, that, to the aſtoniſhment of their enemies, they had before daylight almoſt completed a redoubt, with a ſtrong intrenchment reaching half a mile eaſtward, as far as the river Myſtic. After this they were obliged to ſuſtain a heavy and inceſſant fire from the ſhips and floating batteries with which Charleſtown Neck was ſurrounded, as well as the cannon that could reach the place from Boſton; in ſpite of which, however, they continued their work and finiſhed it before mid-day. A conſiderable body of foot was then landed at the foot of Bunker's Hill, under the command of Generals Howe and Pigot; the former being appointed to attack the lines, and the latter the redoubt. The Americans, however, having the advantage of the ground, as well as of their intrenchments, poured down ſuch inceſſant volleys as threatened the whole body with deſtruction; and General Howe was for a little time left almoſt alone, all his officers being killed or wounded. The provincials in the mean time had taken poſſeſſion of Charleſtown, ſo that General Pigot was obliged to contend with them in that place as well as in the redoubt. The conſequence was, that he was overmatched; his troops were thrown into diſorder; and he would in all probability have been defeated, had not General Clinton advanced to his relief: upon which the attack was renewed with ſuch fury, that the provincials were driven beyond the neck that leads to Charleſtown. In the heat of the engagement the Britiſh troops were obliged to ſet fire to the town of Charleſtown, which quickly obliged the provincials to yield after they were deprived of that ſhelter. The loſs on the Britiſh ſide amounted to about 1000, among whom were 19 officers killed and 70 wounded; that of the Americans did not exceed 500.

The Britiſh troops claimed the victory in this engagement with juſtice, though it muſt be allowed that it was dearly bought; and the Americans boaſted that the real advantages were on their ſide, as they had ſo much weakened the enemy, that they durſt not afterwards venture out of their intrenchments. From the many advantages, however, which the Americans poſſeſſed, it is evident that the greateſt diſplay of valour was on the ſide of their enemies. The former were ſtrongly intrenched, and moſt of their fortifications cannon proof; their ſoldiers were all choſen, and excellent markſmen, to whom muſkets ready loaded were handed as faſt as they were diſcharged; and when one party was wearied, another came to their aſſiſtance, as was perceived by the ſpectators on the tops of the houſes at Boſton. Conſidering, however, that this was the firſt time the provincials had been in actual ſervice, it muſt be owned that they behaved with great ſpirit, and by no means merited the appellation of *cowards*, with which they were ſo often branded in Britain.

In other places the ſame determined ſpirit of reſiſtance appeared on the part of the Americans. Lord North's conciliatory ſcheme was utterly rejected by the aſſemblies of Pennſylvania and New Jerſey, and afterwards in every other colony. The commencement of hoſtilities at Lexington determined the colony of New York, which had hitherto continued to waver, to unite with the reſt; and as the ſituation of New York renders it unable to reſiſt an attack from the ſea, it was reſolved, before the arrival of a Britiſh fleet, to ſecure the military ſtores, ſend off the women and children, and to ſet fire to the city if it was ſtill found incapable of defence. The exportation of proviſions was everywhere prohibited, particularly to the Britiſh fiſhery on the banks of Newfoundland, or to ſuch colonies of America as ſhould adhere to the Britiſh intereſt. Congreſs reſolved on the eſtabliſhment of an army, and of a large paper currency in order to ſupport it. In the inland northern colonies, Colonels Eaſton and Ethan Allen, without receiving any orders from congreſs, or communicating their deſign to anybody, with a party of only 250 men, ſurpriſed the forts of Crown Point, Ticonderago, and the reſt that form a communication betwixt the colonies and Canada. On this occaſion 200 pieces of cannon fell into their hands, beſides mortars and a large quantity of military ſtores, together with two armed veſſels, and materials for the conſtruction of others.

America.

181 The Americans become more and more determined in their oppoſition.

182 Crown Point and Ticonderago taken by the Americans.

After the battle of Bunker's Hill, the provincials erected fortifications on the heights which commanded Charleſtown, and ſtrengthened the reſt in ſuch a manner that there was no hope of driving them from thence; at the ſame time that their activity and boldneſs aſtoniſhed the Britiſh officers, who had been accuſtomed to entertain too mean an opinion of their courage.

183 Troops in Boſton diſtreſſed.

The troops, thus ſhut up in Boſton, were ſoon reduced to diſtreſs. Their neceſſities obliged them to attempt the carrying off the American cattle on the iſlands before Boſton, which produced frequent ſkirmiſhes; but the provincials, better acquainted with the navigation of theſe ſhores, landed on the iſlands, deſtroyed or carried off whatever was of any uſe, burned the lighthouſe at the entrance of the harbour, and took priſoners the workmen ſent to repair it, as well as a party of marines who guarded them. Thus the garriſon were reduced to the neceſſity of ſending out armed veſſels to make prizes indiſcriminately of all that came in their way, and of landing in different places to plunder for ſubſiſtence as well as they could.

184 Articles of union betwixt the colonies.

The congreſs in the mean time continued to act with all the vigour which its conſtituents had expected. Articles of confederation and perpetual union were drawn up and ſolemnly agreed upon; by which they bound themſelves and their poſterity for ever. Theſe were in ſubſtance as follow:

1. Each colony was to be independent within itſelf, and to retain an abſolute ſovereignty in all domeſtic affairs.

2. Delegates to be annually elected to meet in congreſs, at ſuch time and place as ſhould be enacted in the preceding congreſs.

3. This aſſembly ſhould have the power of determining war or peace, making alliances; and in ſhort all that power which ſovereigns of ſtates uſually claim as their own.

4. The

America. 4. The expences of war to be paid out of the common treaſury, and raiſed by a poll tax on males between 16 and 60: the proportions to be determined by the laws of the colony.

5. An executive council to be appointed to act in place of the congreſs during its receſs.

6. No colony to make war with the Indians without conſent of congreſs.

7. The boundaries of all the Indian lands to be ſecured and aſcertained to them; and no purchaſes of lands were to be made by individuals, or even by a colony, without conſent of congreſs.

8. Agents appointed by congreſs ſhould reſide among the Indians, to prevent frauds in trading with them, and to relieve, at the public expence, their wants and diſtreſſes.

9. This confederation to laſt until there ſhould be a reconciliation with Britain; or, if that event ſhould not take place, it was to be perpetual.

After the action of Bunker's Hill, however, when the power of Great Britain appeared leſs formidable in the eyes of America than before, congreſs proceeded formally to juſtify their proceedings in a declaration drawn up in terms more expreſſive, and well calculated to excite attention.

"Were it poſſible (ſaid they) for men who exerciſe their reaſon, to believe that the divine Author of our exiſtence intended a part of the human race to hold an abſolute property in and unbounded power over others, marked out by His infinite goodneſs and wiſdom as the objects of a regal domination, never rightfully reſiſtible, however ſevere and oppreſſive; the inhabitants of theſe colonies might at leaſt require from the parliament of Great Britain ſome evidence that this dreadful authority over them had been granted to that body: but a reverence for our Great Creator, principles of humanity, and the dictates of common ſenſe, muſt convince all thoſe who reflect upon the ſubject, that government was inſtituted to promote the welfare of mankind, and ought to be adminiſtered for the attainment of that end.

"The legiſlature of Great Britain, however, ſtimulated by an inordinate paſſion for power, not only unjuſtifiable, but which they know to be peculiarly reprobated by the very conſtitution of that kingdom; and deſpairing of ſucceſs in any mode of conteſt where regard ſhould be had to law, truth, or right; have at length, deſerting thoſe, attempted to effect their cruel and impolitic purpoſe, of enſlaving theſe colonies by violence, and have thereby rendered it neceſſary for us to cloſe with their laſt appeal from reaſon to arms. Yet, however blinded that aſſembly may be, by their intemperate rage for unlimited domination, ſo to ſlight juſtice in the opinion of mankind, we eſteem ourſelves bound by obligations to the reſt of the world to make known the juſtice of our cauſe."

After taking notice of the manner in which their anceſtors left Britain, the happineſs attending the mutual friendly commerce betwixt that country and her colonies, and the remarkable ſucceſs of the late war, they proceed as follows: "The new miniſtry finding the brave foes of Britain, though frequently defeated, yet ſtill contending, took up the unfortunate idea of granting them a haſty peace, and of then ſubduing her faithful friends.

185 Declaration on taking up arms.

"Theſe devoted colonies were judged to be in ſuch a ſtate as to preſent victories without bloodſhed, and all the eaſy emoluments of ſtatutable plunder. The uninterrupted tenour of their peaceable and reſpectful behaviour from the beginning of their colonization; their dutiful, zealous, and uſeful ſervices during the war, though ſo recently and amply acknowledged in the moſt honourable manner by his majeſty, by the late king, and by parliament, could not ſave them from the intended innovations. Parliament was influenced to adopt the pernicious project; and aſſuming a new power over them, has in the courſe of eleven years given ſuch deciſive ſpecimens of the ſpirit and conſequences attending this power, as to leave no doubt of the effects of acquieſcence under it.

"They have undertaken to give and grant our money without our conſent, though we have ever exerciſed an excluſive right to diſpoſe of our own property. Statutes have been paſſed for extending the juriſdiction of the courts of admiralty, and vice-admiralty, beyond their ancient limits; for depriving us of the accuſtomed and ineſtimable rights of trial by jury, in caſes affecting both life and property; for ſuſpending the legiſlature of one of our colonies; for interdicting all commerce to the capital of another; and for altering fundamentally the form of government eſtabliſhed by charter, and ſecured by acts of its own legiſlature; and ſolemnly confirmed by the crown; for exempting the murderers of coloniſts from legal trial, and in effect from puniſhment; for erecting in a neighbouring province, acquired by the joint arms of Great Britain and America, a deſpotiſm dangerous to our very exiſtence; and for quartering ſoldiers upon the coloniſts in time of a profound peace. It has alſo been reſolved in parliament, that coloniſts charged with committing certain offences, ſhall be tranſported to England to be tried.

"But why ſhould we enumerate our injuries in detail? By one ſtatute it was declared, that parliament can of right make laws to bind us in all caſes whatever. What is to defend us againſt ſo enormous, ſo unlimited a power? Not a ſingle perſon who aſſumes it is choſen by us, or is ſubject to our controul or influence; but on the contrary, they are all of them exempt from the operation of ſuch laws; and an American revenue, if not diverted from the oſtenſible purpoſes from which it is raiſed, would actually lighten their own burdens in proportion as it increaſes ours.

"We ſaw the miſery to which ſuch deſpotiſm would reduce us. We for ten years inceſſantly and ineffectually beſieged the throne as ſupplicants; we reaſoned, we remonſtrated with parliament in the moſt mild and decent language: but adminiſtration, ſenſible that we ſhould regard theſe meaſures as freemen ought to do, ſent over fleets and armies to enforce them.

"We have purſued every temperate, every reſpectful meaſure; we have even procceded to break off all commercial intercourſe with our fellow-ſubjects as our laſt peaceable admonition, that our attachment to no nation on earth would ſupplant our attachment to liberty: this we flattered ourſelves was the ultimate ſtep of the controverſy; but ſubſequent events have ſhown how vain was this hope of finding moderation in our enemies!

"The Lords and Commons, in their addreſs in the month

America. month of February, said, that a rebellion at that time actually existed in the province of Massachusets Bay, and that those concerned in it had been countenanced and encouraged by unlawful combinations and engagements entered into by his majesty's subjects in several of the colonies; and therefore they besought his majesty that he would take the most effectual measures to enforce due obedience to the laws and authority of the supreme legislature. Soon after the commercial intercourse of whole colonies with foreign countries was cut off by an act of parliament; by another, several of them were entirely prohibited from the fisheries in the seas near their coasts, on which they always depended for their subsistence; and large reinforcements of ships and troops were immediately sent over to General Gage.

"Fruitless were all the entreaties, arguments, and eloquence of an illustrious band of the most distinguished peers and commoners, who nobly and strenuously asserted the justice of our cause, to stay, or even to mitigate, the heedless fury with which these accumulated outrages were hurried on. Equally fruitless was the interference of the city of London, of Bristol, and many other respectable towns in our favour."

After having reproached parliament, General Gage, and the British government in general, they proceed thus: "We are reduced to the alternative of choosing an unconditional submission to tyranny or resistance by force. The latter is our choice. We have counted the cost of this contest, and find nothing so dreadful as voluntary slavery. Honour, justice, and humanity, forbid us tamely to surrender that freedom which we received from our gallant ancestors, and which our innocent posterity have a right to receive from us. Our cause is just; our union is perfect; our internal resources are great; and, if necessary, foreign assistance is undoubtedly attainable. We fight not for glory or conquest; we exhibit to mankind the remarkable spectacle of a people attacked by unprovoked enemies. They boast of their privileges and civilization, and yet proffer no milder conditions than servitude or death. In our own native land, in defence of the freedom that is our birthright, for the protection of our property acquired by the honest industry of our forefathers and our own, against violence actually offered, we have taken up arms; we shall lay them down when hostilities shall cease on the part of our aggressors, and all danger of their being renewed shall be removed,—and not before."

These are some of the most striking passages in the declaration of congress on taking up arms against Great Britain, and dated July 6th 1775. Without inquiring whether the principles on which it is founded are right or wrong, the determined spirit which it shows ought to have convinced us, that the conquest of America was an event scarcely ever to be expected. In every other respect an equal spirit was shown; and the rulers of the British nation had the mortification to see those whom they styled *rebels* and *traitors*, succeed in negotiations in which they themselves were utterly foiled. In the passing of the Quebec bill, ministry had flattered themselves that the Canadians would be so much attached to them on account of restoring the French laws, that they would very readily join in any attempt against the colonists, who had reprobated that bill in such strong terms; but in this, as in every thing

186 Quebec bill disagreeable to those whom it was intended to please.

else indeed, they found themselves mistaken. The Canadians having been subject to Britain for a period of 15 years, and being thus rendered sensible of the superior advantages of British government, received the bill itself with evident marks of disapprobation; nay, reprobated it as tyrannical and oppressive. A scheme had been formed for General Carleton, governor of the province to raise an army of Canadians wherewith to act against the Americans; and so sanguine were the hopes of administration in this respect, that they had sent 20,000 stand of arms, and a great quantity of military stores, to Quebec for the purpose. But the people, though they did not join the Americans, yet were found immovable in their purpose to stand neuter. Application was made to the bishop; but he declined to interpose his influence, as contrary to the rules of the Popish clergy: so that the utmost efforts of government in this province were found to answer little or no purpose. America.

187 Ministry attempt in vain to arm the Indians.

The British administration next tried to engage the Indians in their cause. But though agents were dispersed among them with large presents to the chiefs, they universally replied, that they did not understand the nature of the quarrel, nor could they distinguish whether those who dwelt in America or on the other side of the ocean were in fault: but they were surprised to see Englishmen ask their assistance against one another; and advised them to be reconciled, and not think of shedding the blood of their brethren.—To the representations of congress they paid more respect. These set forth, that the English on the other side of the ocean had taken up arms to enslave not only their countrymen in America, but the Indians also; and if the latter should enable them to overcome the colonists, they themselves would soon be reduced to a state of slavery also. By arguments of this kind these savages were engaged to remain neuter; and thus the colonists were freed from a most dangerous enemy. On this occasion the congress thought proper to hold a solemn conference with the different tribes of Indians. The speech made by them on the occasion is curious, but too long to be fully inserted. The following is a specimen of the European mode of addressing these people.

188 Speech of the commissioners from congress to the Indians.

"Brothers, Sachems, and Warriors!

"We, the delegates from the Twelve United Provinces, now sitting in general congress at Philadelphia, send their talk to you our brothers.

"Brothers, and Friends now attend!

"When our fathers crossed the great water, and came over to this land, the king of England gave them a talk, assuring them that they and their children should be his children; and that if they would leave their native country, and make settlements, and live here, and buy and sell, and trade with their brethren beyond the water, they should still keep hold of the same covenant-chain, and enjoy peace; and it was covenanted, that the fields, houses, goods, and possessions which our fathers should acquire, should remain to them as their own, and be their children's for ever, and at their sole disposal.

"Brothers and Friends, open a kind ear!

"We will now tell you of the quarrel betwixt the

America. counſellors of King George and the inhabitants and colonies of America.

"Many of his counſellors have perſuaded him to break the covenant-chain, and not to ſend us any more good talks. They have prevailed upon him to enter into a covenant againſt us; and have torn aſunder, and caſt behind their backs, the good old covenant which their anceſtors and ours entered into, and took ſtrong hold of. They now tell us, they will put their hands into our pocket without aſking, as though it were their own; and at their pleaſure they will take from us our charters or written civil conſtitution, which we love as our lives; alſo our plantations, our houſes, and goods, whenever they pleaſe, without aſking our leave. They tell us, that our veſſels may go to that or this iſland in the ſea, but to this or that particular iſland we ſhall not trade any more; and, in caſe of our non-compliance with theſe new orders, they ſhut up our harbours.

"Brothers, we live on the ſame ground with you; the ſame iſland is our common birthplace. We deſire to ſit down under the ſame tree of peace with you; let us water its roots, and cheriſh the growth, till the large leaves and flouriſhing branches ſhall extend to the ſetting ſun, and reach the ſkies. If any thing diſagreeable ſhould ever fall out between us, the Twelve United Colonies, and you, the Six Nations, to wound our peace, let us immediately ſeek meaſures for healing the breach. From the preſent ſituation of our affairs, we judge it expedient to kindle up a ſmall fire at Albany, where we may hear each other's voice, and diſcloſe our minds fully to one another."

The other remarkable tranſactions of this congreſs were the ultimate refuſal of the conciliatory propoſal made by Lord North, of which ſuch ſanguine expectations had been formed by the Engliſh miniſtry; and appointing a generaliſſimo to command their armies, which were now very numerous. The perſon choſen for this purpoſe was George Waſhington: a man ſo univerſally beloved, that he was raiſed to ſuch a high ſtation by the unanimous voice of congreſs; and his ſubſequent conduct ſhowed him every way worthy of it. Horace Gates and Charles Lee, two Engliſh officers of conſiderable reputation, were alſo choſen; the former an adjutant-general, the ſecond a major-general. Artemus Ward, Philip Schuyler, and Iſrael Putnam, were likewiſe nominated major-generals. Seth Pomeroy, Richard Montgomery, David Wooſter, William Heath, Joſeph Spencer, John Thomas, John Sullivan, and Nathaniel Green were choſen brigadier-generals at the ſame time.

189 Gen. Waſhington appointed commander in chief.

190 Georgia accedes to the confederacy.

Congreſs had now alſo the ſatisfaction to receive deputies from the colony of Georgia, expreſſing a deſire to join the confederacy. The reaſons they gave for renouncing their allegiance to Britain were, that the conduct of parliament towards the other colonies had been oppreſſive; that though the obnoxious acts had not been extended to them, they could view this only as an omiſſion, becauſe of the ſeeming little conſequence of their colony; and therefore looked upon it rather to be a ſlight than a favour. At the ſame time they framed a petition to the king, ſimilar to that ſent by the other colonies, and which met with a ſimilar reception.

The ſucceſs which had hitherto attended the Americans in all their meaſures, now emboldened them to think not only of defending themſelves, but likewiſe of acting offenſively againſt Great Britain. The conqueſt of Canada appeared an object within their reach, and one that would be attended with many advantages; and as an invaſion of that province was already facilitated by the taking of Crown Point and Ticonderago, it was reſolved if poſſible to penetrate that way into Canada, and reduce Quebec during the winter, before the fleets and armies, which they were well aſſured would ſail thither from Britain, ſhould arrive. By order of congreſs, therefore, 3000 men were put under the command of Generals Montgomery and Schuyler, with orders to proceed to Lake Champlain, from whence they were to be conveyed in flat-bottomed boats to the mouth of the river Sorel, a branch of the great river St Lawrence, and on which is ſituated a fort of the ſame name with the river. On the other hand, they were oppoſed by General Carleton governor of Canada, a man of great activity and experience in war; who, with a very few troops, had hitherto been able to keep in awe the diſaffected people of Canada, notwithſtanding all the repreſentations of the coloniſts. He had now augmented his army by a conſiderable number of Indians, and promiſed even in his preſent ſituation to make a very formidable reſiſtance.

America. 191 The Americans attempt the conqueſt of Canada.

As ſoon as General Montgomery arrived at Crown Point, he received information that ſeveral armed veſſels were ſtationed at St John's, a ſtrong fort on the Sorel, with a view to prevent his croſſing the lake; on which he took poſſeſſion of an iſland which commands the mouth of the Sorel, and by which he could prevent them from entering the lake. In conjunction with General Schuyler, he next proceeded to St John's: but finding that place too ſtrong, he landed on a part of the country conſiderably diſtant, and full of woods and ſwamps. From thence, however, they were driven by a party of Indians whom General Carleton had employed.

The provincial army was now obliged to retreat to the iſland of which they had at firſt taken poſſeſſion; where General Schuyler being taken ill, Montgomery was left to command alone. His firſt ſtep was to gain over the Indians whom General Carleton had employed, and this he in a great meaſure accompliſhed; after which, on receiving the full number of troops appointed for his expedition, he determined to lay ſiege to St John's. In this he was facilitated by the reduction of Chamblee, a ſmall fort in the neighbourhood, where he found a large ſupply of powder. An attempt was made by General Carleton to relieve the place; for which purpoſe he with great pains collected about 1000 Canadians, while Colonel Maclean propoſed to raiſe a regiment of the Highlanders who had emigrated from their own country to America.

192 Chamblee taken.

193 General Carleton defeated.

But while General Carleton was on his march with theſe new levies, he was attacked by a ſuperior force of provincials, and utterly defeated; which being made known to another body of Canadians who had joined Colonel Maclean, they abandoned him without ſtriking a blow, and he was obliged to retreat to Quebec.

The defeat of General Carleton was a ſufficient recompenſe to the Americans for that of Colonel Ethan Allen, which had happened ſome time before. The

ſucceſs

America. succeſs which had attended this gentleman againſt Crown Point and Ticonderago had emboldened him to make a ſimilar attempt on Montreal; but being attacked by the militia of the place, ſupported by a detachment of regulars, he was entirely defeated and taken priſoner.

As the defeat of General Carleton and the deſertion of Maclean's forces left no room for the garriſon of St John's to hope for any relief, they now conſented to ſurrender themſelves priſoners of war; but were in other reſpects treated with great humanity. They were in number 500 regulars and 200 Canadians, among whom were many of the French nobility; who had been very active in promoting the cauſe of Britain among their countrymen.

194 St John's fort taken.

General Montgomery next took meaſures to prevent the Britiſh ſhipping from paſſing down the river from Montreal to Quebec. This he accompliſhed ſo effectually, that the whole were taken. The town itſelf was obliged to ſurrender at diſcretion; and it was with the utmoſt difficulty that General Carleton eſcaped in an open boat by the favour of a dark night.

195 and likewiſe Montreal.

No further obſtacle now remained in the way of the Americans to the capital, except what aroſe from the nature of the country; and theſe indeed were very conſiderable. Nothing, however, could damp the ardour of the provincials. Notwithſtanding it was now the middle of November, and the depth of winter was at hand, Colonel Arnold formed a deſign of penetrating through woods, moraſſes, and the moſt frightful ſolitudes from New England to Canada by a nearer way than that which Montgomery had choſen; and this he accompliſhed in ſpite of every difficulty, to the aſtoniſhment of all who ſaw or heard of the attempt. This deſperate march, however, cannot be looked upon as conducive to any good purpoſe. A third part of his men under another colonel had abandoned him by the way, under pretence of want of proviſions; the total want of artillery rendered his preſence inſignificant before a place ſtrongly fortified; and the ſmallneſs of his army rendered it even doubtful whether he could have taken the town by ſurpriſe. The Canadians indeed were amazed at the exploit, and their inclination to revolt from Britain was ſomewhat augmented; but none of them as yet took up arms in behalf of America. The conſternation into which the town of Quebec was thrown proved detrimental rather than otherwiſe to the expedition; as it doubled the vigilance and activity of the inhabitants to prevent any ſurpriſe; and the appearance of common danger united all parties, who, before the arrival of Arnold, were contending moſt violently with one another. He was therefore obliged to content himſelf with blocking up the avenues to the town, in order to diſtreſs the garriſon for want of proviſions; and even this he was unable to do effectually, by reaſon of the ſmall number of his men.

196 Col. Arnold penetrates into Canada.

The matter was not much mended by the arrival of General Montgomery. The force he had with him, even when united to that of Arnold, was too inſignificant to attempt the reduction of a place ſo ſtrongly fortified, eſpecially with the aſſiſtance only of a few mortars and field-pieces. After the ſiege had continued through the month of December, General Montgomery, conſcious that he could accompliſh his end no other way than by ſurpriſe, reſolved to make an attempt on the laſt day of the year 1775. The method he took at this time was perhaps the beſt that human wiſdom could deviſe. He advanced by break of day, in the midſt of a heavy fall of ſnow, which covered his men from the ſight of the enemy. Two real attacks were made by himſelf and Colonel Arnold, at the ſame time that two feigned attacks were made on two other places, thus to diſtract the garriſon, and make them divide their forces. One of the real attacks was made by the people of New York, and the other by thoſe of New England under Arnold. Their hopes of ſurpriſing the place, however, were defeated by the ſignal for the attack being through ſome miſtake given too ſoon. General Montgomery himſelf had the moſt dangerous place, being obliged to paſs between the river and ſome high rocks on which the Upper Town ſtands; ſo that he was forced to make what haſte he could to cloſe with the enemy. His fate, however, was now decided. Having forced the firſt barrier, a violent diſcharge of muſketry and grape ſhot from the ſecond killed him, his principal officers, and the moſt of the party he commanded; on which thoſe who remained immediately retreated. Colonel Arnold in the mean time made a deſperate attack on the Lower Town, and carried one of the barriers after an obſtinate reſiſtance for an hour; but in the action he himſelf received a wound, which obliged him to withdraw. The attack, however, was continued by the officers whom he had left, and another barrier forced: but the garriſon, now perceiving that nothing was to be feared except from that quarter, collected their whole force againſt it; and, after a deſperate engagement of three hours, overpowered the provincials, and obliged them to ſurrender.

America.

197 Attempt to ſurpriſe Quebec.

198 General Montgomery killed, and the Americans defeated.

In this action, it muſt be confeſſed that the valour of the provincial troops could not be exceeded. They had fought under as great diſadvantages as thoſe which attended the Britiſh at Bunker's Hill, and had behaved equally well. Such a terrible diſaſter left no hope remaining of the accompliſhment of their purpoſe, as General Arnold could now ſcarce number 800 effective men under his command. He did not, however, abandon the province, or even remove to a greater diſtance than three miles from Quebec; and here he ſtill found means to annoy the garriſon very conſiderably by intercepting their proviſions. The Canadians, notwithſtanding the bad ſucceſs of the American arms, ſtill continued friendly; and thus he was enabled to ſuſtain the hardſhips of a winter encampment in that moſt ſevere climate. The congreſs, far from paſſing any cenſure on him for his misfortune, created him a brigadier-general.

199 Arnold created a brigadier-general.

While hoſtilities were thus carried on with vigour in the north, the flame of contention was gradually extending itſelf in the ſouth. Lord Dunmore, the governor of Virginia, was involved in diſputes ſimilar to thoſe which had taken place in other colonies. Theſe had proceeded ſo far that the aſſembly was diſſolved; which in this province was attended with a conſequence unknown to the reſt. As Virginia contained a great number of ſlaves, it was neceſſary that a militia ſhould be kept conſtantly on foot to keep them in awe. During the diſſolution of the aſſembly the militia laws expired; and the people, after complaining of the danger they were in from the negroes, formed a convention,

200 Diſputes of Lord Dunmore with his province of Virginia.

America.

which enacted that each county ſhould raiſe a quota for the defence of the province. Dunmore, on this, removed the powder from Williamſburg; which created ſuch diſcontents, that an immediate quarrel would probably have enſued, had not the merchants of the town undertaken to obtain ſatisfaction for the injury ſuppoſed to be done to the community. This tranquillity, however, was ſoon interrupted; the people, alarmed by a report that an armed party were on their way from the man of war where the powder had been depoſited, aſſembled in arms, and determined to oppoſe by force any farther removals. In ſome of the conferences which paſſed at this time, the governor let fall ſome unguarded expreſſions, ſuch as threatening them with ſetting up the royal ſtandard, proclaiming liberty to the negroes, deſtroying the town of Williamſburg, &c. which were afterwards made public, and exaggerated in ſuch a manner as greatly to increaſe the public ferment.

The people now held frequent aſſemblies. Some of them took up arms with a deſign to force the governor to reſtore the powder, and to take the public money into their own poſſeſſion; but on their way to Williamſburg for this purpoſe, they were met by the receiver-general, who became ſecurity for the payment of the gunpowder, and the inhabitants promiſed to take care of the magazine and public revenue.

201 He ſends his family aboard a man of war.

By this inſurrection the governor was ſo much intimidated, that he ſent his family on board a man of war. He himſelf, however, iſſued a proclamation, in which he declared the behaviour of the perſon who promoted the tumult treaſonable, accuſed the people of diſaffection, &c. On their part they were by no means deficient in recriminating; and ſome letters of his to Britain being about the ſame time diſcovered, conſequences enſued extremely ſimilar to thoſe which had been occaſioned by thoſe of Mr Hutchinſon at Boſton.

202 Fortifies his palace.

In this ſtate of confuſion the governor thought it neceſſary to fortify his palace with artillery, and procure a party of marines to guard it. Lord North's conciliatory propoſal arriving alſo about the ſame time, he uſed his utmoſt endeavours to cauſe the people comply with it. The arguments he uſed were ſuch as muſt do him honour; and had not matters already gone to ſuch a pitch of diſtraction, it is highly probable that ſome attention would have been paid to them. "The view (he ſaid) in which the colonies ought to behold this conciliatory propoſal, was no more than an earneſt admonition from Great Britain to relieve her wants: that the utmoſt condeſcendence had been uſed in the mode of application; no determinate ſum having been fixed, as it was thought moſt worthy of Britiſh generoſity to take what they thought could be conveniently ſpared, and likewiſe to leave the mode of raiſing it to themſelves," &c. But the clamour and diſſatisfaction were now ſo univerſal, that nothing elſe could be attended to. The governor had called an aſſembly for the purpoſe of laying this conciliatory propoſal before them; but it had been little attended to. The aſſembly began their ſeſſion by inquiries into the ſtate of the magazine. It had been broken into by ſome of the townſmen; for which reaſon ſpring-guns had been placed there by the governor, which diſcharged themſelves upon the offenders at their entrance: theſe circumſtances, with others of a ſimilar kind, raiſed ſuch a

203 His arguments for L. North's conciliatory plan.

violent uproar, that as ſoon as the preliminary buſineſs of the ſeſſion was over, the governor retired on board a man of war, informing the aſſembly that he durſt no longer truſt himſelf on ſhore. This produced a long courſe of diſputation, which ended in a poſitive refuſal of the governor to truſt himſelf again in Williamſburg, even to give his aſſent to the bills, which could not be paſſed without it, and though the aſſembly offered to bind themſelves for his perſonal ſafety. In his turn he requeſted them to meet him on board the man of war, where he then was; but this propoſal was rejected, and all further correſpondence containing the leaſt appearance of friendſhip was diſcontinued.

America.

204 The governor retires on board a man of war.

Lord Dunmore, thus deprived of his government, attempted to reduce by force thoſe whom he could no longer govern. Some of the moſt ſtrenuous adherents to the Britiſh cauſe, whom their zeal had rendered obnoxious at home, now repaired to him. He was alſo joined by numbers of black ſlaves. With theſe and the aſſiſtance of the Britiſh ſhipping, he was for ſome time enabled to carry on a kind of predatory war, ſufficient to hurt and exaſperate, but not to ſubdue. After ſome inconſiderable attempts on land, proclaiming liberty to the ſlaves, and ſetting up the royal ſtandard, he took up his reſidence at Norfolk, a maritime town of ſome conſequence, where the people were better affected to Britain than in moſt other places. A conſiderable force, however, was collected againſt him; and the natural impetuoſity of his temper prompting him to act againſt them with more courage than caution, he was entirely defeated, and obliged to retire to his ſhipping, which was now crowded by the number of thoſe who had incurred the reſentment of the provincials.

205 Attempts to reduce the colony by force,

206 but is entirely defeated.

In the mean time a ſcheme of the utmoſt magnitude and importance was formed by one Mr Conolly, a Pennſylvanian of an intrepid and aſpiring diſpoſition, and attached to the cauſe of Britain. The firſt ſtep of this plan was to enter into a league with the Ohio Indians. This he communicated to Lord Dunmore, and it received his approbation: Upon which Conolly ſet out, and actually ſucceeded in his deſign. On his return he was deſpatched to General Gage, from whom he received a colonel's commiſſion, and ſet out in order to accompliſh the remainder of his ſcheme. The plan in general was, that he ſhould return to the Ohio, where, by the aſſiſtance of the Britiſh and Indians in theſe parts, he was to penetrate through the back ſettlements into Virginia, and join Lord Dunmore at Alexandria. But by an accident very naturally to be expected, he was diſcovered, taken priſoner, and thrown into a dungeon.

207 Mr Conolly's plan for reducing Virginia.

208 He is diſcovered and taken priſoner.

After the retreat of Lord Dunmore from Norfolk, that place was taken poſſeſſion of by the provincials, who treated the loyaliſts that had remained there with great cruelty; at the ſame time that they greatly diſtreſſed thoſe on board Lord Dunmore's fleet, by refuſing to ſupply them with any neceſſaries. Nor was this all; the vicinity of the ſhipping was ſo great as to afford the riflemen an opportunity of aiming at the people on board, and exerciſing the cruel occupation of killing them, in which they did not fail every day to employ themſelves. Theſe proceedings at laſt drew a remonſtrance from his lordſhip; in which he inſiſted that the fleet ſhould be furniſhed with neceſſaries, and

209 Cruelty of the Americans.

that

America.

that the ſoldiers ſhould deſiſt from the cruel diverſion above mentioned; but both theſe requeſts being denied, a reſolution was taken to ſet fire to the town. After giving the inhabitants proper warning, a party landed, under cover of a man of war, and ſet fire to that part which lay neareſt the ſhore; but the flames were obſerved at the ſame time to break forth in every other quarter, and the whole town was reduced to aſhes. This univerſal deſtruction, by which a loſs of more than 300,000l. was incurred, is ſaid to have been occaſioned by order of the congreſs itſelf, that the loyaliſts might find no refuge there for the future.

210 The town of Norfolk deſtroyed.

211 The governors of South and North Carolina expelled.

In the ſouthern colonies of Carolina the governors were expelled and obliged to take refuge on board of men of war, as Lord Dunmore had been; Mr Martin, governor of North Carolina, on a charge of attempting to raiſe the back ſettlers, conſiſting chiefly of Scots Highlanders, againſt the colony. Having ſecured themſelves againſt any attempts from theſe enemies, however, they proceeded to regulate their internal concerns in the ſame manner as the reſt of the colonies; and by the end of the year 1775, Britain beheld the whole of America united againſt her in the moſt determined oppoſition. Her vaſt poſſeſſions of that tract of land (ſince known by the name of the *Thirteen United States*) were now reduced to the ſingle town of Boſton; in which her forces were beſieged by an enemy with whom they were apparently not able to cope, and by whom they muſt of courſe expect in a very ſhort time to be expelled. The ſituation of the inhabitants of Boſton, indeed, was peculiarly unhappy. After having failed in their attempts to leave the town, General Gage had conſented to allow them to retire with their effects; but afterwards, for what reaſon does not well appear, he refuſed to fulfil his promiſe. When he reſigned his place to General Howe in October 1775, the latter, apprehenſive that they might give intelligence of the ſituation of the Britiſh troops, ſtrictly prohibited any perſon from leaving the place under pain of military execution. Thus matters continued till the month of March 1776, when the town was evacuated.

212 Miſerable ſituation of the inhabitants of Boſton.

213 Boſton ſeverely cannonaded by the provincials.

On the 2d of that month, General Waſhington opened a battery on the weſt ſide of the town, from whence it was bombarded with a heavy fire of cannon at the ſame time; and three days after, it was attacked by another battery from the eaſtern ſhore. This terrible attack continued for 14 days without intermiſſion; when General Howe, finding the place no longer tenible, determined if poſſible to drive the enemy from their works. Preparations were therefore made for a moſt vigorous attack on a hill called Dorcheſter Neck, which the Americans had fortified in ſuch a manner as would in all probability have rendered the enterpriſe next to deſperate. No difficulties, however, were ſufficient to daunt the ſpirit of the general; and every thing was in readineſs, when a ſudden ſtorm prevented this intended exertion of Britiſh valour. Next day, upon a more cloſe inſpection of the works they were to attack, it was thought adviſable to deſiſt from the enterpriſe altogether. The fortifications were very ſtrong, and extremely well provided with artillery; and beſides other implements of deſtruction, upwards of 100 hogſheads of ſtones were provided to roll down upon the enemy as they came up; which, as the aſcent was extremely ſteep, muſt have done prodigious execution.

America.

Nothing therefore now remained but to think of a retreat; and even this was attended with the utmoſt difficulty and danger. The Americans, however, knowing that it was in the power of the Britiſh general to reduce the town to aſhes, which could not have been repaired in many years, did not think proper to give the leaſt moleſtation; and for the ſpace of a fortnight the troops were employed in the evacuation of the place, from whence they carried along with them 2000 of the inhabitants, who durſt not ſtay on account of their attachment to the Britiſh cauſe. From Boſton they ſailed to Halifax; but all their vigilance could not prevent a number of valuable ſhips from falling into the hands of the enemy. A conſiderable quantity of cannon and ammunition had alſo been left at Bunker's Hill and Boſton Neck; and in the town an immenſe variety of goods, principally woollen and linen, of which the provincials ſtood very much in need. The eſtates of thoſe who fled to Halifax were confiſcated; as alſo thoſe who were attached to government, and had remained in the town. As an attack was expected as ſoon as the Britiſh forces ſhould arrive, every method was employed to render the fortifications, already very ſtrong, impregnable. For this purpoſe ſome foreign engineers were employed, who had before arrived at Boſton; and ſo eager were people of all ranks to accompliſh this buſineſs, that every able-bodied man in the place, without diſtinction of rank, ſet apart two days in the week, to complete it the ſooner.

214 The place evacuated.

215 Its fortifications ſtrengthened.

The Americans, exaſperated to the utmoſt by the proceedings of parliament, now formally renounced all connexion with Britain, and declared themſelves independent. This celebrated declaration was publiſhed on the 4th of July 1776. Previous to this a circular letter had been ſent through each colony, ſtating the reaſons for it; and ſuch was the animoſity now everywhere prevailing againſt Great Britain, that it met with univerſal approbation, except in the province of Maryland alone. It was not long, however, before the people of that colony, finding themſelves left in a very dangerous minority, thought proper to accede to the meaſures of the reſt. The manifeſto itſelf was much in the uſual ſtyle, ſtating a long liſt of grievances, for which redreſs had been often applied in vain; and for theſe reaſons they determined on a final ſeparation; to hold the people of Britain as the reſt of mankind, "enemies in war, in peace friends."

216 Congreſs declares the States of America independent.

After thus publicly throwing off all allegiance and hope of reconciliation, the coloniſts ſoon found that an exertion of all their ſtrength was required in order to ſupport their pretenſions. Their arms, indeed, had not, during this ſeaſon, been attended with ſucceſs, in Canada. Reinforcements had been promiſed to Colonel Arnold, who ſtill continued the blockade of Quebec; but they did not arrive in time to ſecond his operations. Being ſenſible, however, that he muſt either deſiſt from the enterpriſe, or finiſh it ſucceſsfully, he recommenced in form; attempting to burn the ſhipping, and even to ſtorm the town itſelf. They were unſucceſsful, however, by reaſon of the ſmallneſs of their number, though they ſucceeded ſo far as to burn a number of houſes in the ſuburbs; and the garriſon were

217 The ſiege of Quebec ſtill continued.

America. were obliged to pull down the remainder, in order to prevent the fire from ſpreading.

As the provincials, though unable to reduce the town, kept the garriſon in continual alarms, and in a very diſagreeable ſituation, ſome of the nobility collected themſelves into a body under the command of one Mr Beaujeu, in order to relieve their capital; but they were met on their march by the provincials, and ſo entirely defeated, that they were never afterwards able to attempt any thing. The Americans, however, had but little reaſon to plume themſelves on this ſucceſs. Their want of artillery at laſt convinced them, that it was impracticable in their ſituation to reduce a place ſo ſtrongly fortified: the ſmallpox at the ſame time made its appearance in their camp, and carried off great numbers; intimidating the reſt to ſuch a degree, that they deſerted in crowds. To add to their misfortunes, the Britiſh reinforcements unexpectedly appeared, and the ſhips made their way through the ice with ſuch celerity, that the one part of their army was ſeparated from the other; and General Carleton ſallying out as ſoon as the reinforcement was landed, obliged them to fly with the utmoſt precipitation, leaving behind them all their cannon and military ſtores; at the ſame time that their ſhipping was entirely captured by veſſels ſent up the river for that purpoſe. On this occaſion the provincials fled with ſuch precipitation that they could not be overtaken; ſo that none fell into the hands of the Britiſh excepting the ſick and wounded. General Carleton now gave a ſignal inſtance of his humanity: Being well appriſed that many of the provincials had not been able to accompany the reſt in their retreat, and that they were concealed in woods, &c. in a very deplorable ſituation, he generouſly iſſued a proclamation, ordering proper perſons to ſeek them out, and give them relief at the public expence; at the ſame time, leſt, through fear of being made priſoners, they ſhould refuſe theſe offers of humanity, he promiſed, that, as ſoon as their ſituation enabled them, they ſhould be at liberty to depart to their reſpective homes.

218 Canadians defeated by the provincials;

219 who are in their turn defeated by General Carleton.

220 Humanity of the Britiſh general.

221 He purſues the provincials.

The Britiſh general, now freed from any danger of an attack, was ſoon enabled to act offenſively againſt the provincials, by the arrival of the forces deſtined for that purpoſe from Britain. By theſe he was put at the head of 12,000 regular troops, among whom were thoſe of Brunſwick. With this force he inſtantly ſet out to the Three Rivers, where he expected that Arnold would have made a ſtand; but he had fled to Sorel, a place 150 miles diſtant from Quebec, where he was at laſt met by the reinforcements ordered by congreſs. Here, though the preceding events were by no means calculated to inſpire much military ardour, a very daring enterpriſe was undertaken; and this was, to ſurpriſe the Britiſh troops poſted here under Generals Fraſer and Neſbit; of whom the former commanded thoſe on land, the latter ſuch as were on board of tranſports and were but a little way diſtant. The enterpriſe was undoubtedly very hazardous, both on account of the ſtrength of the parties againſt whom they were to act, and as the main body of the Britiſh forces was advanced within 50 miles of the place; beſides that a number of armed veſſels and tranſports with troops lay between them and the Three Rivers. Two thouſand choſen men, however, under General Thomſon, engaged in this enterpriſe. Their ſucceſs was by no means anſwerable to their ſpirit and valour. Though they paſſed the ſhipping without being obſerved, General Fraſer had notice of their landing; and thus being prepared to receive them, they were ſoon thrown into diſorder, at the ſame time that General Neſbit, having landed his forces, prepared to attack them in the rear. On this occaſion ſome field pieces did prodigious execution, and a retreat was found to be unavoidable. General Neſbit, however, had got between them and their boats; ſo that they were obliged to take a circuit through a deep ſwamp, while they were hotly purſued by both parties at the ſame time, who marched for ſome miles on each ſide of the ſwamp, till at laſt the miſerable provincials were ſheltered from further danger by a wood at the end of the ſwamp. Their general, however, was taken, with 200 of his men. America.

222 General Thomſon defeated and taken priſoner by General Fraſer.

By this diſaſter the provincials loſt all hopes of accompliſhing any thing in Canada. They demoliſhed their works, and carried off their artillery with the utmoſt expedition. They were purſued, however, by General Burgoyne; againſt whom it was expected that they would have collected all their force, and made a reſolute ſtand. But they were now too much diſpirited by misfortune, to make any further exertions of valour. On the 18th of June the Britiſh general arrived at Fort St John's, which he found abandoned and burnt. Chamblee had ſhared the ſame fate, as well as all the veſſels that were not capable of being dragged up againſt the current of the river. It was thought that they would have made ſome reſiſtance at Nut Iſland, the entrance to Lake Champlain; but this alſo they had abandoned, and retreated acroſs the lake to Crown Point, whither they could not be immediately followed. Thus was the province of Canada entirely evacuated by the Americans; whoſe loſs in their retreat from Quebec was not calculated at leſs than 1000 men, of whom 400 fell at once into the hands of the enemy at a place called the Cedars, about 50 miles above Montreal. General Sullivan, however, who conducted this retreat after the affair of General Thomſon, was acknowledged to have had great merit in what he did, and received the thanks of congreſs accordingly.

223 The provincials purſued by General Burgoyne;

224 but eſcape to Crown Point.

This bad ſucceſs in the north, however, was ſomewhat compenſated by what happened in the ſouthern colonies.—We have formerly taken notice that Mr Martin, governor of North Carolina, had been obliged to leave his province and take refuge on board a man of war. Notwithſtanding this, he did not deſpair of reducing it again to obedience. For this purpoſe he applied to the Regulators, a daring ſet of banditti, who lived in a kind of independent ſtate; and though conſidered by government as rebels, yet had never been moleſted, on account of their numbers and known ſkill in the uſe of fire-arms. To the chiefs of theſe people commiſſions were ſent, in order to raiſe ſome regiments; and Colonel Macdonald, a brave and enterpriſing officer, was appointed to command them. In the month of February he erected the king's ſtandard, iſſued proclamations, &c. and collected ſome forces, expecting to be ſoon joined by a body of regular troops, who were known to be ſhipped from Britain to act againſt the ſouthern colonies. The Americans, ſenſible of their danger, deſpatched immediately what forces they

225 An inſurrection in North Carolina in favour of Britain.

America. they had to act againſt the royaliſts, at the ſame time that they diligently exerted themſelves to ſupport theſe with ſuitable reinforcements. Their preſent force was commanded by a General Moore, whoſe numbers were inferior to Macdonald; for which reaſon the latter ſummoned him to join the king's ſtandard under pain of being treated as a rebel. But Moore, being well provided with cannon, and conſcious that nothing could be attempted againſt him, returned the compliment, by acquainting Colonel Macdonald, that if he and his party would lay down their arms, and ſubſcribe an oath of fidelity to congreſs, they ſhould be treated as friends; but if they perſiſted in an undertaking for which it was evident they had not ſufficient ſtrength, they could not but expect the ſevereſt treatment. In a few days General Moore found himſelf at the head of 8000 men, by reaſon of the continual ſupplies which daily arrived from all parts. The royal party amounted only to 2000, and they were deſtitute of artillery, which prevented them from attacking the enemy while they had the advantage of numbers. They were now therefore obliged to have recourſe to a deſperate exertion of perſonal valour; by dint of which they effected a retreat for 80 miles to Moor's Creek, within 16 miles of Wilmington. Could they have gained this place, they expected to have been joined by Governor Martin and General Clinton, who had lately arrived with a conſiderable detachment. But Moore with his army purſued them ſo cloſe, that they were obliged to attempt the paſſage of the creek itſelf, though a conſiderable body of the enemy, under the command of Colonel Coſwell, with fortifications well planted with cannon, was poſted on the other ſide. On attempting the creek, however, it was found not to be fordable. They were obliged therefore to croſs over a wooden bridge which the provincials had not time to deſtroy entirely. They had, however, by pulling up part of the planks, and greaſing the remainder in order to render them ſlippery, made the paſſage ſo difficult, that the royaliſts could not attempt it. In this ſituation they were, on the 27th of February, attacked by Moore, with his ſuperior army, and totally defeated with the loſs of their general and moſt of their leaders, as well as the beſt and braveſt of their men.

226 The royaliſts entirely defeated.

227 Lord Dunmore finally driven out of Virginia.

Thus was the power of the provincials eſtabliſhed in North Carolina. Nor were they leſs ſucceſsful in the province of Virginia; where Lord Dunmore, having long continued an uſeleſs predatory war, was at laſt driven from every creek and road in the province. The people he had on board were diſtreſſed to the higheſt degree by confinement in ſmall veſſels. The heat of the ſeaſon, and the numbers crowded together, produced a peſtilential fever, which made great havock, eſpecially among the blacks. At laſt, finding themſelves in the utmoſt hazard of periſhing by famine as well as by diſeaſe, they ſet fire to the leaſt valuable of their veſſels, reſerving only about 50 for themſelves, in which they bade a final adieu to Virginia, ſome ſailing to Florida, ſome to Bermuda, and the reſt to the Weſt Indies.

228 Britiſh armament ſent againſt Charleſtown.

In South Carolina the provincials had a more formidable enemy to deal with. A ſquadron, whoſe object was the reduction of Charleſtown, had been fitted out in December 1775; but by reaſon of unfavourable weather did not reach Cape Fear in North Carolina till the month of May 1776: and here it met with America. further obſtacles till the end of the month. Thus the Americans, always noted for their alertneſs in raiſing fortifications, had time to ſtrengthen thoſe of Charleſtown in ſuch a manner as rendered it extremely difficult to be attacked. The Britiſh ſquadron conſiſted of two 50 gun ſhips, four of 30 guns, two of 20, an armed ſchooner and bomb-ketch; all under the command of Sir Peter Parker. The land forces were commanded by Lord Cornwallis, with Generals Clinton and Vaughan. As they had yet no intelligence of the evacuation of Boſton, General Howe deſpatched a veſſel to Cape Fear with ſome inſtructions; but it was too late; and in the beginning of June the ſquadron anchored off Charleſtown bar. Here they met with ſome difficulty in croſſing, being obliged to take out the guns from the two large ſhips, which were, notwithſtanding, ſeveral times in danger of ſticking faſt. The next obſtacle was a ſtrong fort on Sullivan's Iſland, ſix miles eaſt from Charleſtown; which, though not completely finiſhed, was very ſtrong. However, the Britiſh generals reſolved without heſitation to attack it; but though an attack was eaſy from the ſea, it was very difficult to obtain a co-operation of the land forces. This was attempted by landing them on Long Iſland, adjacent to Sullivan's Iſland on the eaſt, from which it is ſeparated by a very narrow creek, ſaid not to be above two feet deep at low water. Oppoſite to this ford the provincials had poſted a ſtrong body of troops, with cannon and intrenchments; while General Lee was poſted on the main land, with a bridge of boats betwixt that and Sullivan's Iſland, ſo that he could at pleaſure ſend reinforcements to the troops in the fort on Sullivan's Iſland.

On the part of the Britiſh, ſo many delays occurred, that it was the 28th of June before matters were in readineſs for an attack; and by this time the provincials had abundantly provided for their reception. On the morning of that day the bomb-ketch began to throw ſhells into Fort Sullivan, and about mid-day the two 50 gun ſhips, and 30 gun frigates came up and began a ſevere fire. Three other frigates were ordered to take their ſtation between Charleſtown and the fort, in order to enfilade the batteries, and cut off the communication with the main land; but through the ignorance of the pilots they all ſtuck faſt; and though two of them were diſentangled, they were found to be totally unfit for ſervice: the third was burnt that ſhe might not fall into the hands of the enemy.

229 The fleet make a furious attack.

The attack was therefore confined to the five armed ſhips and bomb-ketch, between whom and the fort a dreadful fire enſued. The Briſtol ſuffered exceſſively. The ſprings on her cable being ſhot away, ſhe was for ſome time entirely expoſed to the enemy's fire. As the enemy poured in great quantities of red-hot balls, ſhe was twice in flames. The captain (Mr Morris), after receiving five wounds, was obliged to go below deck in order to have his arm amputated. After undergoing this operation he returned to his place, where he received another wound, but ſtill refuſed to quit his ſtation: at laſt he received a red-hot ball in his belly, which inſtantly put an end to his life. Of all the officers and ſeamen who ſtood on the quarter-deck of this veſſel, not one eſcaped without a wound excepting Sir Peter Parker alone; whoſe intrepidity and

230 Bravery of Captain Morris.

preſence

America.

presence of mind on this occasion was very remarkable. The engagement lasted till darkness put an end to it.

231 The British repulsed.

Little damage was done by the British, as the works of the enemy lay so low that many of the shot flew over; and the fortifications, being composed of palm-trees mixed with earth, were extremely well calculated to resist the impression of cannon. During the height of the attack, the provincial batteries remained for some time silent, so that it was concluded that they had been abandoned; but this was found to proceed only from want of powder; for as soon as a supply of this necessary article was obtained, the firing was resumed as brisk as before. During the whole of this desperate engagement it was found impossible for the land forces to give the least assistance to the fleet. The enemy's works were found to be much stronger than they had been imagined, and the depth of water effectually prevented them from making any attempt. In this unsuccessful attack the killed and wounded on the part of the British amounted to about 200. The Bristol and Experiment were so much damaged, that it was thought they could not have been got over the bar; however, this was at last accomplished by a very great exertion of naval skill, to the surprise of the provincials, who had expected to make them both prizes. On the American side the loss was judged to have been very considerable, as most of their guns were dismounted, and reinforcements had poured into the fort during the whole time of the action.

232 Americans form a navy.

This year also, the Americans, having so frequently made trial of their valour by land, became desirous of trying it by sea also, and of forming a navy that might in some measure be able to protect their trade, and do essential hurt to the enemy. In the beginning of March Commodore Hopkins was despatched with five frigates to the Bahama islands, where he made himself master of the ordnance and military stores; but the gunpowder, which had been the principal object, was removed. On his return he captured several vessels; but was foiled in his attempt on the Glasgow frigate, which found means to escape notwithstanding the efforts of his whole squadron.

The time, however, was now come when the fortitude and patience of the Americans were to undergo a severe trial. Hitherto they had been on the whole successful in their operations: but now they were doomed to experience misfortune, misery, and disgrace; the enemy overrunning their country, and their own armies not able to face them in the field. The province of New York, as being the most central colony, and most accessible by sea, was pitched upon for the object of the main attack. The force sent against it consisted of 6 ships of the line, 30 frigates, besides other armed vessels, and a vast number of transports. The fleet was commanded by Lord Howe, and the land forces by his brother General Howe, who was now at Halifax. The latter, however, a considerable time before his brother arrived, had set sail from Halifax, and lay before New York, but without attempting to commence hostilities until he should be joined by his brother. The Americans had, according to custom, fortified New York, and the adjacent islands, in an extraordinary manner. However, General Howe was suffered to land his troops on Staten Island, where he was soon joined by a number of the inhabitants. About the middle of July, Lord Howe arrived with the grand armament; and being one of the commissioners appointed to receive the submission of the colonists, he published a circular letter to this purpose to the several governors who had lately been expelled from their provinces, desiring them to make the extent of his commission, and the powers he was invested with by parliament, as public as possible. Here, however, congress saved him trouble, by ordering his letter and declaration to be published in all the newspapers, that every one, as they said, might see the insidiousness of the British ministry, and that they had nothing to trust to besides the exertion of their own valour.

233 Armament sent against New York.

234 General Howe lands on Staten Island.

American

235 General Washington refuses a letter from Lord Howe.

Lord Howe next sent a letter to General Washington; but as it was directed "To George Washington, Esq;" the General refused to accept of it, as not being directed in the style suitable to his station. To obviate this objection, Adjutant-general Paterson was sent with another letter, directed "To George Washington, &c. &c. &c." But though a very polite reception was given the bearer, General Washington utterly refused the letter; nor could any explanation of the adjutant induce him to accept of it. The only interesting part of the conversation was that relating to the powers of the commissioners, of which Lord Howe was one. The adjutant told him, that these powers were very extensive; that the commissioners were determined to exert themselves to the utmost, in order to bring about a reconciliation; and that he hoped the general would consider this visit as a step towards it. General Washington replied, That it did not appear that these powers consisted in any thing else than granting pardons; and as America had committed no offence, she asked no forgiveness, and was only defending her unquestionable rights.

236 Hostilities commence.

The decision of every thing being now, by consent of both parties, left to the sword, no time was lost, but hostilities commenced as soon as the British troops could be collected. This, however, was not done before the month of August; when they landed without any opposition on Long Island, opposite to the shore of Staten Island. General Putnam, with a large body of troops, lay encamped and strongly fortified on a peninsula on the opposite shore, with a range of hills between the armies, the principal pass of which was near a place called *Flat-bush*. Here the centre of the British army, consisting of Hessians, took post; the left wing, under General Grant, lying near the shore; and the right, consisting of the greater part of the British forces, lay under Lord Percy, Cornwallis, and General Clinton. Putnam had ordered the passes to be secured by large detachments, which was executed as to those at hand; but one of the utmost importance, that lay at a distance, was entirely neglected. This gave an opportunity to a large body of troops under Lord Percy and Clinton to pass the mountains and attack the Americans in the rear, while they were engaged with the Hessians in front. Through this piece of negligence their defeat became inevitable. Those who were engaged with the Hessians first perceived their mistake, and began a retreat towards their camp; but the passage was intercepted by the British troops, who drove them back into the woods. Here they were met by the Hessians; and thus were they for many hours slaughtered between the two parties, no

237 Situation of the British and American armies

way

America.

way of escape remaining but by breaking through the British troops, and thus regaining their camp. In this attempt many perished; and the right wing, engaged with General Grant, shared the same fate. The victory was complete; and the Americans lost on this fatal day (August 27th) between 3000 and 4000 men, of whom 2000 were killed in the battle or pursuit. Among these a regiment, consisting of young gentlemen of fortune and family in Maryland, was almost entirely cut in pieces, and of the survivors not one escaped without a wound.

238 The Americans defeated with great slaughter.

The ardour of the British troops was now so great, that they could scarcely be restrained from attacking the lines of the provincials; but for this there was now no occasion, as it was certain they could not be defended. Of the British only 61 were killed in this engagement, and 257 wounded. Eleven hundred of the enemy, among whom were three generals, were taken prisoners.

239 They abandon their camp in the night.

As none of the American commanders thought it proper to risk another attack, it was resolved to abandon their camp as soon as possible. Accordingly on the night of the 29th of August, the whole of the continental troops were ferried over with the utmost secrecy and silence; so that in the morning the British had nothing to do but take possession of the camp and artillery which had been abandoned.

240 Lord Howe sends a message to congress,

This victory, though complete, was very far from being so decisive as the conquerors imagined. Lord Howe, supposing that it would be sufficient to intimidate the congress into some terms, sent General Sullivan, who had been taken prisoner in the late action, to congress, with a message, importing, that though he could not consistently treat with them as a legal assembly, yet he would be very glad to confer with any of the members in their private capacity; setting forth at the same time the nature and extent of his powers as commissioner. But the congress were not as yet sufficiently humbled to derogate in the least from the dignity of character they had assumed. They replied, That the congress of the free and independent states of America could not consistently send any of its members in another capacity than that which they had publicly assumed; but as they were extremely desirous of restoring peace to their country upon equitable conditions, they would appoint a committee of their body to wait upon him, and learn what proposals he had to make.

241 and is waited on by a committee.

This produced a new conference. The committee appointed by congress was composed of Dr Franklin, Mr Adams, and Mr Rutledge. They were very politely received by his lordship; but the conference proved as fruitless as before independency had been declared, and the final answer of the deputies was, That they were extremely willing to enter into any treaty with Great Britain that might conduce to the good of both nations, but that they would not treat in any other character than that of independent states. This positive declaration instantly put an end to all hopes of reconciliation; and it was resolved to prosecute the war with the utmost vigour. Lord Howe, after publishing a manifesto, in which he declared the refusal of congress, and that he himself was willing to confer with all well-disposed persons about the means of restoring public tranquillity, set about the most proper methods for

242 The conference terminates ineffectually.

reducing the city of New York. Here the provincial troops were posted, and from a great number of batteries kept continually annoying the British shipping. The East River lay between them, of about 1200 yards in breadth, which the British troops were extremely desirous of passing. At last the ships having, after an incessant cannonade of several days, silenced the most troublesome batteries, a body of troops was sent up the river to a bay, about three miles distant, where the fortifications were less strong than in other places. Here having driven off the provincials by the cannon of the fleet, they marched directly towards the city; but the enemy, finding that they should now be attacked on all sides, abandoned the city, and retired to the north of the island, where their principal force was collected. In their passage thither they skirmished with the British, but carefully avoided a general engagement; and it was observed that they did not behave with that ardour and impetuous valour which had hitherto marked their character.

243 New York abandoned by the provincials.

The British and provincial armies were not now above two miles distant from each other. The former lay encamped from shore to shore for an extent of two miles, being the breadth of the island, which, though 15 miles long, exceeds not two in any part in breadth. The provincials, who lay directly opposite, had strengthened their camp with many fortifications; at the same time, being masters of all the passes and defiles betwixt the two camps, they were enabled to defend themselves against an army much more numerous than their own: and they had also strongly fortified a pass called *King's Bridge*, whence they could secure a passage to the continent in case of any misfortune. Here General Washington, in order to inure the provincials to actual service, and at the same time to annoy the enemy as much as possible, employed his troops in continual skirmishes; by which it was observed that they soon recovered their spirits, and behaved with their usual boldness.

244 Situation of the British and American armies.

As the situation of the two armies was now highly inconvenient for the British generals, it was resolved to make such movements as might oblige General Washington to relinquish his strong situation. The possession of New York had been less beneficial than was expected. It had been concerted among the provincials, that the city should be burnt at the time of evacuation; but as they were forced to depart with precipitation, they were prevented from putting the scheme in execution. In a few days, however, it was attempted by some who had been left behind for that purpose. Taking advantage of a high wind and dry weather, the town was set on fire in several places at once, by means of combustibles properly placed for that purpose; and notwithstanding the most active exertions of the soldiery and sailors, a fourth part of the city was consumed.

245 New York set on fire by the provincials.

On this occasion the British were irritated to the highest degree; and many persons, said to be incendiaries, were without mercy thrown into the flames. It was determined to force the provincial army to a greater distance, that they might have it less in their power, by any emissaries, to engage others in a similar attempt. For this purpose, General Howe having left Lord Percy with sufficient force to garrison New York, he embarked his army in flat-bottomed boats, by which

America.

they were conveyed through the dangerous paſſage called *Hell Gate*, and landed near the town of Weſt Cheſter, lying on the continent towards Connecticut. Here, having received a ſupply of men and proviſions, they moved to New Rochelle, ſituated on the ſound which ſeparates Long Iſland from the continent. After this, receiving ſtill freſh reinforcements, they made ſuch movements as threatened to diſtreſs the provincials very much, by cutting off their convoys of proviſions from Connecticut, and thus force them to an engagement. This, however, General Waſhington determined at all events to avoid. He therefore extended his forces into a long line oppoſite to the way in which the enemy marched, keeping the Bruna, a river of conſiderable magnitude, between the two armies, with the North River on his rear. Here again the provincials continued for ſome time to annoy and ſkirmiſh with the royal army, until at laſt, by ſome other manœuvres, the Britiſh general found means to attack them advantageouſly at a place called the *White Plains*, and drove them from ſome of their poſts. The victory on this occaſion was much leſs complete than the former; however it obliged the provincials once more to ſhift their ground, and to retreat farther up the country. General Howe purſued for ſome time; but at laſt finding all his endeavours vain to bring the Americans to a pitched battle, he determined to give over ſuch an uſeleſs chaſe, and employ himſelf in reducing the forts which the provincials ſtill retained in the neighbourhood of New York. In this he met with the moſt complete ſucceſs. The Americans, on the approach of the king's forces, retreated from King's Bridge into Fort Waſhington; and this, as well as Fort Lee, which lay in the neighbourhood, was quickly reduced, though the garriſon made their eſcape. Thus the jerſeys were laid entirely open to the incurſions of the Britiſh troops; and ſo fully were theſe provinces taken poſſeſſion of by the royal army, that its winter quarters extended from New Brunſwick to the river Delaware. Had any number of boats been at hand, it is probable that Philadelphia would now have fallen into their hands. All theſe, however, had been carefully removed by the Americans. In lieu of this enterpriſe, Sir Henry Clinton undertook an expedition to Rhode Iſland, and became maſter of it without loſing a man. His expedition was alſo attended with this further advantage, that the American fleet under Commodore Hopkins was obliged to ſail as far as poſſible up the river Providence, and thus remained entirely uſeleſs.

246 General Waſhington obliged to move farther from New York.

247 Is defeated at the White Plains.

248 The Jerſeys entirely overrun by the Britiſh troops.

249 Rhode Iſland taken.

The ſame ill ſucceſs continued to attend the Americans in other parts. After their expulſion from Canada, they had croſſed the lake Champlain, and taken up their quarters at Crown Point, as we have already mentioned. Here they remained for ſome time in ſafety, as the Britiſh had no veſſels on the lake, and conſequently General Burgoyne could not purſue them. To remedy this deficiency, there was no poſſible method, but either to conſtruct veſſels on the ſpot, or take to pieces ſome veſſels already conſtructed, and drag them up the river into the lake. This, however, was effected in no longer a ſpace than three months; and the Britiſh general, after incredible toil and difficulty, ſaw himſelf in poſſeſſion of a great number of veſſels, by which means he was enabled to purſue his enemies, and invade them in his turn. The labour

250 The Britiſh convey veſſels up the lake Champlain.

undergone at this time by the ſea and land forces muſt indeed have been prodigious; ſince there were conveyed over land, and dragged up the rapids of St Lawrence, no fewer than 30 large long boats, 400 batteaux, beſides a vaſt number of flat-bottomed boats, and a gondola of 30 tons. The intent of the expedition was to puſh forward before winter to Albany, where the army would take up its winter quarters, and next ſpring effect a junction with that under General Howe, when it was not doubted that the united force and ſkill of theſe two commanders would ſpeedily put a termination to the war. America.

By reaſon of the difficulties with which the equipment of this fleet had been attended, it was the beginning of October before the expedition could be undertaken. It was now, however, by every judge allowed to be completely able to anſwer the purpoſe for which it was intended. It conſiſted of one large veſſel with three maſts, carrying 18 twelve pounders; two ſchooners, the one carrying 14, the other 12 ſix pounders; a large flat-bottomed radeau with 6 twenty-four and 6 twelve pounders; and a gondola with 8 nine pounders. Beſides theſe were 20 veſſels of a ſmaller ſize, called *gun-boats*, carrying each a piece of braſs ordnance from 9 to 24 pounders, or howitzers. Several long-boats were fitted out in the ſame manner; and beſides all theſe, there was a vaſt number of boats and tenders, of various ſizes, to be uſed as tranſports for the troops and baggage. It was manned by a number of ſelect ſeamen, and the guns were to be ſerved by a detachment from the corps of artillery; the officers and ſoldiers appointed for this expedition were alſo choſen out of the whole army.

251 Deſtroy the naval force of the provincials,

To oppoſe this formidable armament the Americans had only a very inconſiderable force, commanded by General Arnold; who, after engaging part of the Britiſh fleet for a whole day, took advantage of the darkneſs of the night to ſet ſail without being perceived, and next morning was out of ſight: but he was ſo hotly purſued by the Britiſh, that on the ſecond day after he was overtaken, and forced to a ſecond engagement. In this he behaved with great gallantry; but his force being very inferior to that of the enemy, he was obliged to run his ſhips aſhore and ſet them on fire. A few only eſcaped to Lake George; and the garriſon of Crown Point having deſtroyed or carried off every thing of value, retired to Ticonderago. Thither General Carleton intended to have purſued them; but the difficulties he had to encounter appeared ſo many and ſo great, that it was thought proper to march back into Canada, and deſiſt from any further operations till next ſpring.

252 The Americans almoſt entirely diſperſed.

Thus the affairs of the Americans ſeemed everywhere going to wreck: even thoſe who had been moſt ſanguine in their cauſe began to waver. The time, alſo, for which the ſoldiers had enliſted themſelves was now expired; and the bad ſucceſs of the preceding campaign had been ſo very diſcouraging, that no perſon was willing to engage himſelf during the continuance of a war, of which the event ſeemed to be ſo doubtful. In conſequence of this, therefore, General Waſhington found his army daily decreaſing in ſtrength; ſo that from 30,000, of whom it conſiſted when General Howe landed on Staten Iſland, ſcarce a tenth part could now be muſtered. To aſſiſt the chief commander as much

as

America. as poſſible, General Lee had collected a body of forces in the north; but on his way ſouthward, having imprudently taking up his lodging at ſome diſtance from his troops, information was given to Colonel Harcourt, who happened at that time to be in the neighbourhood, and Lee was made priſoner. The loſs of this general was much regretted, the more eſpecially as he was of ſuperior quality to any priſoner in the poſſeſſion of the coloniſts, and could not therefore be exchanged. Six field officers were offered in exchange for him, and refuſed; and the congreſs was highly irritated as its being reported that he was to be treated as a deſerter, having been a half-pay officer in the Britiſh ſervice at the commencement of the war. In conſequence of this they iſſued a proclamation, threatening to retaliate on the priſoners in their poſſeſſion whatever puniſhment ſhould be inflicted on any of thoſe taken by the Britiſh, and eſpecially that their conduct ſhould be regulated by the treatment of General Lee.

253 General Lee taken priſoner.

254 Continental army for 1777.

In the mean time they proceeded with the moſt indefatigable diligence to recruit their army, and bound their ſoldiers to ſerve for a term of three years, or during the continuance of the war. The army deſigned for the enſuing campaign was to conſiſt of 88 battalions; of which each province was to contribute its quota; and 20 dollars were offered as a bounty to each ſoldier, beſides an allotment of lands at the end of the war. In this allotment it was ſtipulated, that each ſoldier ſhould have 100 acres; an enſign 150; a lieutenant 200; a captain 300; a major 400; a lieutenant-colonel 450; and a colonel 500. No lands were promiſed to thoſe who inliſted only for three years. All officers or ſoldiers diſabled through wounds received in the ſervice were to enjoy half-pay during life. To defray the expence, congreſs borrowed five millions of dollars at five *per cent.*; for payment of which the United States became ſurety. At the ſame time, in order to animate the people to vigorous exertions, a declaration was publiſhed, in which they ſet forth the neceſſity there was for taking proper methods to enſure ſucceſs in their cauſe: they endeavoured to palliate as much as poſſible the misfortunes which had already happened; and repreſented the true cauſe of the preſent diſtreſs to be the ſhort term of inliſtment.

This declaration, together with the imminent danger of Philadelphia, determined the Americans to exert themſelves to the utmoſt in order to reinforce General Waſhington's army. They ſoon received farther encouragement, however, by an exploit of that general againſt the Heſſians. As the royal army extended in different cantonments for a great way, General Waſhington, perceiving the imminent danger to which Philadelphia was expoſed, reſolved to make ſome attempt on thoſe diviſions of the enemy which lay neareſt that city. Theſe happened to be the Heſſians, who lay in three diviſions, the laſt only 20 miles diſtant from Philadelphia. On the 25th of December, having collected as conſiderable a force as he could, he ſet out with an intent to ſurpriſe that body of the enemy who lay at Trenton. His army was divided into three bodies; one of which he ordered to croſs the Delaware at Trenton Ferry, a little below the town; the ſecond at a good diſtance below, at a place called *Bordentown*, where the ſecond diviſion of Heſſians was placed; while he himſelf with the third, directing his courſe to a ferry ſome miles above Trenton, intended to have paſſed it at midnight, and attack the Heſſians at break of day. But by reaſon of various impediments, it was eight in the morning before he could reach the place of his deſtination. The enemy, however, did not perceive his approach till they were ſuddenly attacked. Colonel Ralle, who commanded them, did all that could be expected from a brave and experienced officer; but every thing was in ſuch confuſion, that no efforts of valour or ſkill could now retrieve matters. The colonel himſelf was mortally wounded, his troops were entirely broken, their artillery ſeized, and about 1000 taken priſoners. America.

This action, though ſeemingly of no very deciſive nature, was ſufficient at that time to turn the fortune of war in favour of America. It tended greatly to leſſen the fear which the provincials had of the Heſſians, at the ſame time that it equally abated the confidence which the Britiſh had till now put in them. Reinforcements came into General Waſhington's army from all quarters; ſo that he was ſoon in a condition to leave Philadelphia, and take up his quarters at Trenton. Emboldened by his ſucceſs, he determined to make an attempt on a diviſion of the Britiſh forces ſtationed at Maidenhead, a town ſituated half way between Trenton and Princetown. This conſiſted of three regiments under the command of Colonel Mawhood, an officer of great merit. The troops were ſurpriſed on their march; but though they were ſeparately ſurrounded and attacked by a force ſo vaſtly ſuperior, they charged the enemy ſo reſolutely with their bayonets, that they effected a retreat. Theſe attempts of the Americans, however, with the hoſtile diſpoſition of the people, ſhowed the impoſſibility of maintaining poſts ſo far advanced in the enemy's country; ſo that it was reſolved to retreat towards Brunſwick, in order to prevent it, with the troops and magazines it contained, from falling into the hands of the provincials. General Waſhington loſt no opportunity of recovering what had been loſt; and by dividing his army into ſmall parties, which could be reunited on a few hours warning, he in a manner entirely covered the country with it, and repoſſeſſed himſelf of all the important places.

255 Another attempt on three Britiſh regiments,

256 but they make good their retreat.

Thus ended the campaign of 1776, with ſcarce any real advantage, other than the acquiſition of the city of New York, and of a few fortreſſes in its neighbourhood; where the troops were conſtrained to act with as much circumſpection as if they had been beſieged by a victorious army, inſtead of being themſelves the conquerors.

The army at New York began in 1777 to exerciſe a kind of predatory war, by ſending out parties to deſtroy magazines, make incurſions, and take or deſtroy ſuch forts as lay on the banks of rivers, to which their great command of ſhipping gave them acceſs. In this they were generally ſucceſsful: the provincial magazines at Peek's Hill, a place about 50 miles diſtant from New York, were deſtroyed, the town of Dunbury in Connecticut burnt, and that of Ridgefield in the ſame province was taken poſſeſſion of. In returning from the laſt expedition, however, the Britiſh were greatly haraſſed by the enemy under Generals Arnold, Wooſter, and Sullivan; but they made good their retreat in ſpite of all oppoſition, with the loſs of only 170 killed

257 Excurſions of the Britiſh from New York.

America. killed and wounded. On the American ſide the loſs was much greater; General Wooſter was killed, and Arnold in the moſt imminent danger. On the other hand, the Americans deſtroyed the ſtores at Sagg harbour, in Long Iſland, and made priſoners of all who defended the place.

As this method of making war, however, could anſwer but little purpoſe, and favoured more of the barbarous incurſions of ſavages than of a war carried on by a civilized people, it was reſolved to make an attempt on Philadelphia. At firſt it was thought that this could be done through the Jerſeys; but General Waſhington had received ſuch large reinforcements, and poſted himſelf ſo ſtrongly, that it was found to be impracticable. Many ſtratagems were uſed to draw him from this ſtrong ſituation, but without ſucceſs; ſo that it was found neceſſary to make the attempt on Philadelphia by ſea. While the preparations neceſſary for this expedition were going forward, the Americans found means to make amends for the capture of General Lee by that of General Preſcot, who was ſeized in his quarters with his aid-de-camp, in much the ſame manner as General Lee had been. This was exceedingly mortifying to the general himſelf, as he had not long ago ſet a price upon General Arnold himſelf, by offering a ſum of money to any one that apprehended him; which the latter anſwered by ſetting a lower price upon General Preſcot.

258 General Preſcot taken priſoner.

259 The fleet ſails for Philadelphia.

The month of July was far advanced before the preparations for the expedition againſt Philadelphia were completed; and it was the 23d before the fleet was able to ſail from Sandy Hook. The force employed in this expedition conſiſted of 36 battalions of Britiſh and Heſſians, a regiment of light horſe, and a body of loyaliſts raiſed at New York. The remainder of theſe, with 17 battalions, and another body of light horſe, was ſtationed at New York under Sir Henry Clinton. Seven battalions were ſtationed at Rhode Iſland. After a week's ſailing they arrived at the mouth of the Delaware; but there received certain intelligence, that the navigation of the river was ſo effectually obſtructed, that no poſſibility of forcing a paſſage remained. Upon this it was reſolved to proceed farther ſouthward to Cheſapeak bay in Maryland, from whence the diſtance to Philadelphia was not very great, and where the provincial army would find leſs advantage from the nature of the country than in the Jerſeys.

260 The army lands at the head of the Elk.

The navigation from Delaware to Cheſapeak took up the beſt part of the month of Auguſt, and that up the bay itſelf was extremely difficult and tedious. At laſt, having ſailed up the river Elk as far as was practicable, the troops were landed without oppoſition, and ſet forward on their intended expedition. On the news of their arrival in Cheſapeak, General Waſhington left the Jerſeys, and haſtened to the relief of Philadelphia; and in the beginning of September met the royal army at Brandy-wine Creek about mid-day, between the head of the Elk and Philadelphia. Here he adhered to his former method of ſkirmiſhing and haraſſing the royal army on its march; but as this proved inſufficient to ſtop its progreſs, he retired to that ſide of the creek next to Philadelphia with an intent to diſpute the paſſage. This brought on a general engagement on the 11th of September, in which the Americans were worſted through the ſuperior diſcipline

261 The Americans defeated.

of the Britiſh troops; and it was only through the approach of night that they were ſaved from being entirely deſtroyed. On this occaſion the provincials loſt about 1000 in killed and wounded, beſides 400 taken priſoners. America.

The loſs of this battle proved alſo the loſs of Philadelphia. General Waſhington retired towards Lancaſter, an inland town at a conſiderable diſtance from Philadelphia. Here, however, the Britiſh general took ſuch meaſures as muſt have forced the provincials to a ſecond engagement; but a violent rain, which laſted a day and a night, prevented his deſign. General Waſhington, though he could not prevent the loſs of Philadelphia, ſtill adhered to his original plan of diſtreſſing the royal party, by laying ambuſhes and cutting off detached parties: but in this he was leſs ſucceſsful than formerly; and one of his own detachments, which lay in ambuſh in a wood, were themſelves ſurpriſed and entirely defeated, with the loſs of 300 killed and wounded, beſides a great number taken, and all their arms and baggage.

262 An American detachment ſurpriſed and defeated with great ſlaughter.

General Howe now perceving that the Americans would not venture another battle even for the ſake of their capital, took peaceable poſſeſſion of it on the 26th of September. His firſt care was then to cut off, by means of ſtrong batteries, the communication betwcen the upper and lower parts of the river: which was executed notwithſtanding the oppoſition of ſome American armed veſſels; one of which, carrying 36 guns, was taken. His next taſk was to open a communication with it by ſea; and this was a work of no ſmall difficulty. A vaſt number of batteries and forts had been erected, and immenſe machines formed like *chevaux de frize*, from whence they took their name, ſunk in the river to prevent its navigation. As the fleet was ſent round to the mouth of the river in order to co-operate with the army, this work, however difficult, was accompliſhed; nor did the provincials give much oppoſition, as well knowing that all places of this kind were now untenable. General Waſhington, however, took the advantage of the royal army being divided to attack the camp of the principal diviſion of it that lay at German-town in the neighbourhood of Philadelphia. In this he met with very little ſucceſs; for though he reached the place of deſtination by three o'clock in the morning, the patrols had time to call the troops to arms. The Americans, notwithſtanding, made a very reſolute attack; but they were received with ſuch bravery, that they were compelled to abandon the attempt, and retreat in great diſorder; with the advantage, however, of carrying off their cannon, though purſued for a conſiderable way, after having 300 killed, 600 wounded, and upwards of 400 taken priſoners, among whom were 54 officers. On the Britiſh ſide, the loſs amounted to 430 wounded and priſoners, and 70 killed; but among the laſt were General Agnew and Colonel Bird, with ſome other excellent officers.

263 General Howe takes poſſeſſion of Philadelphia.

264 Royal army attacked at German-town.

265 The Americans defeated.

There ſtill remained two ſtrong forts on the Delaware to be reduced. Theſe were Mud Iſland and Red Bank. The various obſtructions which the Americans had thrown in the way rendered it neceſſary to bring up the Auguſta, a ſhip of the line, and the Merlin frigate, to the attack of Mud Iſland; but during the heat of action both were grounded. Upon this

America.

this the Americans ſent down four fire-ſhips, and directed the whole fire from their galleys againſt them. The former were rendered ineffectual by the courage and ſkill of the Britiſh ſeamen; but during the engagement both the Auguſta and Merlin took fire and were burnt to aſhes, and the other ſhips obliged to withdraw. The enemy, encouraged by this unſucceſsful attempt, proceeded to throw new obſtructions in the way; but the Britiſh general having found means to convey a number of cannon and to erect batteries within gunſhot of the fort by land, and bringing up three ſhips of the line which mounted heavy cannon, the garriſon, after making a vigorous defence for one day, perceiving that preparations were making for a general aſſault on the next, abandoned the place in the night. Thoſe who defended Red Bank followed their example, and abandoned it on the approach of Lord Cornwallis. A great number of the American ſhipping now finding themſelves entirely deſtitute of any protection, ſailed up the river in the night time. Seventeen however remained, whoſe retreat was intercepted by a frigate and ſome armed veſſels; on which the Americans ran them aſhore and burnt them, to prevent their falling into the enemy's hands.

266 The Britiſh ſhips of war burnt.

267 All the forts near Philadelphia reduced.

Thus the campaign of 1777 in Pennſylvania concluded ſucceſsfully on the part of the Britiſh. In the north, however, matters wore a different aſpect. The expedition in that quarter had been projected by the Britiſh miniſtry as the moſt effectual method that could be taken to cruſh the colonies at once. The four provinces of New England had originally begun the confederacy againſt Britain, and were ſtill conſidered as the moſt active in the continuation of it; and it was thought, that any impreſſion made upon them, would contribute in an effectual manner to the reduction of all the reſt. For this purpoſe, an army of 4000 choſen Britiſh troops and 3000 Germans was put under the command of General Burgoyne; General Carleton was directed to uſe his intereſt with the Indians to perſuade them to join in this expedition; and the province of Quebec was to furniſh large parties to join in the ſame. The officers who commanded under General Burgoyne were General Philips of the artillery, Generals Fraſer, Powell, and Hamilton, with the German officers Generals Reideſel and Speecht. The ſoldiers, as has already been obſerved, were all excellently diſciplined, and had been kept in their winter-quarters with all imaginable care, in order to prepare them for the expedition on which they were going. To aid the principal expedition, another was projected on the Mohawk river under Colonel St Leger, who was to be aſſiſted by Sir John Johnſon, ſon to the famous Sir William Johnſon, who had ſo greatly diſtinguiſhed himſelf in the war of 1755.

268 Expedition projected againſt New England.

269 General Burgoyne joined by the Indians.

On the 21ſt of June 1777, the army encamped on the weſtern ſide of the lake Champlain; where being joined by a conſiderable body of Indians, General Burgoyne made a ſpeech, in which he exhorted thoſe new allies to lay aſide their ferocious and barbarous manner of making war; to kill only ſuch as oppoſed them in arms; and to ſpare priſoners, with ſuch women and children as ſhould fall into their hands. After iſſuing a proclamation, in which the force of Britain and that which he commanded was ſet forth in very oſtentatious terms, the campaign opened with the ſiege of Ticonderago. The place was very ſtrong, and garriſoned by 6000 men under General Sinclair; nevertheleſs, the works were ſo extenſive, that even this number was ſcarce ſufficient to defend them properly. They had therefore omitted to fortify a rugged eminence called *Sugar Hill*, the top of which overlooked and effectually commanded the whole works; vainly imagining that the difficulty of the aſcent would be ſufficient to prevent the enemy from taking poſſeſſion of it. On the approach of the firſt diviſion of the army, the provincials abandoned and ſet fire to their outworks; and ſo expeditious were the Britiſh troops, that by the 5th of July every poſt was ſecured which was judged neceſſary for inveſting it completely. A road was ſoon after made to the very ſummit of that eminence which the Americans had with ſuch confidence ſuppoſed could not be aſcended; and ſo much were they now diſheartened, that they inſtantly abandoned the fort entirely, taking the road to Skeneſborough, a place to the ſouth of Lake George; while their baggage, with what artillery and military ſtores they could carry off, were ſent to the ſame place by water. But the Britiſh generals were determined not to let them paſs ſo eaſily. Both were purſued, and both overtaken. Their armed veſſels conſiſted only of five galleys; two of which were taken, and three blown up; on which they ſet fire to their boats and fortifications at Skeneſborough. On this occaſion the provincials loſt 200 boats, 130 pieces of cannon, with all their proviſions and baggage. Their land forces under Colonel Francis made a brave defence againſt General Fraſer: and being greatly ſuperior in number, had almoſt overpowered him, when General Reideſel with a large body of Germans came to his aſſiſtance. The enemy were now overpowered in their turn; and their commander being killed, they fled on all ſides with great precipitation. In this action 200 Americans were killed, as many taken priſoners, and above 600 wounded, many of whom periſhed in the woods for want of aſſiſtance.

America.

270 Ticonderago beſieged and taken.

271 Americans defeated by land and water.

During the engagement General Sinclair was at Caſtleton, about ſix miles from the place; but inſtead of going forward to Forte Anne, the next place of ſtrength, he repaired to the woods which lie between that fortreſs and New England. General Burgoyne, however, detached Colonel Hill with the ninth regiment, in order to intercept ſuch as ſhould attempt to retreat towards Fort Anne. On his way he met with a body of the enemy, ſaid to be ſix times as numerous as his own; but after an engagement of three hours, they were obliged to retire with great loſs. After ſo many diſaſters, deſpairing of being able to make any ſtand at Fort Anne, they ſet fire to it, and retired to Fort Edward. In all theſe engagements the loſs of killed and wounded in the royal army did not exceed 200 men.

272 They are again defeated, and abandon Fort Anne.

General Burgoyne was now obliged to ſuſpend his operations for ſome time, and wait at Skeneſborough for the arrival of his tents, proviſions, &c. but employed this interval in making roads through the country about St Anne, and in clearing a paſſage for his troops to proceed againſt the enemy. This was attended with incredible toil; but all obſtacles were ſurmounted with equal patience and reſolution by the army. In ſhort, after undergoing the utmoſt difficulty that could be undergone, and making every exertion that man could

273 General Burgoyne makes his way to Fort Edward with great difficulty.

America. could make, he arrived with his army before Fort Edward about the end of July. Here General Schuyler had been for ſome time endeavouring to recruit the ſhattered American forces, and had been joined by General Sinclair with the remains of his army; the garriſon of Fort George alſo, ſituated on the lake of that name, had evacuated the place and retired to Fort Edward.

274 Americans retire to Saratoga. But on the approach of the royal army, they retired from thence alſo, and formed their head-quarters at Saratoga. Notwithſtanding the great ſucceſſes of the Britiſh general, they ſhowed not the leaſt diſpoſition to ſubmit, but ſeemed only to conſider how they might make the moſt effectual reſiſtance. For this purpoſe, the militia was everywhere raiſed and draughted to join the army at Saratoga; and ſuch numbers of volunteers were daily added, that they ſoon began to recover from the terror into which they had been thrown. That they might have a commander whoſe abilities could be relied on, General Arnold was appointed, who repaired to Saratoga with a conſiderable train of artillery; but receiving intelligence that Colonel St Leger was proceeding with great rapidity in his expedition on the Mohawk river, he removed to Still-water, a place about half way between Saratoga and the junction of the Mohawk and Hudſon's river.

275 Fort Stanwix beſieged. The colonel, in the mean time, had advanced as far as Fort Stanwix; the ſiege of which he preſſed with great vigour. On the 6th of Auguſt, underſtanding that a

176 A detachment of Americans cut in pieces. ſupply of proviſions, eſcorted by 800 or 900 men, was on the way to the fort, he deſpatched Sir John Johnſon with a ſtrong detachment to intercept it. This he did ſo effectually, that, beſides intercepting the proviſions, 400 of its guard were ſlain, 200 taken, and the reſt eſcaped with great difficulty. The garriſon, however, were not to be intimidated by this diſaſter, nor by the threats or repreſentations of the colonel; on the contrary, they made ſeveral ſucceſsful ſallies under Colonel Willet, the ſecond in command; and this gentleman, in company with another, even ventured out of the fort, and, eluding the vigilance of the enemy, paſſed through them in order to haſten the march of General Arnold to their aſſiſtance.

277 The Indians deſert, and force the colonel to raiſe the ſiege. Thus the affairs of Colonel St Leger ſeemed to be in no very favourable ſituation, notwithſtanding his late ſucceſs, and they were ſoon totally ruined by the deſertion of the Indians. They had been alarmed by the report of General Arnold's advancing with 2000 men to the relief of the fort; and while the colonel was attempting to give them encouragement, another report was ſpread, that General Burgoyne had been defeated with great ſlaughter, and was now flying before the provincials. On this he was obliged to do as they thought proper; and the retreat could not be effected without the loſs of the tents and ſome of the artillery and military ſtores.

278 General Burgoyne diſtreſſed for want of proviſions. General Burgoyne, in the mean time, notwithſtanding all the difficulties he had already ſuſtained, found that he muſt ſtill encounter more. The roads he had made with ſo much labour and pains were deſtroyed either by the wetneſs of the ſeaſon or by the enemy; ſo that the proviſions he brought from Fort George could not arrive at his camp without the moſt prodigious toil. On hearing of the ſiege of Fort Stanwix by Colonel St Leger, he determined to move forward,

in hopes of encloſing the enemy betwixt his own army and that of St Leger, or of obtaining the command of all the country between Fort Stanwix and Albany; or at any rate, a junction with Colonel St Leger would be effected, which could not but be attended with the moſt happy conſequences. The only difficulty was the want of proviſions; and this it was propoſed to remedy by reducing the provincial magazines at Bennington. For this purpoſe, Colonel Baum, a German officer of great bravery, was choſen, with a body of 500 men. The place was about twenty miles from Hudſon's river; and to ſupport Colonel Baum's party, the whole army marched up the river's bank, and encamped almoſt oppoſite to Saratoga, with the river betwixt it and that place. An advanced party was poſted at Batten Kill, between the camp and Bennington, in order to ſupport Colonel Baum. In their way the Britiſh ſeized a large ſupply of cattle and proviſions, which were immediately ſent to the camp; but the badneſs of the roads retarded their march ſo much, that intelligence of their deſign was ſent to Bennington. Underſtanding now that the American force was greatly ſuperior to his own, the colonel acquainted the general, who immediately deſpatched Colonel Breyman with a party to his aſſiſtance; but through the ſame cauſes that had retarded the march of Colonel Baum this aſſiſtance could not arrive in time. General Starke, in the mean time, who commanded at Bennington, determined to attack the two parties ſeparately; and for this purpoſe advanced againſt Colonel Baum, whom he ſurrounded on all ſides and attacked with the utmoſt violence. The troops defended themſelves with great valour, but were to a man either killed or taken. Colonel Breyman, after a deſperate engagement, had the good luck to effect a retreat through the darkneſs of the night, which otherwiſe he could not have done, as his men had expended all their ammunition, being 40 rounds to each.

America.

279 Makes an attempt on the provincial magazines at Bennington.

280 Colonel Baum utterly defeated and taken priſoner.

281 Colonel Breyman defeated.

General Burgoyne, thus diſappointed in his attempt on Bennington, applied himſelf with indefatigable diligence to procure proviſions from Fort George; and having at length amaſſed a ſufficient quantity to laſt for a month, he threw a bridge of boats over the river Hudſon, which he croſſed about the middle of September, encamping on the hills and plains near Saratoga. As ſoon as he approached the provincial army, at this time encamped at Stillwater under General Gates, he determined to make an attack; for which purpoſe he put himſelf at the head of the central diviſion of his army, having General Fraſer and Colonel Breyman on the right, with Generals Reideſel and Philips on the left. In this poſition he advanced towards the enemy on the 19th of September. But the Americans did not now wait to be attacked: on the contrary, they attacked the central diviſion with the utmoſt violence; and it was not until General Philips with the artillery came up that they could be repulſed. On this occaſion, though the Britiſh troops loſt only 330 in killed and wounded, and the enemy no fewer than 1500, the former were very much alarmed at the obſtinate reſolution ſhown by the Americans. This did not, however, prevent them from advancing towards the enemy, and poſting themſelves the next day within cannon-ſhot of their lines. But their allies the Indians began to deſert in great numbers; and at the ſame time the

282 The Americans attack the royal army;

283 and are with great difficulty repulſed.

284 The Indians deſert.

general

America.

general was in the higheſt degree mortified by having no intelligence of any aſſiſtance from Sir Henry Clinton, as had been ſtipulated. He now received a letter from him, by which he was informed that Sir Henry intended to make a diverſion on the North River in his favour. This afforded but little comfort: however, he returned an anſwer by ſeveral truſty perſons whom he deſpatched different ways, ſtating his preſent diſtreſſed ſituation, and mentioning that the proviſions and other neceſſaries he had would only enable him to hold out till the 12th of October.

285 A letter from Sir Henry Clinton, with General Burgoyne's anſwer.

286 Expedition of the provincials againſt Ticonderago.

In the mean time the Americans, in order to cut off the retreat of the Britiſh army in the moſt effectual manner, undertook an expedition againſt Ticonderago; but were obliged to abandon the enterpriſe after having ſurpriſed all the outpoſts, and taking a great number of boats with ſome armed veſſels, and a number of priſoners. The army under General Burgoyne, however, continued to labour under the greateſt diſtreſſes; ſo that in the beginning of October he had been obliged to diminiſh the ſoldiers allowance. On the 7th of that month he determined to move towards the enemy. For this purpoſe he ſent a body of 1500 men to reconnoitre their left wing; intending, if poſſible, to break through it in order to effect a retreat. The detachment, however, had not proceeded far when a dreadful attack was made upon the left wing of the Britiſh army, which was with great difficulty preſerved from being entirely broken by a reinforcement brought up by General Fraſer, who was killed in the attack. After the troops had with the moſt deſperate efforts regained their camp, it was moſt furiouſly aſſaulted by General Arnold; who, notwithſtanding all oppoſition, would have forced the intrenchments, had he not received a dangerous wound, which obliged him to retire. Thus the attack failed on the left, but on the right the camp of the German reſerve was forced, Colonel Breyman killed, and his countrymen defeated with great ſlaughter, and the loſs of all their artillery and baggage.

287 They make a deſperate attack on the royal army;

288 kill General Fraſer,

289 and defeat the Germans with great ſlaughter.

290 The royal army in danger of being ſurrounded.

291 Attempt a retreat without ſucceſs.

This was by far the heavieſt loſs the Britiſh army had ſuſtained ſince the action at Bunker's Hill. The liſt of killed and wounded amounted to near 1200, excluſive of the Germans; but the greateſt misfortune was, that the enemy had now an opening on the right and rear of the Britiſh forces, ſo that the army was threatened with entire deſtruction. This obliged General Burgoyne once more to ſhift his poſition, that the enemy might alſo be obliged to alter theirs. This was accompliſhed on the night of the 7th, without any loſs, and all the next day he continued to offer the enemy battle; but they were now too well aſſured of obtaining a complete victory, by cutting off all ſupplies from the Britiſh, to riſk a pitched battle. Wherefore they advanced on the right ſide, in order to encloſe him entirely; which obliged the general to direct a retreat towards Saratoga. But the enemy had now ſtationed a great force on the ford at Hudſon's river, ſo that the only poſſibility of retreat was by ſecuring a paſſage to Lake George; and to effect this, a body of workmen was detached, with a ſtrong guard, to repair the roads and bridges that led to Fort Edward. As ſoon as they were gone, however, the enemy ſeemed to prepare for an attack; which rendered it neceſſary to recall the guard, and the workmen being of courſe left expoſed could not proceed. America.

In the mean time, the boats which conveyed proviſions down Hudſon's river were expoſed to the continual fire of the American markſmen, who took many of them; ſo that it became neceſſary to convey the proviſions over land. In this extreme danger it was reſolved to march by night to Fort Edward, forcing the paſſages at the fords either above or below the place; and in order to effect this the more eaſily, it was reſolved that the ſoldiers ſhould carry their proviſions on their backs, leaving behind their baggage and every other incumbrance. But before this could be executed, intelligence was received that the enemy had raiſed ſtrong intrenchments oppoſite to theſe fords, well provided with cannon, and that they had likewiſe taken poſſeſſion of the riſing ground between Fort George and Fort Edward, which in like manner was provided with cannon.

292 Diſtreſſed ſituation of the royal army.

All this time the American army was increaſing by the continual arrival of militia and volunteers from all parts. Their parties extended all along the oppoſite bank of Hudſon's river, and ſome had even paſſed it in order to obſerve the leaſt movement of the Britiſh army. The whole force under General Gates was computed at 16,000 men, while the army under General Burgoyne ſcarce amounted to 6000; and every part of the camp was reached by the grape and rifle ſhot of the enemy, beſides a diſcharge from their artillery, which was almoſt inceſſant. In this ſtate of extreme diſtreſs and danger, the army continued with the greateſt conſtancy and perſeverance till the evening of the 13th of October, when an inventory of proviſions being taken, it was found that no more remained than what was ſufficient to ſerve for three days; and a council of war being called, it was unanimouſly determined that there was no method now remaining but to treat with the enemy. In conſequence of this, a negotiation was opened next day, which ſpeedily terminated in the capitulation of the whole Britiſh army; the principal article of which was, that the troops were to have a free paſſage to Britain, on condition of not ſerving againſt America during the war. On this occaſion, General Gates ordered his army to keep within their camp while the Britiſh ſoldiers went to a place appointed for them to lay down their arms, that the latter might not have the additional mortification of being made ſpectacles of ſo melancholy an event. The number of thoſe who ſurrendered at Saratoga amounted to 5750, according to the American accounts; the liſt of ſick and wounded left in the camp when the army retreated to Saratoga, to 528; and the number of thoſe loſt by other accidents ſince the taking of Ticonderago, to near 3000. Thirty-five braſs field-pieces, 7000 ſtand of arms, clothing for an equal number of ſoldiers, with the tents, military cheſt, &c. conſtituted the booty on this occaſion.

293 It is obliged to capitulate.

294 Succeſsful expedition of Sir Henry Clinton.

Sir Henry Clinton, in the mean time, had ſailed up the North river, and deſtroyed the two forts called Montgomery and Clinton, with Fort Conſtitution, and another place called Continental Village, where were barracks for 2000 men. Seventy large cannon were carried away, beſides a number of ſmaller artillery, and a great quantity of ſtores and ammunition; a large boom

America. boom and chain reaching acroſs the river from Fort Montgomery to a point of land called St Anthony's Noſe, and which coſt not leſs than 70,000l. ſterling, were partly deſtroyed and partly carried away, as was alſo another boom of little leſs value at Fort Conſtitution. The loſs of the Britiſh army was but ſmall in number, though ſome officers of great merit were killed in the different attacks.

Another attack was made by Sir James Wallace with ſome frigates, and a body of land forces under General Vaughan. The place which now ſuffered was named Eſopus: the fortifications were deſtroyed, and the town itſelf was reduced to aſhes, as that called Continental Village had been before.

But theſe ſucceſſes, of whatever importance they might be, were now diſregarded by both parties. They ſerved only to irritate the Americans, flushed with their ſucceſs; and they were utterly inſufficient to raiſe the ſpirits of the Britiſh, who were now thrown into the utmoſt diſmay.

295 Great dejection on account of Burgoyne's capture.

On the 16th of March 1778, Lord North intimated to the houſe of commons, that a paper had been laid before the king by the French ambaſſador, intimating the concluſion of an alliance between the court of France and the United States of America. The preliminaries of this treaty had been concluded in the end of the year 1777, and a copy of them ſent to congreſs, in order to counteract any propoſals that might be made in the mean time by the Britiſh miniſtry. On the 6th of February 1778, the articles were formally ſigned, to the great ſatisfaction of the French nation.

296 Treaty between France and America.

They were in ſubſtance as follows:

1. If Great Britain ſhould, in conſequence of this treaty, proceed to hoſtilities againſt France, the two nations ſhould mutually aſſiſt one another.

2. The main end of the treaty was in an effectual manner to maintain the independency of America.

3. Should thoſe places of North America ſtill ſubject to Britain be reduced by the colonies, they ſhould be confederated with them, or ſubjected to their juriſdiction.

4. Should any of the Weſt India iſlands be reduced by France, they ſhould be deemed its property.

5. No formal treaty with Great Britain ſhould be concluded either by France or America without the conſent of each other; and it was mutually engaged that they ſhould not lay down their arms till the independence of the States had been formally acknowledged.

6. The contracting parties mutually agreed to invite thoſe powers that had received injuries from Great Britain to join the common cauſe.

7. The United States guaranteed to France all the poſſeſſions in the Weſt Indies which ſhe ſhould conquer; and France in her turn guaranteed the abſolute independency of the States, and their ſupreme authority over every country they poſſeſſed, or might acquire during the war.

297 Debates occaſioned by the treaty.

The mortification of ſuch a treaty as this could not but be looked upon as a declaration of war. On its being announced to the houſe, every one agreed in an addreſs to his majeſty, promiſing to ſtand by him to the utmoſt in the preſent emergency; but it was warmly contended by the members in oppoſition, that the preſent miniſtry ought to be removed on account of their numberleſs blunders and miſcarriages in every inſtance. Many were of opinion, that the only way to extricate the nation from its trouble was to acknowledge the independency of America at once; and thus we might ſtill do with a good grace what muſt inevitably be done at laſt, after expending much more blood and treaſure than had yet been laviſhed in this unhappy conteſt. The miniſterial party, however, entertained different ideas. Inſtigated by zeal for the national honour, it was determined at once to reſent the arrogance of France, and proſecute hoſtilities againſt America with more vigour than ever, ſhould the terms now offered them be rejected. America.

298 Americans ſend agents to different courts.

The Americans, in the mean time, aſſiduouſly employed their agents at the courts of Spain, Vienna, Pruſſia, and Tuſcany, in order, if poſſible, to conclude alliances with them, or at leaſt to procure an acknowledgment of their independency. As it had been reported that Britain intended to apply for aſſiſtance to Ruſſia, the American commiſſioners were enjoined to uſe their utmoſt influence with the German princes to prevent ſuch auxiliaries from marching through their territories, and to endeavour to procure the recall of the German troops already ſent to America. To France they offered a ceſſion of ſuch Weſt India iſlands as ſhould be taken by the united ſtrength of France and America; and ſhould Britain by their joint endeavours be diſpoſſeſſed of Newfoundland, Cape Breton, and Nova Scotia, theſe territories ſhould be divided betwixt the two nations, and Great Britain be totally excluded from the fiſhery. The propoſals to the Spaniſh court were, that in caſe they ſhould think proper to eſpouſe their quarrel, the American ſtates ſhould aſſiſt in reducing Penſacola under the dominion of Spain, provided their ſubjects were allowed the free navigation of the river Miſſiſſippi, and the uſe of the harbour of Penſacola; and they further offered, that if agreeable to Spain, they would declare war againſt Portugal, ſhould that power expel the American ſhips from its ports.

299 General Burgoyne's troops detained in America.

In the mean time, the troops under General Burgoyne were preparing to embark for Britain according to the convention at Saratoga; but to their utter ſurpriſe, congreſs poſitively refuſed to allow them to embark, under pretence that ſome ſiniſter deſigns were harboured on the part of Britain, and that they only wanted an opportunity to join the other troops at Philadelphia or New York.

300 Predatory war carried on by the Britiſh troops.

The ſeaſon for action was now approaching; and congreſs was indefatigable in its preparations for a new campaign, which it was confidently ſaid would be the laſt. Among other methods taken for this purpoſe, it was recommended to all the young gentlemen of the colonies to form themſelves into bodies of cavalry to ſerve at their own expence during the war. General Waſhington at the ſame time, in order to remove all encumbrances from his army, lightened the baggage as much as poſſible, by ſubſtituting ſacks and portmanteaus in place of cheſts and boxes, and uſing packhorſes inſtead of waggons. On the other hand, the Britiſh army, expecting to be ſpeedily reinforced by 20,000 men, thought of nothing but concluding the war according to their wiſhes before the end of the campaign. It was with the utmoſt concern as well as indignation, therefore, that they received the news of Lord North's conciliatory bill. It was univerſally looked upon as a national diſgrace;

301 Conciliatory bill received with indignation by the army.

America. disgrace; and some even tore the cockades from their hats, and trampled them under their feet as a token of their indignation. By the colonists it was received with indifference. The British commissioners endeavoured to make it as public as possible; and the congress, as formerly, ordered it to be printed in all the newspapers. On this occasion Governor Tryon enclosed several copies of the bill to General Washington in a letter, entreating that he would allow them to be circulated; to which that general returned for answer a copy of a newspaper in which the bill was printed, with the resolutions of congress upon it. These were, That whoever presumed to make a separate agreement with Britain should be deemed a public enemy; that the United States could not with any propriety keep correspondence with the commissioners until their independence was acknowledged, and the British fleets and armies removed from America. At the same time, the colonies were warned not to suffer themselves to be deceived into security by any offers that might be made; but to use their utmost endeavours to send their quotas with all diligence into the field. The individuals with whom the commissioners conversed on the subject of the conciliatory bill, generally returned for answer, that the day of reconciliation was past; and that the haughtiness of Britain had extinguished all filial regard in the breasts of the Americans.

302 Despised by the colonists.

About this time also Mr Silas Deane arrived from France with two copies of the treaty of commerce and alliance to be signed by congress. Advices of the most agreeable nature were also received from various parts, representing in the most favourable light the dispositions of the European powers; all of whom, it was said, wished to see the independence of America settled upon the most firm and permanent basis. Considering the situation of matters with the colonists at this time, therefore, it is no wonder that the commissioners found themselves unable to accomplish the business on which they came. Their proposals were utterly rejected, themselves treated as spies, and all intercourse with them interdicted.

303 Bad success of the commissioners.

But before any final answer could be obtained from congress, Sir Henry Clinton had taken the resolution of evacuating Philadelphia. Accordingly, on the 10th of June, after having made all necessary preparations, the army marched out of the city, and crossed the Delaware before noon with all its baggage and other encumbrances. General Washington, apprised of this design, had despatched expresses into the Jerseys with orders to collect all the force that could be assembled in order to obstruct the march of the enemy. After various movements on both sides, Sir Henry Clinton, with the royal army, arrived on the 27th of June at a place called Freehold; where, judging that the enemy would attack him, he encamped in a very strong situation. Here General Washington determined to make an attack as soon as the army had again begun its march. The night was spent in making the necessary preparations, and General Lee with his division was ordered to be ready by daybreak. But Sir Henry Clinton, justly apprehending that the chief object of the enemy was the baggage, committed it to the care of General Knyphausen, whom he ordered to set out early in the morning, while he followed with the rest of the army. The attack was accordingly made; but the British general had taken such care to arrange his troops properly, and so effectually supported his forces when engaged with the Americans, that the latter not only made no impression, but were with difficulty preserved from a total defeat by the advance of General Washington with the whole army. The British troops effected their retreat with the loss of 300 men, of whom many died through mere fatigue, without any wound. In this action General Lee was charged by General Washington with disobedience and misconduct in retreating before the British army. He was tried by a court martial, and sentenced to a temporary suspension from his command. After they had arrived at Sandy Hook, a bridge of boats was by Lord Howe's directions thrown from thence over the channel which separated the island from the main land, and the troops were conveyed aboard the fleet; after which they sailed to New York. After sending some light detachments to watch the enemy's motions, General Washington marched towards the North River, where a great force had been collected to join him, and where it was now expected that some very capital operations would take place.

304 Philadelphia evacuated.

In the mean time, France had set about her preparations for the assistance of the Americans. On the 14th of April Count d'Estaing had sailed from Toulon with a strong squadron of ships of the line and frigates, and arrived on the coast of Virginia in the beginning of July, while the British fleet was employed in conveying the forces from Sandy Hook to New York. It consisted of one ship of 90 guns, one of 80, six of 74, and four of 64, besides several large frigates; and, exclusive of its complement of sailors, had 6000 marines and soldiers on board. To oppose this the British had only six ships of 64 guns, three of 50, and two of 40, with some frigates and sloops. Notwithstanding this inferiority, however, the British admiral posted himself so advantageously, and showed such superior skill, that D'Estaing did not think proper to attack him. He therefore remained at anchor four miles off Sandy Hook till the 22d of July, without effecting any thing more than the capture of some vessels, which, through ignorance of his arrival, fell into his hands.

305 French fleet arrives in America.

The next attempt of the French admiral was, in conjunction with the Americans, on Rhode Island. It was proposed that D'Estaing, with the 6000 troops he had with him, should make a descent on the southern part of the island, while a body of the Americans should take possession of the north; at the same time the French squadron was to enter the harbour of Newport, and take and destroy all the British shipping. On the 8th of August the French admiral entered the harbour as was proposed, but found himself unable to do any material damage. Lord Howe, however, instantly set sail for Rhode Island; and D'Estaing, confiding in his superiority, immediately came out of the harbour to attack him. A violent storm parted the two fleets, and did so much damage that they were rendered totally unfit for action. The French, however, suffered most; and several of the ships being afterwards attacked singly by the British, very narrowly escaped being taken. On the 20th of August

306 Attempts Rhode Island without success.

America. he returned to Newport in a very ſhattered condition; and, not thinking himſelf ſafe there, ſailed two days after for Boſton. General Sullivan had landed in the mean time on the northern part of Rhode Iſland with 10,000 men. On the 17th of Auguſt they began their operations by erecting batteries, and making their approaches to the Britiſh lines. But General Pigot, who commanded in Newport, had taken ſuch effectual care to ſecure himſelf on the land ſide, that without the aſſiſtance of a marine force it was altogether impoſſible to attack him with any probability of ſucceſs. The conduct of D'Eſtaing, therefore, who had abandoned them when maſter of the harbour, gave the greateſt diſguſt to the people of New England, and Sullivan began to think of a retreat. On perceiving his intentions, the garriſon ſallied out upon him with ſo much vigour, that it was not without difficulty that he effected his retreat. He had not been long gone when Sir Henry Clinton arrived with a body of 4000 men; which, had it arrived ſooner, would have enabled the Britiſh commander to have gained a deciſive advantage over him, as well as to have deſtroyed the town of Providence, which, by its vicinity to Rhode Iſland, and the enterpriſes which were continually projected and carried on in that place, kept the inhabitants of Rhode Iſland in continual alarms.

307 The coaſts of America invaded by the Britiſh fleet.

The firſt Britiſh expedition was to Buzzard's Bay, on the coaſt of New England and neighbourhood of Rhode Iſland. Here they deſtroyed a great number of privateers and merchantmen, magazines, with ſtorehouſes, &c.; whence proceeding to a fertile and populous iſland called Martha's Vineyard, they carried off 10,000 ſheep and 300 black cattle. Another expedition took place up the North River, under Lord Cornwallis and General Knyphauſen; the principal event of which was the deſtruction of a regiment of American cavalry, known by the name of Waſhington's Light Horſe. A third expedition was directed to Little Egg Harbour in New Jerſey, a place noted for privateers, the deſtruction of which was its principal intention. It was conducted by Captains Ferguſon and Collins, and ended in the deſtruction of the enemy's veſſels, as well as of the place itſelf. At the ſame time part of another body of American troops, called Pulaſki's Legion, was ſurpriſed, and a great number of them put to the ſword.

308 Expedition againſt Georgia.

The Americans had in the beginning of the year projected the conqueſt of Weſt Florida; and one Captain Willing, with a party of reſolute men, had made a ſucceſsful incurſion into the country. This awakened the attention of the Britiſh to the ſouthern colonies, and an expedition againſt them was reſolved on. Georgia was the place of deſtination; and the more effectually to enſure ſucceſs, Colonel Campbell, with a ſufficient force, under convoy of ſome ſhips of war, commanded by Commodore Hyde Parker, embarked at New York, while General Prevoſt, who commanded in Eaſt Florida, was directed to ſet out with all the force he could ſpare. The armament from New York arrived off the coaſt of Georgia in the month of December; and though the enemy were very ſtrongly poſted in an advantageous ſituation on the ſhore, the Britiſh troops made good their landing, and advanced towards Savannah the capital of the province. That very day they defeated the forces of the provincials, which oppoſed them; and took poſſeſſion of the town with ſuch celerity, that the Americans had not time to execute a reſolution they had taken of ſetting it on fire. In ten days the whole province of Georgia was reduced, Sunbury alone excepted; and this was alſo brought under ſubjection by General Prevoſt in his march northward. Every proper method was taken to ſecure the tranquillity of the country; and rewards were offered for apprehending committee and aſſembly men, or ſuch as they judged moſt inimical to the Britiſh intereſts. On the arrival of General Prevoſt, the command of the troops naturally devolved on him as the ſenior officer; and the conqueſt of Carolina was next projected. America.

309 Take poſſeſſion of Georgia.

310 Carolina invaded.

In this attempt there was no ſmall probability of ſucceſs. The country contained a great number of friends to government, who now eagerly embraced the opportunity of declaring themſelves; many of the inhabitants of Georgia had joined the royal ſtandard; and there was not in the province any conſiderable body of provincial forces capable of oppoſing the efforts of regular and well-diſciplined troops. On the firſt news of General Prevoſt's approach, the loyaliſts aſſembled in a body, imagining themſelves able to ſtand their ground until their allies ſhould arrive; but in this they were diſappointed. The Americans attacked and defeated them with the loſs of half their number. The remainder retreated into Georgia; and after undergoing many difficulties, at laſt effected a junction with the Britiſh forces.

In the mean time, General Lincoln, with a conſiderable body of American troops, had encamped within 20 miles of the town of Savannah; and another ſtrong party had poſted themſelves at a place called *Briar's Creek*, farther up the river of the ſame name. Thus the extent of the Britiſh government was likely to be circumſcribed within very narrow bounds. General Prevoſt therefore determined to diſlodge the party at Briar's Creek: and the latter, truſting to their ſtrong ſituation, and being remiſs in their guard, ſuffered themſelves to be ſurpriſed on the 30th of March 1779; when they were utterly routed with the loſs of 400 killed and taken, beſides a great number drowned in the river or the ſwamps. The whole artillery, ſtores, baggage, and almoſt all the arms, of this unfortunate party were taken, ſo that they could no more make any ſtand; and thus the province of Georgia was once more freed from the enemy, and a communication opened with thoſe places in Carolina where the royaliſts chiefly reſided.

311 Americans defeated.

The victory at Briar's Creek proved of conſiderable ſervice to the Britiſh cauſe. Great numbers of the loyaliſts joined his army, and conſiderably increaſed its force. Hence he was enabled to ſtretch his poſts further up the river, and to guard all the principal paſſes: ſo that General Lincoln was reduced to a ſtate of inaction; and at laſt moved off towards Auguſta, in order to protect the provincial aſſembly, which was obliged to ſit in that place, the capital being now in the hands of the Britiſh.

Lincoln had no ſooner quitted his poſt, than it was judged a proper time by the Britiſh general to put in execution the grand ſcheme which had been meditated againſt Carolina. Many difficulties indeed lay in his way. The river Savannah was ſo ſwelled by the exceſ-

ſive

America.

five rains of the ſeaſons, that it ſeemed impaſſable; the oppoſite ſhore, for a great way, was ſo full of ſwamps and marſhes, that no army could march over it without the greateſt difficulty; and, to render the paſſage ſtill more difficult, General Moultrie was left with a conſiderable body of troops in order to oppoſe the enemy's attempts. But in ſpite of every oppoſition, the conſtancy and perſeverance of the Britiſh forces at laſt prevailed. General Moultrie was defeated, and obliged to retire towards Charleſtown; and the victorious army, after having waded through the marſhes for ſome time, at laſt arrived in an open country, through which they purſued their march with great rapidity towards the capital; while General Lincoln remained in a ſtate of ſecurity at Auguſta, vainly imagining that the obſtacles he had left in the way could not be ſurmounted.

312 The Britiſh troops advance to Charleſtown.

313 General Lincoln advances to its relief.

Certain intelligence of the danger to which Charleſtown was expoſed at laſt arouſed the American general from his lethargy. A choſen body of infantry, mounted on horſeback for the greater expedition, was deſpatched before him; while Lincoln himſelf followed with all the forces he could collect. General Moultrie too, with the troops he had brought from Savannah, and ſome others he had collected ſince his retreat from thence, had taken poſſeſſion of all the avenues leading to Charleſtown, and prepared for a vigorous defence. But all oppoſition proved ineffectual. The Americans were defeated in every encounter; and, retreating continually, allowed the Britiſh army to come within cannon-ſhot of Charleſtown on the 12th of May.

The town was now ſummoned to ſurrender, and the inhabitants would gladly have agreed to obſerve a neutrality during the reſt of the war, and would have engaged alſo for the reſt of the province. But theſe terms not being accepted, they made preparations for a vigorous defence. It was not, however, in the power of the Britiſh commander at this time to make an attack with any proſpect of ſucceſs. His artillery was not of ſufficient weight; there were no ſhips to ſupport his attack by land; and General Lincoln advancing rapidly with a ſuperior army, threatened to encloſe him between his own force and the town; ſo that ſhould he fail in his firſt attempt, certain deſtruction would be the conſequence. For theſe reaſons he withdrew his forces from before the town, and took poſſeſſion of two iſlands called *St James's* and *St John's*, lying to the ſouthward; where having waited ſome time, his force was augmented by the arrival of two frigates. With theſe he determined to make himſelf maſter of Port Royal, another iſland poſſeſſed of an excellent harbour and many other natural advantages, from its ſituation alſo commanding all the ſea coaſt from Charleſtown to Savannah river. The American general, however, did not allow this to be accompliſhed without oppoſition. Perceiving that his opponent had occupied an advantageous poſt on St John's iſland preparatory to his enterpriſe againſt Port Royal, he attempted, on the 20th of June, to diſlodge him from it; but after an obſtinate attack, the provincials were, as uſual, obliged to retire with conſiderable loſs. On this occaſion the ſucceſs of the Britiſh arms was in a great meaſure owing to an armed float; which galled the right flank of the enemy ſo effectually, that they could direct their efforts only againſt the ſtrongeſt part of the lines, which proved impregnable to their attacks. This diſappointment was inſtantly followed by the loſs of Port Royal, which General Prevoſt took poſſeſſion of, and put his troops into proper ſtations, waiting for the arrival of ſuch reinforcements as were neceſſary for the intended attack on Charleſtown.

314 The attempt on it abandoned.

315 The Americans defeated.

America.

316 D'Eſtaing's proclamation.

In the mean time Count d'Eſtaing, who, as we have already obſerved, had put into Boſton harbour to refit, had uſed his utmoſt efforts to ingratiate himſelf with the inhabitants of that city. Zealous alſo in the cauſe of his maſter, he had publiſhed a proclamation to be diſperſed through Canada, inviting the people to return to their original friendſhip with France, and declaring that all who renounced their allegiance to Great Britain ſhould certainly find a protector in the king of France. All his endeavours, however, proved inſufficient at this time to produce any revolution, or even to form a party of any conſequence among the Canadians.

317 D'Eſtaing fails to the Weſt Indies.

As ſoon as the French admiral had refitted his fleet, he took the opportunity, while that of Admiral Byron had been ſhattered by a ſtorm, of ſailing to the Weſt Indies. During his operations there, the Americans having repreſented his conduct as totally unſerviceable to them, he received orders from Europe to aſſiſt the colonies with all poſſible ſpeed.

318 D'Eſtaing's expedition againſt Georgia.

In compliance with theſe orders, he directed his courſe towards Georgia, with a deſign to recover that province out of the hands of the enemy, and to put it, as well as South Carolina, in ſuch a poſture of defence as would effectually ſecure them from any future attack. This ſeemed to be an eaſy matter, from the little force with which he knew he ſhould be oppoſed; and the next object in contemplation was no leſs than the deſtruction of the Britiſh fleet and army at New York, and their total expulſion from the continent of America. Full of theſe hopes, the French commander arrived off the coaſt of Georgia with a fleet of 22 ſail of the line and 10 large frigates. His arrival was ſo little expected, that ſeveral veſſels laden with proviſions and military ſtores fell into his hands; the Experiment alſo, a veſſel of 50 guns, commanded by Sir James Wallace, was taken after a ſtout reſiſtance. On the continent, the Britiſh troops were divided. General Prevoſt, with an inconſiderable part, remained at Savannah; but the main force was under Colonel Maitland at Port Royal. On the firſt appearance of the French fleet, an expreſs was deſpatched to Colonel Maitland: but it was intercepted by the enemy; ſo that before he could ſet out in order to join the commander in chief, the Americans had ſecured moſt of the paſſes by land, while the French fleet effectually blocked up the paſſage by ſea. But, by taking advantage of creeks and rivulets, and marching over land, he arrived juſt in time to relieve Savannah.

319 Abſurd conduct of the French commander.

D'Eſtaing, after making a gaſconade of what had happened at St Vincents and Grenada, had allowed General Prevoſt 24 hours to deliberate whether he ſhould capitulate or not. This time the general employed in making the beſt preparations he could for a defence; and during this time it was that Colonel Maitland arrived. D'Eſtaing's ſummons was now rejected; and as on this occaſion the ſuperiority of the enemy was by no means ſo much out of proportion as it had been at Grenada, there was every probability of

America. succeſs on the part of the Britiſh. The garriſon now conſiſted of 3000 men, all of approved valour and experience, while the united force of the French and Americans did not amount to 10,000. The event was anſwerable to the expectations of the Britiſh general. Having the advantage of a ſtrong fortification and excellent engineers, the fire of the allies made ſo little impreſſion, that D'Eſtaing reſolved to bombard the town, and a battery of nine mortars was erected for the purpoſe. This produced a requeſt from General Prevoſt, that the women and children might be allowed to retire to a place of ſafety. But the allied commanders had the inhumanity to refuſe compliance; and they reſolved to give a general aſſault. This was accordingly attempted on the 9th of October: but the aſſailants were everywhere repulſed with ſuch ſlaughter, that 1200 were killed and wounded; among the former was Count Pulaſki, and among the latter was D'Eſtaing himſelf.

320 Cruelty of the French and American generals.

321 They are utterly defeated.

This diſaſter entirely overthrew the ſanguine hopes of the Americans and French; mutual reproaches and animoſities took place in the moſt violent degree; and after waiting eight days longer, both parties prepared for a retreat; the French to their ſhipping, and the Americans into Carolina.

322 Succeſsful expeditions againſt the northern American provinces.

While the allies were thus unſucceſsfully employed in the ſouthern colonies, their antagoniſts were no leſs aſſiduous in diſtreſſing them in the northern parts. Sir George Collier was ſent with a fleet, carrying on board General Matthews, with a body of land forces, into the province of Virginia. Their firſt attempt was on the town of Portſmouth; where, though the enemy had deſtroyed ſome ſhips of great value, the Britiſh troops arrived in time to ſave a great number of others. On this occaſion about 120 veſſels of different ſizes were burnt, and 20 carried off; and an immenſe quantity of proviſions deſigned for the uſe of General Waſhington's army was either deſtroyed or carried off, together with a great variety of naval and military ſtores. The fleet and army returned with little or no loſs to New York.

The ſucceſs with which this expedition was attended, ſoon gave encouragement to attempt another. The Americans had for ſome time been employed in the erection of two ſtrong forts on the river; the one at Verplanks Neck on the eaſt, and the other at Stoney Point on the weſt ſide. Theſe when completed would have been of the utmoſt ſervice to the Americans, as commanding the principal paſs, called the *King's Ferry*, between the northern and ſouthern colonies. At preſent, however, they were not in a condition to make any effectual defence; and it was therefore determined to attack them before the works ſhould be completed. The force employed on this occaſion was divided into two bodies; one of which directed its courſe againſt Verplanks, and the other againſt Stoney Point. The former was commanded by General Vaughan, the latter by General Pattiſon, while the ſhipping was under the direction of Sir George Collier. General Vaughan met with no reſiſtance, the enemy abandoning their works, and ſetting fire to every thing combuſtible that they could not carry off. At Stoney Point, however, a vigorous defence was made, though the garriſon was at laſt obliged to capitulate upon honourable conditions. To ſecure the poſſeſſion of this laſt, which was the more important of the two, General Clinton removed from his former ſituation, and encamped in ſuch a manner that Waſhington could not give any aſſiſtance. The Americans, however, revenged themſelves by diſtreſſing, with their numerous privateers, the trade to New York. America.

This occaſioned a third expedition to Connecticut, where theſe privateers were chiefly built and harboured. The command was given to Governor Tyron, and to General Garth, an officer of known valour and experience. Under convoy of a conſiderable number of armed veſſels they landed at Newhaven, where they demoliſhed the batteries that had been erected to oppoſe them, and deſtroyed the ſhipping and naval ſtores; but they ſpared the town itſelf, as the inhabitants had abſtained from firing out of their houſes upon the troops. From Newhaven they marched to Fairfield, where they proceeded as before, reducing the town alſo to aſhes. Norwalk was next attacked, which in like manner was reduced to aſhes; as was alſo Greenfield, a ſmall ſeaport in the neighbourhood.

Theſe ſucceſſes proved very alarming as well as detrimental to the Americans; ſo that General Waſhington determined at all events to drive the enemy from Stoney Point. For this purpoſe he ſent General Wayne with a detachment of choſen men, directing them to attempt the recovery of it by ſurpriſe. On this occaſion the Americans ſhowed a ſpirit and reſolution exceeding any thing they had performed during the courſe of the war. Though after the capture of it by the Britiſh the fortifications of this place had been completed, and were very ſtrong, they attacked the enemy with bayonets, after paſſing through a heavy fire of muſketry and grape ſhot; and in ſpite of all oppoſition, obliged the ſurviving part of the garriſon, amounting to 500 men, to ſurrender themſelves priſoners of war.

Though the Americans did not at preſent attempt to retain poſſeſſion of Stoney Point, the ſucceſs they had met with in the enterpriſe emboldened them to make a ſimilar attempt on Paulus Hook a fortified poſt on the Jerſey ſide oppoſite to New York; but in this they were not attended with equal ſucceſs, being obliged to retire with precipitation after they had made themſelves maſters of one or two poſts.

323 Unſucceſsful expedition of the Americans againſt Penobſcot.

Another expedition of greater importance was now projected on the part of the Americans. This was againſt a poſt on the river Penobſcot, on the borders of Nova Scotia, of which the Britiſh had lately taken poſſeſſion, and where they had begun to erect a fort which threatened to be a very great inconvenience to the coloniſts. The armament deſtined againſt it was ſo ſoon got in readineſs, that Colonel Maclean, the commanding officer at Penobſcot, found himſelf obliged to drop the execution of part of his ſcheme; and inſtead of a regular fort, to content himſelf with putting the works already conſtructed in as good a poſture of defence as poſſible. The Americans could not effect a landing without a great deal of difficulty, and bringing the guns of their largeſt veſſels to bear upon the ſhore. As ſoon as this was done, however, they erected ſeveral batteries, and kept up a briſk fire for the ſpace of a fortnight; after which they propoſed to give a general aſſault: but before this could be effected, they perceived Sir George Collier with a Britiſh fleet ſailing up the river to attack

America. tack them. On this they inſtantly embarked their artillery and military ſtores, ſailing up the river as far as poſſible in order to avoid him. They were ſo cloſely purſued, however, that not a ſingle veſſel could eſcape; ſo that the whole fleet, conſiſting of 19 armed veſſels and 24 tranſports was deſtroyed; moſt of them indeed being blown up by themſelves. The ſoldiers and ſailors were obliged to wander through immenſe deſerts, where they ſuffered much for want of proviſions; and to add to their calamities, a quarrel broke out between the ſoldiers and ſeamen concerning the cauſe of their diſaſter, which ended in a violent fray, wherein a great number were killed.

Thus the arms of America and France being almoſt everywhere unſucceſsful, the independency of the former ſeemed yet to be in danger notwithſtanding the aſſiſtance of ſo powerful an ally, when further encouragement was given by the acceſſion of Spain to the confederacy againſt Britain in the month of June 1779. The firſt effect of this appeared in an invaſion of Weſt Florida by the Spaniards in September 1779. As the country was in no ſtate of defence, the enemy eaſily made themſelves maſters of the whole almoſt without oppoſition. Their next enterpriſe was againſt the Bay of Honduras, where the Britiſh logwood cutters were ſettled. Theſe finding themſelves too weak to reſiſt, applied to the governor of Jamaica for relief; who ſent them a ſupply of men, ammunition, and military ſtores, under Captain Dalrymple. Before the arrival of this detachment, the principal ſettlement in thoſe parts, called *St George's Key*, had been taken by the Spaniards and retaken by the Britiſh. In his way Captain Dalrymple fell in with a ſquadron from Admiral Parker in ſearch of ſome regiſter ſhips richly laden; but which retreating into the harbour of Omoa, were too ſtrongly protected by the fort to be attacked with ſafety. A project was then formed, in conjunction with the people of Honduras, to reduce this fort. The deſign was to ſurpriſe it; but the Spaniards having diſcovered them, they were obliged to fight. Victory quickly declared for the Britiſh; but the fortifications were ſo ſtrong, that the artillery they had brought along with them were found too light to make any impreſſion. It was then determined to try the ſucceſs of an eſcalade; and this was executed with ſo much ſpirit, that the Spaniards ſtood aſtoniſhed without making any reſiſtance, and, in ſpite of all the efforts of their officers, threw down their arms and ſurrendered. The ſpoil was immenſe, being valued at three millions of dollars. The Spaniards chiefly lamented the loſs of 250 quintals of quickſilver; a commodity indiſpenſably neceſſary in the working of their gold and ſilver mines, ſo that they offered to ranſom it at any price; but this was refuſed, as well as the ranſom of the fort, though the governor offered 300,000 dollars for it. A ſmall garriſon was left for the defence of the place: but it was quickly attacked by a ſuperior force, and obliged to evacuate it, though not without deſtroying every thing that could be of uſe to the enemy; ſpiking the guns, and even locking the gates of the fort and carrying off the keys. All this was done in ſight of the beſiegers; after which the garriſon embarked without the loſs of a man.

324 Spain joins the confederacy againſt Britain.

325 Fort Omoa taken by the Britiſh;

326 but they are obliged to evacuate it.

As no operations of any conſequence took place this year in the province of New York, the congreſs made uſe of the opportunity to deſpatch General Sullivan with a conſiderable force, in order to take vengeance on the Indians for their ravages and depredations: and the object of the expedition was, not merely the reduction of them, but if poſſible their utter extirpation. Of this the Indians were appriſed; and collecting all their ſtrength, reſolved to come to a deciſive engagement. Accordingly they took a ſtrong poſt in the moſt woody and mountainous part of the country; erecting a breaſtwork in the front of large logs of wood extending half a mile in length, while their right flank was covered by a river, and the left by a hill of difficult acceſs. This advantageous poſition they had taken by the advice of the refugees who were among them, and of whom 200 or 300 were preſent in the battle.

America. 327 Americans take vengeance on the Indians.

Thus poſted, the Indians waited the approach of the American army; but the latter having brought ſome artillery along with them, played it againſt the breaſtwork of the enemy with ſuch ſucceſs, that in two hours it was almoſt deſtroyed; and at the ſame time a party having reached the top of the hill, they became apprehenſive of being ſurrounded, on which they inſtantly fled with precipitation, leaving a great number of killed and wounded behind them. The Americans after this battle met with no further reſiſtance of any conſequence. They were ſuffered to proceed without interruption, and to execute in the moſt ample manner the vengeance they had projected. On entering the country of the Indians, it appeared that they had been acquainted with agriculture and the arts of peace far beyond what had been ſuppoſed. From General Sullivan's account it was learned, that the Indian houſes were large, convenient, and even elegant; their grounds were excellently cultivated, and their gardens abounded in fruit trees and vegetables of all kinds fit for food. The whole of this fine country was now by the American general converted into a deſert. Forty towns and ſettlements, beſides ſcattered habitations, were demoliſhed; the fields of corn, the orchards, the plantations, were utterly laid waſte; all the fruit trees were cut down; and ſo great had been the induſtry of the Indians, that in one orchard 1500 of theſe were deſtroyed. The quantity of corn waſted on this occaſion was ſuppoſed to amount to 160,000 buſhels. In ſhort ſuch was the deſolation, that on the American army's leaving the country, not a houſe, not a field of corn, nor a fruit tree, was left upon the ground, nor was an Indian to be ſeen throughout the whole tract.

We muſt now take a view of the tranſactions in the ſouthern colonies; to which the war was, in the year 1780, ſo effectually transferred, that the operations there became at laſt deciſive. The ſucceſs of General Prevoſt in advancing to the very capital of South Carolina has been already related, together with the obſtacles which prevented him from becoming maſter of it at that time. Towards the end of the year 1779, however, Sir Henry Clinton ſet ſail from New York with a conſiderable body of troops, intended for the attack of Charleſtown, South Carolina, in a fleet of ſhips of war and tranſports under the command of Vice Admiral Arbuthnot. They had a very tedious voyage; the weather was uncommonly bad; ſeveral of the tranſports were loſt, as were alſo the greater part of the horſes:

328 Expedition of Sir Henry Clinton againſt Charleſtown.

America. horſes which they carried with them, intended for cavalry or other public uſes; and an ordnance ſhip likewiſe foundered at ſea. Having arrived at Savannah, where they endeavoured to repair the damages ſuſtained on their voyage, they proceeded from thence on the 10th of February 1780 to North Ediſto, the place of debarkation which had been previouſly appointed. They had a favourable and ſpeedy paſſage thither: and though it required time to have the bar explored and the channel marked, the tranſports all entered the harbour the next day; and the army took poſſeſſion of John's iſland without oppoſition. Preparations were then made for paſſing the ſquadron over Charleſtown bar, where the high water ſpring tides were only 19 feet deep: but no opportunity offered of going into the harbour till the 20th of March, when it was effected without any accident, though the American galleys continually attempted to prevent the Engliſh boats from ſounding the channel. The Britiſh troops had previouſly removed from John's to James's iſland; and on the 29th of the ſame month they effected their landing at Charleſtown Neck. On the 1ſt of April they broke ground within 800 yards of the American works; and by the 8th the beſiegers guns were mounted in battery.

As ſoon as the army began to erect their batteries againſt the town, Admiral Arbuthnot embraced the firſt favourable opportunity of paſſing Sullivan's iſland, upon which there was a ſtrong fort of batteries, the chief defence of the harbour. He weighed on the 9th, with the Roebuck, Richmond, and Romulus, Blonde, Virginia, Raleigh, and Sandwich armed ſhip, the Renown bringing up the rear; and, paſſing through a ſevere fire, anchored in about two hours under James's iſland, with the loſs of 27 ſeamen killed and wounded. The Richmond's fore-top maſt was ſhot away, and the ſhips in general ſuſtained damage in their maſts and rigging, though not materially in their hulls. But the Acetus tranſport, having on board ſome naval ſtores, grounded within gunſhot of Sullivan's iſland, and received ſo much damage that ſhe was obliged to be abandoned and burnt.

329 The town defended by Lincoln.

On the 10th, Sir Henry Clinton and Admiral Arbuthnot ſummoned the town to ſurrender to his majeſty's arms: but Major-general Lincoln, who commanded in Charleſtown, returned them an anſwer, declaring it to be his intention to defend the place. The batteries were now opened againſt the town; and from their effect the fire of the American advanced works conſiderably abated. It appears that the number of troops under the command of Lincoln was by far too few for defending works of ſuch extent as thoſe of Charleſtown; and that many of theſe were men little accuſtomed to military ſervice, and very ill provided with clothes and other neceſſaries. Lincoln had been for ſome time expecting reinforcements and ſupplies from Virginia and other places; but they came in very ſlowly. Earl Cornwallis, and Lieutenant-colonel Tarleton under him, were alſo extremely active in intercepting ſuch reinforcements and ſupplies as were ſent to the American general. They totally defeated a conſiderable body of cavalry and militia which was proceeding to the relief of the town; and alſo made themſelves maſters of ſome poſts which gave them in a great degree the command of the country, by

330 Several reinforcements intended for his relief intercepted.

which means great ſupplies of proviſions fell into their America. hands.

Such was the ſtate of things, and Fort Sullivan had alſo been taken by the king's troops, when on the 18th of May General Clinton again ſummoned the town to ſurrender; an offer being made, as had been done before, that if they ſurrendered, the lives and property of the inhabitants ſhould be preſerved to them. Articles of capitulation were then propoſed by General Lincoln; but the terms were not agreed to by General Clinton. At length, however, the town being cloſely inveſted on all ſides, and the preparations to ſtorm it in every part being in great forwardneſs, and the ſhips ready to move to the aſſault, General Lincoln, who had been applied to for that purpoſe by the inhabitants, ſurrendered it on ſuch articles of capitulation as General Clinton had before agreed to. This was on the 4th of May, which was one month and two days after the town had been firſt ſummoned to ſurrender.

331 The place ſurrenders.

A large quantity of ordnance, arms, and ammunition, was found in Charleſtown; and, according to Sir Henry Clinton's account, the number of priſoners taken in Charleſtown amounted to 5618 men, excluſive of near a thouſand ſailors in arms; but according to General Lincoln's account, tranſmitted to the congreſs, the whole number of continental troops taken priſoners amounted to no more than 2487. The remainder, therefore, included in General Clinton's account, muſt have conſiſted of militia and inhabitants of the town. Several American frigates were alſo taken or deſtroyed in the harbour of Charleſtown.

The loſs of Charleſtown evidently excited a conſiderable alarm in America: and their popular writers, particularly the author of the celebrated performance entitled Common Senſe, in ſome other pieces made uſe of it as a powerful argument to lead them to more vigorous exertions againſt Great Britain, that they might the more effectually and certainly ſecure their independence.

332 Apprehenſions at New York.

While Sir Henry Clinton was employed in his voyage to Charleſtown, and in the ſiege of that place, the garriſon at New York ſeem not to have been wholly free from apprehenſions for their own ſafety. An intenſe froſt, accompanied with great falls of ſnow, began about the middle of December 1779, and ſhut up the navigation of the port of New York from the ſea, within a few days after the departure of Admiral Arbuthnot and General Clinton. The ſeverity of the weather increaſed to ſo great a degree, that towards the middle of January all communications with New York by water were entirely cut off, and as many new ones opened by the ice. The inhabitants could ſcarcely be ſaid to be in an inſular ſtate. Horſes with heavy carriages could go over the ice into the Jerſeys from one iſland to another. The paſſage in the North River, even in the wideſt part from New York to Paulus Hook, which was 2000 yards, was about the 19th of January practicable for the heavieſt cannon: an event which had been unknown in the memory of man. Proviſions were ſoon after tranſported upon ſledges, and a detachment of cavalry marched upon the ice from New York to Staten Iſland, which was a diſtance of 11 miles.

The city of New York being thus circumſtanced

America. was conſidered as much expoſed to the attacks from the continental troops: and it was ſtrongly reported that General Waſhington was meditating a great ſtroke upon New York with his whole force, by different attacks. Some time before this, Major-general Pattiſon, commandant at New York, having received an addreſs from many of the inhabitants, offering to put themſelves in military array, he thought the preſent a favourable opportunity of proving the ſincerity of their profeſſions. Accordingly he iſſued a proclamation, calling upon all the male inhabitants from 16 to 60 to take up arms. The requiſition was ſo readily complied with, that in a few days 40 companies from the ſix wards of the city were enrolled, officered, and under arms, to the number of 2600, many ſubſtantial citizens ſerving in the ranks of each company. Other volunteer companies were formed; and the city was put into a very ſtrong poſture of defence.

333 Forwardneſs of the inhabitants to be enrolled for its defence.

No attack, however, was made upon New York, whatever deſign might originally have been meditated; but an attempt was made upon Staten iſland, where there were about 1800 men, under the command of Brigadier-general Sterling, who were well intrenched. General Waſhington, whoſe army was hutted at Morriſtown, ſent a detachment of 2700 men, with ſix pieces of cannon, two mortars, and ſome horſes, commanded by Lord Sterling, who arrived at Staten iſland early in the morning of the 15th January. The advanced poſts of the Britiſh troops retired upon the approach of the Americans, who formed the line, and made ſome movements in the courſe of the day; but they withdrew in the night, after having burnt one houſe, pillaged ſome others, and carried off with them about 200 head of cattle. Immediately on the arrival of the Americans on Staten iſland, Lieutenant-general Knyphauſen had embarked 600 men to attempt a paſſage, and to ſupport General Sterling: but the floating ice compelled them to return. It is, however, imagined, that the appearance of theſe tranſports, with the Britiſh troops on board, which the Americans could ſee towards the cloſe of the day, induced the latter to make ſo precipitate a retreat.

334 The provincials attack Staten Iſland;

335 but are induced to make a precipitate retreat.

After Charleſtown had ſurrendered to the king's troops, General Clinton iſſued two proclamations, and alſo circulated a hand bill amongſt the inhabitants of South Carolina, in order to induce them to return to their allegiance, and to be ready to join the king's troops. It was ſaid, that the helping hand of every man was wanted to re-eſtabliſh peace and good government: and that as the commander in chief wiſhed not to draw the king's friends into danger, while any doubt could remain of their ſucceſs; ſo now that this was certain, he truſted that one and all would heartily join, and by a general concurrence give effect to ſuch neceſſary meaſures for that purpoſe as from time to time might be pointed out. Thoſe who had families were to form a militia to remain at home, and occaſionally to aſſemble in their own diſtricts, when required, under officers of their own chooſing, for the maintenance of peace and good order. Thoſe who had no families, and who could conveniently be ſpared for a time, it was preſumed, would cheerfully aſſiſt his majeſty's troops in driving their oppreſſors, acting under the authority of congreſs, and all the miſeries of war, far from that colony. For this purpoſe it was America. ſaid to be neceſſary that the young men ſhould be ready to aſſemble when required, and to ſerve with the king's troops for any ſix months of the enſuing twelve that might be found requiſite, under proper regulations. They might chooſe officers to each company to command them; and were to be allowed, when on ſervice, pay, ammunition, and proviſions, in the ſame manner as the king's troops. When they joined the army, each man was to be furniſhed with a certificate, declaring that he was only engaged to ſerve as a militiaman for the time ſpecified; that he was not to be marched beyond North Carolina and Georgia; and that, when the time was out, he was freed from all claims whatever of military ſervice, excepting the common and uſual militia duty where he lived. He would then, it was ſaid, have paid his debt to his country, and be entitled to enjoy undiſturbed that peace, liberty, and property, at home, which he had contributed to ſecure. The proclamations and publications of General Clinton appear to have produced ſome effect in South Carolina; though they probably operated chiefly upon thoſe who were before not much inclined to the cauſe of American independence. Two hundred and ten of the inhabitants of Charleſtown ſigned an addreſs to General Clinton and Admiral Arbuthnot, ſoliciting to be readmitted to the character and condition of Britiſh ſubjects, the inhabitants of that city having been hitherto conſidered as priſoners on parole; declaring their diſapprobation of the doctrine of American independence; and expreſſing their regret, that after the repeal of thoſe ſtatutes which gave riſe to the troubles in America, the overtures made by his majeſty's commiſſioners had not been regarded by the congreſs. Sir Henry Clinton, in one of the proclamations iſſued at this time, declared, that if any perſons ſhould thenceforward appear in arms in order to prevent the eſtabliſhment of his majeſty's government in that country, or ſhould, under any pretence or authority whatſoever, attempt to compel any other perſon or perſons to do ſo, or who ſhould hinder or intimidate the king's faithful and loyal ſubjects from joining his forces or otherwiſe performing thoſe duties their allegiance required, ſuch perſons ſhould be treated with the utmoſt ſeverity, and their eſtates be immediately ſeized in order to be confiſcated.

336 Proclamations by General Clinton.

Mean time the ravages of war did not prevent the Americans from paying ſome attention to the arts of peace. On the 4th of May an act paſſed by the council and houſe of repreſentatives of Maſſachuſets Bay for incorporating and eſtabliſhing a ſociety for the cultivation and promotion of the arts and ſciences.

Some doubts having ariſen in the congreſs, towards 337 Proceedings of congreſs. the cloſe of the preceding year, about the propriety of their aſſembling in the city of Philadelphia, it was now reſolved that they ſhould continue to meet there: and a committee of three members was appointed, to report a proper place where buildings might be provided for the reception of the congreſs, together with an eſtimate of the expence of providing ſuch buildings and the neceſſary offices for the ſeveral boards. It was alſo reſolved by the congreſs, that a monument ſhould be erected to the memory of their late general Richard Montgomery, who fell at Quebec, in teſtimony of his ſignal and important ſervices to the United States

America. States of America, with an inſcription expreſſive of his amiable character and heroic achievements; and that the continental treaſurers ſhould be directed to advance a ſum not exceeding 300l. to Dr Franklin to defray the expence; that gentleman being deſired to cauſe the monument to be executed at Paris, or in ſome other part of France. It was likewiſe reſolved by the congreſs, that a court ſhould be eſtabliſhed for the trial of all appeals from the court of admiralty of the United States of America, in caſes of capture; to conſiſt of three judges, appointed and commiſſioned by congreſs, and who were to take an oath of office; and that the trials in this court ſhould be determined by the uſage of nations.

338 Difficulties ariſing from the depreciation of their paper currency.

The difficulties of the congreſs and of the people of America had been greatly increaſed by the depreciation of their paper currency. At the time when the colonies engaged in a war with Great Britain, they had no regular civil governments eſtabliſhed among them of ſufficient energy to enforce the collection of taxes, or to provide funds for the redemption of ſuch bills of credit as their neceſſities obliged them to iſſue. In conſequence of this ſtate of things, their bills increaſed in quantity far beyond the ſum neceſſary for the purpoſe of a circulating medium: and as they wanted at the ſame time ſpecific funds to reſt on for their redemption, they ſaw their paper currency daily ſink in value. The depreciation continued, by a kind of gradual progreſſion, from the year 1777 to 1780: ſo that, at the latter period, the continental dollars were paſſed, by common conſent, in moſt parts of America, at the rate of at leaſt $\frac{1}{40}$ths below their nominal value. The impoſſibility of keeping up the credit of the currency to any fixed ſtandard, occaſioned great and almoſt inſurmountable embarraſſments in aſcertaining the value of property, or carrying on trade with any ſufficient certainty. Thoſe who ſold, and thoſe who bought, were left without a rule whereon to form a judgment of their profit or their loſs; and every ſpecies of commerce or exchange, whether foreign or domeſtic, was expoſed to numberleſs and increaſing difficulties. The conſequences of the depreciation of the paper currency were alſo felt with peculiar ſeverity by ſuch of the Americans as were engaged in their military ſervices, and greatly augmented their other hardſhips. The requiſitions made by the congreſs to the ſeveral colonies for ſupplies, were alſo far from being always regularly complied with: and their troops were not unfrequently in want of the moſt common neceſſaries; which naturally occaſioned complaints and diſcontent among them. Some of theſe difficulties, reſulting from their circumſtances and ſituation, perhaps no wiſdom could have prevented: but they ſeem to have ariſen in part from the congreſs not being ſufficiently acquainted with the principles of finance, and from a defect of ſyſtem in the departments of their government. The cauſe of the Americans appears alſo to have ſuffered ſomewhat by their depending too much on temporary inliſtments. But the congreſs endeavoured, towards the cloſe of the year 1780, to put their army upon a more permanent footing, and to give all the ſatisfaction to their officers and ſoldiers which their circumſtances would permit. They appointed a committee for arranging their finances, and made ſome new regulations reſpecting their war-office and treaſury-board, and other public departments. America.

339 Anniverſary of American independence celebrated at Philadelphia.

Notwithſtanding the diſadvantages under which they laboured, the Americans ſeemed to entertain no doubts but that they ſhould be able to maintain their independency. The 4th of July was celebrated this year at Philadelphia with ſome pomp, as the anniverſary of American independence. A commencement for conferring degrees in the arts was held the ſame day, in the hall of the univerſity there; at which the preſident and members of the congreſs attended, and other perſons in public offices. The Chevalier de la Lucerne, miniſter plenipotentiary from the French king to the United States, was alſo preſent on the occaſion. A charge was publicly addreſſed by the provoſt of the univerſity to the ſtudents; in which he ſaid, that he could not but congratulate them "on that auſpicious day, which, amidſt the confuſions and deſolations of war, beheld learning beginning to revive; and animated them with the pleaſing proſpect of ſeeing the ſacred lamp of ſcience burning with a ſtill brighter flame, and ſcattering its invigorating rays over the unexplored deſerts of that extenſive continent; until the whole world ſhould be involved in the united blaze of knowledge, liberty, and religion. When he ſtretched his views forward (he ſaid), and ſurveyed the riſing glories of America, the enriching conſequences of their determined ſtruggle for liberty, the extenſive fields of intellectual improvement and uſeful invention, in ſcience and arts, in agriculture and commerce, in religion and government, through which the unfettered mind would range, with increaſing delight, in queſt of the undiſcovered treaſure which yet lay concealed in the animal, vegetable, and mineral kingdoms of that new world; or in the other fertile ſources of knowledge with which it abounded. His heart ſwelled with the pleaſing proſpect, that the ſons of that inſtitution would diſtinguiſh themſelves, in the different walks of life, by their literary contributions to the embelliſhment and increaſe of human happineſs."

340 A large body of French troops land at Rhode Iſland.

On the 10th of July, M. Ternay, with a fleet conſiſting of ſeven ſhips of the line, beſides frigates, and a large body of French troops, commanded by the count de Rochambeau, arrived at Rhode Iſland; and the following day 6000 men were landed there. A committee from the general aſſembly of Rhode Iſland was appointed to congratulate the French general upon his arrival: whereupon he returned an anſwer, in which he informed them, that the king his maſter had ſent him to the aſſiſtance of his good and faithful allies the United States of America. At preſent, he ſaid, he only brought over the vanguard of a much greater force deſtined for their aid; and the king had ordered him to aſſure them, that his whole power ſhould be exerted for their ſupport. He added, that the French troops were under the ſtricteſt diſcipline; and, acting under the orders of General Waſhington, would live with the Americans as their brethren.

A ſcheme was ſoon after formed, of making a combined attack with Engliſh ſhips and troops, under the command of Sir Henry Clinton and Admiral Arbuthnot, againſt the French fleet and troops at Rhode Iſland. Accordingly a conſiderable part of the troops at New York was embarked for that purpoſe. General

America. neral Washington having received information of this, passed the North River, by a very rapid movement, and with an army increased to 12,000 men, proceeded with celerity towards King's Bridge, in order to attack New York; but learning that the British general had changed his intentions, and disembarked his troops on the 31st of the month, General Washington recrossed the river, and returned to his former station. Sir Henry Clinton and the admiral had agreed to relinquish their design of attacking the French and Americans at Rhode Island as impracticable for the present.

341 Unsuccessful expedition in the Jerseys.

An unsuccessful attempt was also made about this time in the Jerseys by General Knyphausen, with 7000 British troops under his command, to surprise the advanced posts of General Washington's army. They proceeded very rapidly towards Springfield, meeting little opposition till they came to the bridge there, which was very gallantly defended by 170 of the continental troops, for 15 minutes, against the British army: but they were at length obliged to give up so unequal a contest, with the loss of 37 men. After securing this pass, the British troops marched into the place, and set fire to most of the houses. They also committed some other depredations in the Jerseys; but gained no laurels there, being obliged to return about the beginning of July without effecting any thing material.

But in South Carolina the royal arms were attended with more success. Earl Cornwallis, who commanded the British troops there, obtained a very signal victory over General Gates on the 16th of August. The action began at break of day, in a situation very advantageous for the British troops, but very unfavourable to the Americans. The latter were much more numerous; but the ground on which both armies stood was narrowed by swamps on the right and left, so that the Americans could not properly avail themselves of their superior numbers. There seems to have been some want of generalship in Gates, in suffering himself to be surprised in so disadvantageous a position: but this circumstance was partly the effect of accident; for both armies set out with a design of attacking each other precisely at the same time, at ten the preceding evening, and met together before daylight at the place where the action happened. The attack was made by the British troops with great vigour, and in a few minutes the action was general along the whole line. It was at this time a dead calm, with a little haziness in the air, which preventing the smoke from rising, occasioned so thick a darkness, that it was difficult to see the effect of a very heavy and well-supported fire on both sides. The British troops either kept up a constant fire, or made use of bayonets, as opportunities offered; and, after an obstinate resistance during three quarters of an hour, threw the Americans into total confusion, and forced them to give way in all quarters. The continental troops appear to have behaved well; but the militia were soon broken, and left the former to oppose the whole force of the British troops. General Gates did all in his power to rally the militia, but without effect: the continentals retreated in some order; but the rout of the militia was so great, that the British cavalry are said to have continued the pursuit of them to the distance of 22 miles from the place where the action happened. The loss of the Americans was very considerable: about 1000 prisoners were taken, and more are said to have been killed and wounded, but the number is not very accurately ascertained. Seven pieces of brass cannon, a number of colours, and all the ammunition waggons of the Americans, were also taken. Of the British troops, the killed and wounded amounted to 213. Among the prisoners taken was Major-general Baron de Kalb, a Prussian officer in the American service, who was mortally wounded, having exhibited great gallantry in the course of the action, and received 11 wounds. The British troops by whom this great victory was achieved did not much exceed 2000, while the American army is said to have amounted to 6000; of which, however, the greatest part was militia.

342 Victory obtained by Lord Cornwallis over General Gates.

America.

Lieutenant-colonel Tarleton, who had greatly distinguished himself in this action, was detached the following day, with some cavalry and light infantry, amounting to about 350 men, to attack a corps of Americans under General Sumpter. He executed this service with great activity and military address. He procured good information of Sumpter's movements; and by forced and concealed marches came up with and surprised him on the middle of the day on the 18th, near the Catawba fords. He totally destroyed or dispersed his detachment, which consisted of 700 men, killing 150 on the spot, and taking two pieces of brass cannon, 300 prisoners, and 44 waggons.

343 Activity of Lieut. Col. Tarleton.

Not long after these events, means were found to detach Major-general Arnold, who had engaged so ardently in the cause of America, and who had exhibited so much bravery in the support of it, from the interests of the congress. Major André, adjutant-general to the British army, was a principal agent in this transaction; or, if the overture of joining the king's troops came first from Arnold, this gentleman was the person employed to concert the affair with him. More must have been originally comprehended in the scheme than the mere desertion of the American cause by Arnold: but whatever designs had been formed for promoting the views of the British government, they were frustrated by the apprehending of Major André. He was taken in disguise, after having assumed a false name, on the 23d of September, by three American soldiers; to whom he offered considerable rewards if they would have suffered him to escape, but without effect. Several papers written by Arnold were found upon him; and when Arnold had learned that Major André was seized, he found means to get on board a barge, and to escape to one of the king's ships. General Washington referred the case of Major André to the examination and decision of a board of general officers, consisting of Major-general Greene, Major-general Lord Sterling, Major-general the Marquis de la Fayette, Major-general the Baron de Stenben, two other major-generals, and eight brigadier-generals. Major André was examined before them, and the particulars of his case inquired into; and they reported to the American commander in chief, that Mr André came on shore from the Vulture sloop of war in the night, on an interview with General Arnold, in a private and secret manner; that he changed his dress within the American lines; and, under a feigned name and in a disguised habit, passed the American works at

344 General Arnold deserts the service of congress.

345 Unhappy fate of Major André.

America. Stoney and Verplank's Points, on the evening of the 22d of September; that he was taken on the morning of the 23d at Tarry-town, he being then on his way for New York; and that, when taken, he had in his poſſeſſion ſeveral papers which contained intelligence for the enemy. They therefore determined, that he ought to be conſidered as a ſpy from the enemy; and that, agreeable to the law and uſage of nations, he ought to ſuffer death. Sir Henry Clinton, Lieutenant-general Robertſon, and the late American general Arnold, all wrote preſſing letters to General Waſhington on the occaſion, in order to prevent the deciſion of the board of general officers from being put in force: But their applications were ineffectual. Major Andrè was hanged at Tappan, in the province of New York, on the 2d of October. He met his fate with great firmneſs; but appeared ſomewhat hurt that he was not allowed a more military death, for which he had ſolicited. He was a gentleman of very amiable qualities, had a taſte for literature and the fine arts, and poſſeſſed many accompliſhments. His death, therefore, was regretted even by his enemies; and the ſeverity of the determination concerning him was much exclaimed againſt in Great Britain. It was, however, generally acknowledged by impartial perſons, that there was nothing in the execution of this unfortunate gentleman but what was perfectly conſonant to the rules of war.

346 His amiable character.

Arnold was made a brigadier-general in the king's ſervice, and publiſhed an addreſs to the inhabitants of America, dated from New York, October 7. in which he endeavoured to juſtify his deſertion of their cauſe. He ſaid, that when he firſt engaged in it, he conceived the rights of his country to be in danger, and that duty and honour called him to her defence. A redreſs of grievances was his only aim and object; and therefore he acquieſced unwillingly in the declaration of independence, becauſe he thought it precipitate. But what now induced him to deſert their cauſe was the diſguſt he had conceived at the French alliance, and at the refuſal of congreſs to comply with the laſt terms offered by Great Britain, which he thought equal to all their expectations and to all their wiſhes.

347 Motives aſſigned by Arnold for his conduct.

The Americans, however, accounted for the conduct of Arnold in a different manner. They alleged, that he had ſo involved himſelf in debts and difficulties by his extravagant manner of living in America, that he had rendered it very inconvenient for him to continue there: that after the evacuation of Philadelphia by the Britiſh troops, Arnold being inveſted with the command in that city, had made the houſe of Mr Penn, which was the beſt in the city, his head quarters. This he had furniſhed in an elegant and expenſive manner, and lived in a ſtyle far beyond his income. It was manifeſt, they ſaid, that he could at firſt have no great averſion to the French alliance, becauſe that when M. Gerard, miniſter plenipotentiary from the court of France, arrived at Philadelphia in July 1778, General Arnold early and earneſtly ſolicited that miniſter, with his whole ſuite, to take apartments and bed and board at his houſe, until a proper houſe could be provided by the order of the congreſs. This offer M. Gerard accepted, and continued with him ſome weeks. The French miniſter reſided upwards of 14 months in Philadelphia; during which time General Arnold kept up the moſt friendly and intimate acquaintance with him, and there was a continued interchange of dinners, balls, routes, and concerts: ſo that M. Gerard muſt have believed, that in General Arnold he had found and left one of the warmeſt friends the court of France had in America. He was alſo one of the firſt in congratulating the Chevalier la Luzerne, the ſecond French miniſter. About this time complaints and accuſations were exhibited againſt him by the government of Philadelphia for divers mal-practices; among which charges were, the appropriation of goods and merchandiſe to his own uſe, which he had ſeized as Britiſh property in Philadelphia in July 1778. It was determined by a court-martial, that his conduct was highly reprehenſible; but he was indulgently treated, and was therefore only reprimanded by the commander in chief General Waſhington. It was in theſe circumſtances, the Americans ſaid, bankrupted in reputation and fortune, loaded with debts, and having a growing and expenſive family, that General Arnold firſt turned his thoughts towards joining the royal arms.

348 Different reaſons alleged by the Americans.

America.

349 Actions in South Carolina.

After the defeat of General Gates by Earl Cornwallis, that nobleman exerted himſelf to the utmoſt in extending the progreſs of the Britiſh arms, and with conſiderable effect. But one enterpriſe, which was conducted by Major Ferguſon, proved unſucceſsful. That officer had taken abundant pains to diſcipline ſome of the Tory militia, as they were termed; and with a party of theſe and ſome Britiſh troops, amounting in the whole to about 1400 men, made incurſions into the country. But on the 7th of October he was attacked by a ſuperior body of Americans at a place called King's Mountain, and totally defeated. One hundred and fifty were killed in the action, and 810 made priſoners, of whom 150 were wounded. Fifteen hundred ſtands of arms alſo fell into the hands of the Amerians, whoſe loſs was inconſiderable. But the following month Lieutenant-colonel Tarleton, who continued to exert his uſual activity and bravery, with a party of 170, chiefly cavalry, attacked and defeated General Sumpter, who is ſaid to have had 1000 men, at a place called Black Stocks. Sumpter was wounded, and about 120 of the Americans killed, wounded, or taken. Of the Britiſh troops about 50 were killed and wounded.

350 Capture of Mr Laurens.

On the 3d of September, the Mercury, a congreſs packet, was taken by the Veſtal, Captain Keppel, near Newfoundland. On board this packet was Mr Laurens, late preſident of the congreſs, who was bound on an embaſſy to Holland. He had thrown his papers overboard, but great part of them were recovered without having received much damage. He was brought to London, and examined before the privy council; in conſequence of which he was committed cloſe priſoner to the Tower on the 6th of October, on a charge of high treaſon. His papers were delivered to the miniſtry, and contributed to facilitate a rupture with Holland, as among them was found the ſketch of a treaty of amity and commerce between the republic of Holland and the United States of America.

At the beginning of the year 1781, an affair happened in America, from which expectations were formed by Sir Henry Clinton, that ſome conſiderable advantage might be derived to the royal cauſe. The

long

America.

long continuance of the war, and the difficulties under which the congreſs laboured, had prevented their troops from being properly ſupplied with neceſſaries and conveniences. In conſequence of this, on the 1ſt of January, the American troops that were hutted at Morris Town, and who formed what was called the *Pennſylvania line*, turned out, being in number about 1300, and declared, that they would ſerve no longer, unleſs their grievances were redreſſed, as they had not received their pay, or been furniſhed with the neceſſary clothing or proviſions. It is ſaid that they were ſomewhat inflamed with liquor, in conſequence of rum having been diſtributed to them more liberally than uſual, New-year's-day, being conſidered as a kind of feſtival. A riot enſued, in which an officer was killed, and four wounded; five or ſix of the inſurgents were alſo wounded. They then collected the artillery, ſtores, proviſions, and waggons, and marched out of the camp. They paſſed by the quarters of General Wayne, who ſent a meſſage to them, requeſting them to deſiſt, or the conſequences would prove fatal. They refuſed, and proceeded on their march till the evening, when they took poſt on an advantageous piece of ground, and elected officers from among themſelves. On the ſecond, they marched to Middlebrook, and on the third to Princetown, where they fixed their quarters. On that day a flag of truce was ſent to them from the officers of the American camp, with a meſſage, deſiring to know what were their intentions. Some of them anſwered, that they had already ſerved longer than the time for which they were inliſted, and would ſerve no longer; and others, that they would not return, unleſs their grievances were redreſſed. But at the ſame time they repeatedly, and in the ſtrongeſt terms, denied being influenced by the leaſt diſaffection to the American cauſe, or having any intentions of deſerting to the enemy.

351 Diſcontents among the American troops.

352 Revolt of the Pennſylvania line.

Intelligence of this tranſaction was ſoon conveyed to New York. A large body of Britiſh troops were immediately ordered to hold themſelves in readineſs to move on the ſhorteſt notice, it being hoped that the American revolters might be induced to join the royal army. Meſſengers were alſo ſent to them from General Clinton, acquainting them that they ſhould directly be taken under the protection of the Britiſh government; that they ſhould have a free pardon for all former offences; and that the pay due to them from the congreſs ſhould be faithfully paid them, without any expectation of military ſervice, unleſs it ſhould be voluntary, upon condition of their laying down their arms and returning to their allegiance. It was alſo recommended to them to move beyond the South river; and they were aſſured, that a body of Britiſh troops ſhould be ready to protect them whenever they deſired it. Theſe propoſitions were rejected with diſdain; and they even delivered up two of Sir Henry Clinton's meſſengers to the congreſs. Joſeph Reed, Eſq. preſident of the ſtate of Pennſylvania, afterwards repaired to them at Princetown, and an accommodation took place: ſuch of them as had ſerved out their full terms were permitted to return to their own homes, and others again joined the American army, upon receiving ſatisfactory aſſurances that their grievances ſhould be redreſſed.

353 Ineffectual attempts to induce them to join the royal army.

354 Exertions of Lord Cornwallis in North Carolina.

Lord Cornwallis now began to make very vigorous exertions, in order to penetrate into North Carolina. On the 11th of January his lordſhip's army was in motion, and advancing towards that province; but was ſomewhat delayed by an attempt made by the Americans, under General Morgan, to make themſelves maſters of the valuable diſtrict of Ninety-ſix. In order to prevent this, Lord Cornwallis detached Lieutenant-colonel Tarleton, with 300 cavalry, 300 light infantry, the 7th regiment, the firſt battalion of the 71ſt regiment, and two three-pounders, to oppoſe the progreſs of Morgan, not doubting but that he would be able to perform this ſervice effectually. The Britiſh troops came up with the Americans under General Morgan on the 17th of January. The Americans were drawn up in an open wood, and having been lately joined by ſome militia, were more numerous than the Britiſh troops under Lieutenant-colonel Tarleton; but the latter were ſo much better diſciplined, that they had the utmoſt confidence of obtaining a ſpeedy victory. The attack was begun by the firſt line of infantry, conſiſting of the 7th regiment and a corps of light infantry, with a troop of cavalry placed on each flank. The firſt battalion of the 71ſt and the remainder of the cavalry formed the reſerve. The American line ſoon gave way, and their militia quitted the field; upon which the royal troops, ſuppoſing the victory already gained, engaged with ardour in the purſuit, and were thereby thrown into ſome diſorder. General Morgan's corps, who were ſuppoſed to have been routed, then immediately faced about, and threw in a heavy fire upon the king's troops, which occaſioned the utmoſt confuſion amongſt them; and they were at length totally defeated by the Americans. Four hundred of the Britiſh infantry were either killed, wounded, or taken priſoners: the loſs of the cavalry was much leſs conſiderable; but the two three-pounders fell into the hands of the Americans, together with the colours of the 7th regiment; and all the detachment of royal artillery were either killed or wounded in defence of their colours. Lieutenant-colonel Tarleton, however, made another effort: having aſſembled about 50 of his cavalry, with which he charged and repulſed Colonel Waſhington's horſe, retook his baggage, and killed the Americans who were appointed to guard it. He then retreated to Hamilton's ford, near the mouth of Bullock's creek, carrying with him part of his baggage, and deſtroying the remainder.

America.

355 Defeat of Colonel Tarleton.

356 Operations in conſequence of that event.

This defeat of the troops under Tarleton was a ſevere ſtroke to Lord Cornwallis, as the loſs of his light infantry was a great diſadvantage to him. The day after that event, he employed in collecting the remains of Tarleton's corps, and in endeavouring to form a junction with General Leſlie, who had been ordered to march towards him with a body of Britiſh troops from Wyneſborough. Conſiderable exertions were then made by part of the army, without baggage, to retake the priſoners in the hands of the Americans, and to intercept General Morgan's corps on its retreat to the Catawba. But that American officer, after his defeat of Tarleton, had made forced marches up into the country, and croſſed the Catawba the evening before a great rain, which ſwelled the river to ſuch a degree, as to prevent the royal army from croſſing for ſeveral days; during which time the Britiſh priſoners were got over the Yadkin; whence they proceeded to Dan

America.

River, which they alſo paſſed, and on the 14th of February had reached Court-houſe in the province of Virginia.

557 Lord Cornwallis marches through North Carolina.

Lord Cornwallis employed a halt of two days in collecting ſome flour, and in deſtroying ſuperfluous baggage and all his waggons, excepting thoſe laden with hoſpital ſtores, ſalt, and ammunition, and four reſerved empty in readineſs for ſick or wounded. Being thus freed from all unneceſſary encumbrances, he marched through North Carolina with great rapidity, and penetrated to the remoteſt extremities of that province on the banks of the Dan. His progreſs was ſometimes impeded by parties of the militia, and ſome ſkirmiſhes enſued, but he met with no very conſiderable oppoſition. On the firſt of February, the king's troops croſſed the Catawba at M'Cowan's Ford, where General Davidſon, with a party of American militia, was poſted in order to oppoſe their paſſage; but he falling by the firſt diſcharge, the royal troops made good their landing, and the militia retreated. When Lord Cornwallis arrived at Hillſborough, he erected the king's ſtandard, and invited, by proclamation, all loyal ſubjects to repair to it, and to ſtand forth and take an active part in aſſiſting his lordſhip to reſtore order and government. He had been taught to believe that the king's friends were numerous in that part of the country: but the event did not confirm the truth of the repreſentations that had been given. The royaliſts were but few in number, and ſome of them too timid to join the king's ſtandard. There were, indeed, about 200 who were proceeding to Hillſborough, under Colonel Pyle, in order to avow their attachment to the royal cauſe; but they were met accidentally, and ſurrounded by a detachment from the American army, by whom a number of them are ſaid to have been killed when they were begging for quarter, without making the leaſt reſiſtance. Meanwhile General Greene was marching with great expedition with the troops under his command, in order to form a junction with other corps of American troops, that he might thereby be enabled to put ſome effectual ſtop to the progreſs of Lord Cornwallis.

358 Large quantities of American ſtores deſtroyed by Arnold.

In other places ſome conſiderable advantages were obtained by the royal arms. On the 4th of January, ſome ſhips of war, with a number of tranſports, on board which was a large body of troops under the command of Brigadier-general Arnold, arrived at Weſtover, about 140 miles from the capes of Virginia, where the troops immediately landed and marched to Richmond; which they reached without oppoſition, the militia that was collected having retreated on their approach. Lieutenant-colonel Simcoe marched from hence with a detachment of the Britiſh troops to Weſtham, where they deſtroyed one of the fineſt founderies for cannon in America, and a large quantity of ſtores and cannon. General Arnold, on his arrival at Richmond, found there large quantities of ſalt, rum, ſail-cloth, tobacco, and other merchandiſe; and that part of theſe commodities which was public property he deſtroyed. The Britiſh troops afterwards attacked and diſperſed ſome ſmall parties of the Americans, took ſome ſtores and a few pieces of cannon, and on the 20th of the ſame month marched into Portſmouth. On the 25th Captain Barclay, with ſeveral ſhips of war, and a body of troops under the command of Major Craig, arrived in Cape Fear river. The troops landed about nine miles from Wilmington, and on the 28th entered that town. It was underſtood that their having poſſeſſion of that town, and being maſters of Cape Fear river, would be productive of very beneficial effects to Lord Cornwallis's army. America.

General Greene having effected a junction about the 10th of March with a continental regiment of what were called *eighteen months men*, and two large bodies of militia belonging to Virginia and North Carolina, formed a reſolution to attack the Britiſh troops under the command of Lord Cornwallis. The American army marched from the High Rock Ford on the 12th of the month, and on the 14th arrived at Guildford. Lord Cornwallis, from the information he had received of the motions of the American general, concluded what were his deſigns. As they approached more nearly to each other, a few ſkirmiſhes enſued between ſome advanced parties, in which the king's troops had the advantage. On the morning of the 15th, Lord Cornwallis marched with his troops at daybreak in order to meet the Americans, or to attack them in their encampment. About four miles from Guildford, the advanced guard of the Britiſh army, commanded by Lieutenant-colonel Tarleton, fell in with a corps of the Americans, conſiſting of Lieutenant-colonel Lee's legion, ſome Black Mountain men and Virginian militia, with whom he had a ſevere ſkirmiſh, but whom he at length obliged to retreat. 359 Different ſkirmiſhes.

The greater part of the country in which the action happened is a wilderneſs, with a few cleared fields interſperſed. The American army, which was ſuperior to the royal in point of numbers, was poſted on a riſing ground about a mile and a half from Guildford court-houſe. It was drawn up in three lines: the front line was compoſed of the North Carolinian militia, under the command of the generals Butler and Eaton; the ſecond line of Virginian militia, commanded by the generals Stephens and Lawſon, forming two brigades; the third line, conſiſting of two brigades, one of Virginia and one of Maryland continental troops, commanded by General Huger and Colonel Williams. Lieutenant-colonel Waſhington, with the dragoons of the firſt and third regiments, a detachment of light infantry compoſed of continental troops, and a regiment of riflemen under Colonel Lynch, formed a corps of obſervation for the ſecurity of their right flank. Lieutenant-colonel Lee, with his legion, a detachment of light infantry, and a corps of riflemen under Colonel Campbell, formed a corps of obſervation for the ſecurity of their left flank. The attack of the American army was directed to be made by Lord Cornwallis in the following order: On the right, the regiment of Boſe and the 71ſt regiment, led by Major-general Leſlie, and ſupported by the firſt battalion of guards; on the left, the 23d and 33d regiments, led by Lieutenant-colonel Webſter, and ſupported by the grenadiers and ſecond battalion of guards commanded by Brigadier-general O'Hara; the Yagers and light infantry of the guards remained in a wood on the left of the guns, and the cavalry in the road, ready to act as circumſtances might require. 360 Battle at Guildford.

About half an hour after one in the afternoon, the action commenced by a cannonade, which laſted about twenty minutes; when the Britiſh troops advanced in three

America.

three columns and attacked the North Carolinian brigades with great vigour, and ſoon obliged part of theſe troops, who behaved very ill, to quit the field; but the Virginian militia gave them a warm reception, and kept up a heavy fire for a long time, till being beaten back, the action became general almoſt everywhere. The American corps under the lieutenant-colonels Waſhington and Lee were alſo warmly engaged, and did conſiderable execution. Lieutenant-colonel Tarleton had directions to keep his cavalry compact, and not to charge without poſitive orders, excepting to protect any of the corps from the moſt evident danger of being defeated. The exceſſive thickneſs of the woods rendered the Britiſh bayonets of little uſe, and enabled the broken corps of Americans to make frequent ſtands with an irregular fire. The ſecond battalion of the guards firſt gained the clear ground near Guildford court-houſe, and found a corps of continental infantry, ſuperior in number, formed in an open field on the left of the road. Deſirous of ſignalizing themſelves, they immediately attacked and ſoon defeated them, taking two ſix-pounders: but as they purſued the Americans into the wood with too much ardour, they were thrown into confuſion by a heavy fire, and inſtantly charged and driven back into the field by Lieutenant-colonel Waſhington's dragoons, with the loſs of the ſix-pounders they had taken. But the American cavalry were afterwards repulſed, and the two ſix-pounders again fell into the hands of the Britiſh troops. The ſpirited exertions of Brigadier-general O'Hara and of Lieutenant-colonel Tarleton, greatly contributed to bring the action to a termination. The Britiſh troops having at length broken the ſecond Maryland regiment, and turned the left flank of the Americans, got into the rear of the Virginian brigade, and appeared to be gaining their right, which would have encircled the whole of the continental troops, when General Greene thought it prudent to order a retreat. Many of the American militia diſperſed in the woods; but the continental troops retreated in good order to the Reedy Fork river, and croſſed at the ford about three miles from the field of action, and there halted. When they had collected their ſtragglers, they retreated to the iron works, 10 miles diſtant from Guildford, where they encamped. They loſt their artillery and two waggons laden with ammunition. It was a hard-fought action, and laſted an hour and a half. Of the Britiſh troops, the loſs, as ſtated by Lord Cornwallis, was 532 killed, wounded, and miſſing. General Greene, in his account of the action tranſmitted to the congreſs, ſtated the loſs of the continental troops to amount to 329 killed, wounded, and miſſing; but he made no eſtimate of the loſs of the militia. Lieutenant-colonel Stuart was killed in the action; and Lieutenant-colonel Webſter, and the captains Schutz, Maynard, and Goodriche, died of the wounds that they received in it. Brigadier-general O'Hara, Brigadier-general Howard, and Lieutenant-colonel Tarleton, were alſo wounded. Of the Americans, the principal officer killed was Major Anderſon of the Maryland line, and the generals Stephens and Huger were wounded.

361 The Americans defeated.

362 Hardſhips endured by the Britiſh troops.

The Britiſh troops underwent great hardſhips in the courſe of this campaign; and in a letter of Lord Cornwallis's to Lord George Germain, dated March 17th, he obſerved, that "the ſoldiers had been two days without bread." His lordſhip quitted Guildford three days after the battle which was fought in that place; and on the 7th of April arrived in the neighbourhood of Wilmington. Soon after, General Greene, notwithſtanding his late defeat, endeavoured to make ſome vigorous attempts againſt the king's forces in South Carolina. Lord Rawdon had been appointed to defend the poſt of Camden, with about 800 Britiſh and provincials; and on the 19th of April General Greene appeared before that place with a large body of continentals and militia. He found it, however, impoſſible to attempt to ſtorm the town with any proſpect of ſucceſs; and therefore endeavoured to take ſuch a poſition as ſhould induce the Britiſh troops to ſally from their works. He poſted the Americans about a mile from the town, on an eminence which was covered with woods, and flanked on the left by an impaſſable ſwamp. But on the morning of the 25th, Lord Rawdon marched out of Camden, and with great gallantry attacked General Greene in his camp. The Americans made a vigorous reſiſtance, but were at laſt compelled to give way; and the purſuit is ſaid to have been continued three miles. For ſome time after the action commenced, General Gates entertained great hopes of defeating the Britiſh troops; in which, as the Americans were ſuperior in point of numbers, he would probably have ſucceeded, had not ſome capital military errors been committed by one or two of the officers who ſerved under him. On the American ſide Colonel Waſhington had behaved extremely well in this action, having made upwards of 200 of the Engliſh priſoners, with ten or twelve officers, before he perceived that the Americans were abandoning the field of battle. The loſs of the Engliſh was about one hundred killed and wounded. Upwards of 100 of the Americans were taken priſoners; and, according to the account publiſhed by General Greene, they had 126 killed and wounded. After this action, Greene retreated to Rugeley's mills, 12 miles from Camden, in order to collect his troops and wait for reinforcements.

America.

363 General Greene attacked in his camp by Lord Rawdon, and defeated.

Notwithſtanding the advantage which Lord Rawdon had obtained over General Greene at Camden, that nobleman ſoon after found it neceſſary to quit that poſt; and the Americans made themſelves maſters of ſeveral other poſts that were occupied by the king's troops, and the garriſons of which were obliged to ſurrender themſelves priſoners of war. Theſe troops were afterwards exchanged under a cartel which took place between Lord Cornwallis and General Greene for the releaſe of all priſoners of war, in the ſouthern diſtrict. After theſe events, General Greene laid cloſe ſiege to Ninety-ſix, which was conſidered as the moſt commanding and important of all the poſts in the back country; and on the 19th of June he attempted to ſtorm the garriſon, but was repulſed by the gallantry of the Britiſh troops, with the loſs, as it is ſaid, of 75 killed and 150 wounded. General Greene then raiſed the ſiege, and retired with his army behind the Saluda, to a ſtrong ſituation within 16 miles of Ninety-ſix.

364 Afterwards lays ſiege to Ninety-ſix; but is repulſed.

On the 18th of April a large body of Britiſh troops, under the command of Major-general Philips and Brigadier-general Arnold, embarked at Portſmouth in Virginia, in order to proceed on an expedition for the purpoſe of deſtroying ſome of the American ſtores. A

party.

America. party of light infantry were ſent ten or twelve miles up the Chickahomany; where they deſtroyed ſeveral armed ſhips, ſundry warehouſes, and the American ſtate ſhip yards. At Peterſburgh, the Engliſh deſtroyed 4000 hogſheads of tobacco, one ſhip, and a number of ſmall veſſels on the ſtocks and in the river. At Cheſterfield court-houſe, they burnt a range of barracks for 2000 men and 300 barrels of flour. At a place called *Oſborn's*, they made themſelves maſters of ſeveral veſſels loaded with cordage and flour, and deſtroyed about 2000 hogſheads of tobacco, and ſundry veſſels were ſunk and burnt. At Warwick, they burnt a magazine of 500 barrels of flour, ſome fine mills belonging to Colonel Carey, a large range of public rope-walks and ſtorehouſes, tan and bark houſes full of hides and bark, and great quantities of tobacco. A like deſtruction of ſtores and goods was made in other parts of Virginia.

365 Deſtruction of American ſtores.

From the account already given of ſome of the principal military operations of the preſent year in America, it appears, that though conſiderable advantages had been gained by the royal troops, yet no event had taken place from which it could rationally be expected that the final termination of the war would be favourable to Great Britain. It was alſo a diſadvantageous circumſtance, that there was a miſunderſtanding between Admiral Arbuthnot and Sir Henry Clinton, and a mutual diſapprobation of each other's conduct. This was manifeſt from their deſpatches to government, and eſpecially from thoſe of General Clinton, whoſe expreſſions reſpecting the conduct of the admiral were by no means equivocal.

366 Unlucky miſunderſtanding between the Britiſh admiral and general.

On the 16th of March 1781, a partial action happened off the capes of Virginia, between the fleet under Admiral Arbuthnot, conſiſting of ſeven ſhips of the line and one fifty-gun ſhip, and a French ſquadron, conſiſting of the ſame number of ſhips of the line and one forty-gun ſhip. Some of the ſhips in both fleets received conſiderable damage in the action, and the loſs of the Engliſh was 30 killed and 73 wounded; but no ſhip was taken on either ſide. The Britiſh fleet had, however, conſiderably the advantage; as the French were obliged to retire, and were ſuppoſed to be prevented by this action from carrying troops up the Cheſapeak, in order to attack General Arnold and impede the progreſs of Lord Cornwallis. But it was an unfortunate circumſtance, that ſome time before this engagement, the Romulus, a ſhip of 44 guns, was captured by the French off the capes of Virginia.

367 Action between the Britiſh and French fleets off the capes of Virginia.

Lord Cornwallis, after his victory over General Greene at Guildford, proceeded, as we have ſeen, to Wilmington, where he arrived on the 7th of April. But before he reached that place, he publiſhed a proclamation, calling upon all loyal ſubjects to ſtand forth and take an active part in reſtoring good order and government; and declaring to all perſons who had engaged in the preſent rebellion againſt his majeſty's authority, but who were now convinced of their error, and deſirous of returning to their duty and allegiance, that if they would ſurrender themſelves with their arms and ammunition at head-quarters, or to the officer commanding in the diſtrict contiguous to their reſpective places of reſidence, on or before the 20th of that month, they would be permitted to return to their homes upon giving a military parole; they would be protected in their perſons and properties from all ſorts of violence from the Britiſh troops; and would be reſtored as ſoon as poſſible to all the privileges of legal and conſtitutional government. But it does not appear that any conſiderable number of the Americans were allured by theſe promiſes to give any evidences of their attachment to the royal cauſe.

368 Proclamation by Lord Cornwallis.

America.

On the 20th of May, his lordſhip arrived at Peterſburgh in Virginia, where he joined a body of Britiſh troops that had been under the command of Major-general Philips; but the command of which, in conſequence of the death of that officer, had devolved upon Brigadier-general Arnold. Before this junction he had encountered conſiderable inconveniences from the difficulty of procuring proviſions and forage; ſo that in a letter to Sir Henry Clinton, he informed him, that his cavalry wanted every thing, and his infantry every thing but ſhoes. He added, that he had experienced the diſtreſſes of marching hundreds of miles in a country chiefly hoſtile, without one active or uſeful friend, without intelligence, and without communication with any part of the country.

369 Different actions.

On the 26th of June, about ſix miles from Williamſburgh, Lieutenant-colonel Simcoe, and 350 of the queen's rangers, with 80 mounted yagers, were attacked by a much ſuperior body of the Americans; but whom they repulſed with great gallantry and with equal ſucceſs, making four officers and twenty private men priſoners. The loſs of the Americans in this action is ſaid to have been upwards of 120, and that of the Britiſh troops not more than 40.

On the 6th of July an action happened near the Green Springs in Virginia, between a reconnoitring party of the Americans under General Wayne, amounting to about 800, and a large part of the Britiſh army under Lord Cornwallis; in which the Americans had 127 killed and wounded, and the loſs of the royal troops is ſuppoſed to have been conſiderably greater. It was an action in which no ſmall degree of military ſkill and courage was exhibited by the Americans. In a variety of ſkirmiſhes, the marquis La Fayette very much diſtinguiſhed himſelf, and diſplayed the utmoſt ardour in the American cauſe.

370 General Greene defeated by Col. Stuart.

In South Carolina, an action happened on the 9th of September near the Eata Springs, between a large body of Britiſh troops under the command of Lieutenant-colonel Stuart and a much ſuperior body of Americans, ſaid to amount to more than 4000, under the command of General Greene. It was an obſtinate engagement, and laſted near two hours; but the Americans were defeated, and two of their ſix-pounders fell into the hands of the Engliſh. The loſs, however, of the royal troops was very conſiderable; amounting to more than 400 killed and wounded, and upwards of 200 miſſing.

371 Expedition againſt New London.

In the courſe of the ſame month, General Arnold was ſent on an expedition againſt New London, in Connecticut, where he deſtroyed a great part of the ſhipping, and an immenſe quantity of naval ſtores, European manufactures, and Eaſt and Weſt India commodities. The town itſelf was alſo burnt, which is ſaid to have been unavoidable, on account of the exploſions of great quantities of gunpowder which happened to be in the ſtorehouſes that were ſet on fire. A fort, of which it was thought neceſſary to gain poſſeſſion in this

America. this expedition, was not taken without conſiderable loſs. This was Fort Griſwold; which was defended by the Americans with great gallantry, and the aſſault was made by the Engliſh with equal bravery. The Britiſh troops entered the works with fixed bayonets, and were oppoſed with great vigour by the garriſon with long ſpears. After a moſt obſtinate defence of near forty minutes, the aſſailants gained poſſeſſion of the fort, in which 85 Americans were found dead, and 60 wounded, moſt of them mortally. Of the Britiſh troops Major Montgomery was killed by a ſpear in entering the American works; and 192 men were alſo killed and wounded in this expedition.

372 Critical ſituation of Lord Cornwallis.

Notwithſtanding the ſignal advantages that Lord Cornwallis had obtained over the Americans, his ſituation in Virginia began by degrees to be very critical; and the rather becauſe he did not receive thoſe reinforcements and ſupplies from Sir Henry Clinton, of which he had formed expectations, and which he conceived to be neceſſary to the ſucceſs of his operations. Indeed, the commander in chief was prevented from ſending thoſe reinforcements to Lord Cornwallis which he otherwiſe might have done, by his fears reſpecting New York, againſt which he entertained great apprehenſions that General Waſhington intended to make a very formidable attack. In fact, that able American general appears to have taken much pains, and to have employed great fineſſe, in order to lead Sir Henry Clinton to entertain this imagination. Letters, expreſſive of this intention, fell into the hands of Sir Henry, which were manifeſtly written with a deſign that they ſhould be intercepted, and only with a view to amuſe and deceive the Britiſh general. The project was ſucceſsful; and by a variety of judicious military manœuvres, in which he completely out-generalled the Britiſh commander, he increaſed his apprehenſions about New York, and prevented him from ſending proper aſſiſtance to Lord Cornwallis. Having for a conſiderable time kept Sir Henry Clinton in perpetual alarm in New York, though with an army much inferior to the garriſon of that city, General Waſhington ſuddenly quitted his camp at White Plains, croſſed the Delaware, and marched towards Virginia, apparently with a deſign to attack Lord Cornwallis. Sir Henry Clinton then received information, that the count de Graſſe, with a large French fleet, was expected every moment in the Cheſapeak, in order to co-operate with General Waſhington. He immediately endeavoured, both by land and water, to communicate this information to Lord Cornwallis; and alſo ſent him aſſurances that he would either reinforce him by every poſſible means in his power, or make the beſt diverſion he could in his favour. In the mean time, Lord Cornwallis had taken poſſeſſion of the poſts of York Town and Gloucester in Virginia, where he fortified himſelf in the beſt manner he was able.

373 Ineffectual attempts to afford him aſſiſtance.

On the 28th of Auguſt, Sir Samuel Hood, with a ſquadron from the Weſt Indies, joined the ſquadron under the command of Admiral Graves before New York. It was then neceſſary, on account of the ſituation of Lord Cornwallis, that they ſhould immediately proceed to the Cheſapeak; but ſome time appears to have been needleſsly loſt, though Admiral Hood was extremely anxious that no delay might be made. They arrived, however, in the Cheſapeak, on the 5th of September, with 19 ſhips of the line; where they found the count de Graſſe, who had anchored in that bay on the 30th of Auguſt, with 24 ſhips of the line. The French admiral had previouſly landed a large body of troops, which had been brought from Rhode iſland, and who immediately marched to join the American army under General Waſhington. The Britiſh and French fleets came to an action on the ſame day in which the former arrived in the Cheſapeak. On board the Britiſh fleet 90 were killed and 246 wounded; ſome of the ſhips were greatly damaged in the engagement, and the Terrible, a 74 gun ſhip, was ſo much ſhattered, that it was afterwards found neceſſary to ſet fire to it. That this action had not been favourable to the Engliſh, was manifeſt from the event: the fleets continued in ſight of each other for five days ſucceſſively, and ſometimes were very near; but at length the French fleet all anchored within the Cape, ſo as to block up the paſſage. Admiral Graves, who was the commander in chief, then called a council of war, in which it was reſolved that the fleet ſhould proceed to New York, that the ſhips might be there put into the beſt ſtate for the ſervice: and thus were the French left maſters of the navigation of the Cheſapeak. America.

374 Action between the Britiſh and French fleets off the Cheſapeak.

Before the news of this action had reached New York, a council of war was held there, in which it was reſolved, that 5000 men ſhould be embarked on board the king's ſhips, in order to proceed to the aſſiſtance of Lord Cornwallis. But when it was known that the French were abſolute maſters of the navigation of the Cheſapeak, it was thought inexpedient to ſend off that reinforcement immediately. In another council of war, it was reſolved, that as Lord Cornwallis had proviſions to laſt him till the end of October, it was adviſable to wait for more favourable accounts from Admiral Graves, or for the arrival of Admiral Digby, who was expected with three ſhips of the line. It was not then known at New York, that Admiral Graves had determined to return with the whole fleet to that port.

375 Danger of Lord Cornwallis increaſed.

In the mean time, the moſt effectual meaſures were adopted by General Waſhington for ſurrounding the Britiſh army under Lord Cornwallis. A large body of French troops, under the command of Lieutenant-general the count de Rochambeau, with a very conſiderable train of artillery, aſſiſted in the enterpriſe. The Americans amounted to near 8000 continentals and 5000 militia. General Waſhington was inveſted with the authority of commander in chief of theſe combined forces of America and France. On the 29th of September, the inveſtment of York Town was complete, and the Britiſh army quite blocked up. The day following, Sir Henry Clinton wrote a letter to Lord Cornwallis, containing aſſurances that he would do every thing in his power to relieve him, and ſome information concerning the ſteps that would be taken for that purpoſe. A duplicate of this letter was ſent to his lordſhip by Major Cochran on the 3d of October. That gentleman, who was a very gallant officer, went in a veſſel to the capes, and made his way to Lord Cornwallis, through the whole French fleet, in an open boat. He got to York Town on the 10th of the month; and ſoon after his arrival had his head carried off by a cannon ball.

After the return of Admiral Graves to New York, a council of war was held, conſiſting of flag and gene-

rals

America.

ral officers; in which it was resolved, that a large body of troops should be embarked on board the king's ships as soon as they were refitted, and that the exertions of both fleet and army should be made in order to form a junction with Lord Cornwallis. Sir Henry Clinton himself embarked on board the fleet, with upwards of 7000 troops, on the 18th; they arrived off Cape Charles, at the entrance of the Chesapeak, on the 24th, where they received intelligence that Lord Cornwallis had been obliged to capitulate five days before.

376 Late arrival of General Clinton.

377 Lord Cornwallis's army obliged to surrender.

It was on the 19th of October that Lord Cornwallis surrendered himself and his whole army, by capitulation, prisoners to the combined armies of America and France, under the command of General Washington. He made a defence suitable to the character he had before acquired for courage and military skill; but was compelled to submit to untoward circumstances and superior numbers. It was agreed by the articles of capitulation, that the British troops were to be prisoners to the United States of America, and the seamen to the French king, to whose officers also the British vessels found at York Town and Gloucester were to be delivered up. The British prisoners amounted to more than 6000; but many of them, at the time of surrender, were incapable of duty. A considerable number of cannon, and a large quantity of military stores, fell into the hands of the Americans on this occasion.

As no rational expectation now remained of a subjugation of the colonies, the military operations that succeeded in America were of little consequence. Some inconsiderable actions and skirmishes did indeed take place after that event; in which the refugees chiefly distinguished themselves, and discovered an inveterate animosity against the Americans. On the 5th of May 1782, Sir Guy Carleton arrived at New York, being appointed to the command of the British troops in America in the room of Sir Henry Clinton. Two days after his arrival, he wrote a letter to General Washington, acquainting him, that Admiral Digby was joined with himself in a commission to treat of peace with the people of America; transmitting to him, at the same time, some papers tending to manifest the pacific disposition of the government and people of Britain towards those of America. He also desired a passport for Mr Morgan, who was appointed to transmit a similar letter of compliment to the congress. General Washington declined signing any passport till he had taken the opinion of congress upon that measure; and by them he was directed to refuse any passport for such a purpose. However, another letter was sent to General Washington, dated the 2d of August, and signed by Sir Guy Carleton and Rear-admiral Digby, in which they informed him, that they were acquainted by authority that negotiations for a general peace had already commenced at Paris; that Mr Grenville was invested with full powers to treat with all the parties at war; and was then at Paris in the execution of his commission. They farther informed him, that his majesty, in order to remove all obstacles to that peace which he so ardently wished to restore, had commanded his ministers to direct Mr Grenville, that the independency of the thirteen provinces should be proposed by him, in the first instance, instead of making it the condition of a general treaty. But some jealousies were entertained by the Americans, that it was the design of the British court either to disunite them, or to bring them to treat of a peace separately from their ally the king of France: they therefore resolved, that any man, or body of men, who should presume to make any separate or partial convention or agreement with the king of Great Britain, or with any commissioner or commissioners under the crown of Great Britain, ought to be considered and treated as open and avowed enemies of the United States of America; and also that those states could not with propriety hold any conference or treaty with any commissioners on the part of Great Britain, unless they should, as a preliminary thereto, either withdraw their fleets and armies, or else, in positive or express terms, acknowledge the independence of the said states. They likewise resolved, that any propositions which might be made by the court of Great Britain, in any manner tending to violate the treaty subsisting between them and the king of France, ought to be treated with every mark of indignity and contempt.

America.

379 Resolutions of congress in consequence thereof.

380 Different places evacuated by the king's troops.

In the month of June, the town of Savannah, and the whole province of Georgia, were evacuated by the king's troops; as was also Charlestown, South Carolina, about the close of the year. In the mean time, the negotiations for peace being continued, provisional articles of peace were signed at Paris on the 30th of November by the commissioner of his Britannic Majesty and the American commissioners, in which his majesty acknowledged the united colonies of New Hampshire, Massachusets Bay, Rhode Island and Providence Plantations, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia, to be "free, sovereign, and independent states." They had constituted themselves such on the 4th of July 1776; they had been acknowledged such by the French king on the 30th of January 1778, when he concluded with them a treaty of amity and commerce; Holland had acknowledged them as such April 19th 1782; Sweden acknowledged them as such February 5th 1783; Denmark the 25th February, Spain in March, and Russia in July, the same year.

381 Independency of America acknowledged.

According to the report of the committee appointed for that purpose, the *Foreign Debt* of the United States incurred by the war, amounted to 7,885,085 dollars, and the *Domestic Debt* to 34,115,290, total at 4s. 6d. each, equal to 9,450,084 sterling, the interest of which at 6 *per cent.* is 567,005l. But the cost to Great Britain is moderately computed at 115,654,914l. and the additional annual burden by it 4,557,575l. since January 1775. As to the loss of men during the unhappy war, the States of America, according to authentic estimates, lost by the sword and in prison near 80,000 men; and by the British returns at New York, the number of soldiers killed in the service amounted to 43,633.

382 Loss of men and treasure by the war.

Such was the end of the contest between Great Britain and America: A contest in which the latter attained to an independent rank among the nations, that may be productive of more important consequences than can yet be foreseen; and in which the former, happily for herself, was forced to relinquish a sovereignty that served only to repress her own internal industry

383 General consequences.

378 Sir Guy Carleton arrives at New York, with powers to treat of peace.

America

industry, and retard her prosperity. She has, in the event, only suffered a diminution of unwieldy empire, which has been more than compensated by an increase of population, commerce, revenues, and wealth.

384 Constitution of the American States.

As to the general constitution of the American States:—By the acts of confederation and perpetual union, each of the colonies contracted a reciprocal treaty of alliance and friendship for their common defence, for the maintenance of their liberties, and for their general and mutual advantage; obliging themselves to assist each other against all violence that might threaten all, or any one of them, and to repel in common all the attacks that might be levelled against all, or any one of them, on account of religion, sovereignty, commerce, or under any other pretext whatsoever. Each of the colonies reserved to themselves alone the exclusive right of regulating their internal government, and of framing laws in all matters not included in the articles of confederation.—But for the more convenient management of the general interest of the United States, it was determined, that delegates should be annually appointed in such manner as the legislature of each state should direct, to meet in congress on the first Monday of November of every year, with a power reserved to each state to recall its delegates, or any of them, at any time within the year, and to send others in their stead for the remainder of the year. No state is to be represented in congress by less than two, nor more than seven members; and no person is capable of being a delegate for more than three years, in any term of six years; nor is any person, being a delegate, capable of holding any office under the United States, for which he, or any other for his benefit, shall receive any salary, fees, or emolument of any kind. In determining questions in the United States, in congress assembled, each state is to have one vote. Every state is to abide by the determinations of the United States in congress assembled, on all questions which are submitted to them by the confederation. The articles of confederation are to be inviolably observed by every state, and the union is to be perpetual; nor is any alteration, at any time hereafter, to be made in any of them, unless such alteration be agreed to in a congress of the United States, and be afterwards confirmed by the legislature of every state.

385 Immediate consequences of the revolution to America.

In the mean time, the return of peace was very far from immediately producing in the United States, all that tranquillity and prosperity, which the eager supporters of the revolution had promised to themselves and their country. The public finances were in such a state of entire derangement, as rendered it utterly impossible to make payment of the arrears due to the army. Accordingly the whole officers and soldiers that composed this body, which at the end of a long war, is always so formidable and dangerous to a free state, were extremely discontented. Attempts were made, by anonymous publications, to inflame their minds, which were already sufficiently agitated, and to induce them to unite in redressing their own grievances, while they had still arms in their hands. During the time that matters were in this state, had the commander in chief of the army been a less virtuous man, it is not impossible, that the freedom of America might have been overturned, and these colonies might have exchanged the mild government of Britain, for a military usurpation. It immediately appeared, however, that General Washington was greatly superior to the temptations of vulgar ambition. He summoned a meeting of the general and field officers, with a deputation of an officer from each company, and a proper representation from the staff of the army. Previous to the meeting, he sent for each officer, and enlarged in private on the fatal consequences to their country, and on the loss of reputation to the whole army, which would result from intemperate resolutions. When the day arrived on which they had been summoned to assemble, the 15th of March 1783, he addressed them in a speech, well calculated to produce calmness and moderation. He promised to exert in their favour his whole influence, requesting them to rely on the public faith which had been pledged to them, and he conjured them "as they valued their honour, as they respected the rights of humanity, and as they regarded the military and national character of America; to express their utmost detestation of the men, who were attempting to open the flood-gates of civil discord, and to deluge their rising empire with blood." Having spoken thus, he retired. No reply was made to his speech, and while the assembly hesitated, the friends of tranquillity seized the happy moment, and proposed a resolution, which was carried without opposition, that no circumstances of distress or danger should induce the American army to sully their reputation by sedition, or to distrust the justice of their country.

America.

386 Dismission of the army.

After all, however, the government was only able to give to the army four months pay, in place of the arrears of several years. Notwithstanding this great deficiency, the soldiers suffered themselves, with tolerable quietness, to be disbanded towards the fall of the year, care having been previously taken to get quit of great numbers of the men individually, by granting leave of absence to all that applied for it; in consequence of which, this dangerous body of veteran troops was soon scattered and lost in the immense extent of the American territory. The commander in chief proceeded to Annapolis, then the seat of congress, and on the 23d of December, resigned his commission to the president at a public audience. He immediately retired as a private person, to his farm of Mount Vernon, on the banks of the Potowmack in Virginia.

387 Embarrassments of the Americans.

But here the troubles of the country seemed only to commence. During the early periods of the revolution, amidst the dangers of the war, and while the public zeal for independence remained ardent, the defects of the form of government were not felt. From the mere strength which the public opinion conferred, the congress was able to levy armies, to raise extensive loans, and to conduct the war with vigour; but when immediate danger was removed, and the selfish passions had leisure to operate, its powers were soon found altogether inadequate to provide for the public welfare. Articles of confederation had indeed been entered into, with a view to confer more extensive powers upon congress, but still its authority was extremely defective. By these articles, it was entitled to require from the different states, the sums necessary for the war, and the public expences of the union: But as it had no power to legislate over individuals, but only over the states as political bodies, and possessed no means of coercion over such states as should neglect to make good the

America. payments with which they were aſſeſſed, the revenue of the union was ill paid, and all its exertions were enfeebled. The congreſs had no power of making general commercial regulations to bind the whole ſtates, nor could it even interfere to prevent their waging war againſt each other if they thought fit. Hence, from the mutual jealouſies of thirteen ſeparate legiſlatures, the moſt diſcordant regulations aroſe.

As ſoon as the war was at an end, Great Britain naturally treated the American ſtates as a foreign nation, and prohibited, under pain of confiſcation, any of their commodities to be conveyed to the Britiſh Weſt India iſlands, unleſs in Britiſh built veſſels, navigated by Britiſh mariners. Thus the Americans were excluded from that branch of commerce in which they had formerly obtained moſt of the ready money or ſpecie that came into their country. With a view to induce Great Britain to relax the ſeverity of this and other regulations, injurious to their commerce, ſome of the American ſtates impoſed heavy taxes upon goods of Britiſh manufacture. Other ſtates took advantage of this circumſtance, to invite the Britiſh merchants to frequent their ports excluſively, and not only received all Britiſh commodities free from any duty, but they ſuffered their people to engage in a ſmuggling traffic, for the tranſportation of theſe commodities into the ſtates in which they had been heavily taxed. Thus the ſame commodities which were ſeverely taxed in Philadelphia, were imported without difficulty or expence into the Jerſeys, on the oppoſite ſide of the Delaware, and were daily conveyed by illicit traders acroſs the river. Hence aroſe a ſpirit of commercial jealouſy, and a warfare between the different legiſlatures, which filled the whole country with a degree of diſſenſion, little ſhort of hoſtility.

The Americans were at the ſame time in a great meaſure excluded from the trade to the Mediterranean. They could no longer navigate that ſea with ſafety, a privilege which as Britiſh ſubjects they had always enjoyed. As the congreſs poſſeſſed no funds, wherewith to enter into a compromiſe with the piratical ſtates of Barbary, to whom all Europe pays tribute, the American veſſels were conſtantly expoſed to danger. Being unable to defend themſelves from the corſairs, they were obliged either to relinquiſh the beneficial trade which they had formerly poſſeſſed in that quarter, or to enſure it at a ruinous premium.

Independent of theſe partial evils, the general balance of trade ſpeedily became extremely unfavourable to the United States. The debts due from the merchants to Great Britain, the payment of which had been prohibited by congreſs during the war, were now impatiently demanded. The American merchants were almoſt univerſally ſued, and the remnant of their effects ſeized by the agents of Britiſh houſes. To relieve their own diſtreſs, they proceeded againſt the retailers, who had been unable to pay them during the war, and to whom peace had not yet reſtored proſperity. In this way the old traders were almoſt univerſally ruined, and compelled to abandon all commercial concerns. At the ſame time, however, as the ravages of armies and the want of a free communication between Europe and America during the war, had multiplied the wants of the latter, an inundation of European manufactures, was one of the firſt effects that followed the eſtabliſhment of peace. Theſe were purchaſed by the Americans far beyond their means of payment, and thus almoſt every perſon connected with commerce was brought to ruin, and a great part of the people were involved in their diſtreſs. America.

All theſe evils were aggravated by the want of an efficient government. Congreſs had incurred debts, and iſſued paper money for payment of the intereſt of theſe debts, or of the current public expences; but as it poſſeſſed no efficient revenue, its paper was ſoon depreciated, and became an object of ſpeculation. Diſhoneſt men paid their debts with it, and thus defrauded their creditors, and the morality of the people was ſeverely wounded. The ſeveral ſtates had themſelves alſo contracted debts for the war. Some ſtates willing to fund their debts, impoſed taxes for the purpoſe, which were ſo far beyond the means of the inhabitants, that they could not be levied without extreme rigour. The extremities to which government proceeded in theſe caſes, occaſioned general diſcontents, and even produced an inſurrection in the ſtate of Maſſachuſets.—From all theſe cauſes, an embarraſſed commerce, a depreciated paper money, which inundated all America, the inability of the laws to enforce payment of the taxes, a ſpirit of jealouſy between the different ſtates, and the inadequacy of congreſs to apply a remedy to theſe complicated evils, ſomething little ſhort of anarchy was produced in the United States.

388 Propoſal of a new conſtitution.

In the midſt of theſe calamities, a propoſition was made in 1785, in the houſe of delegates in Virginia, to appoint commiſſioners to meet ſuch commiſſioners as other ſtates might appoint, to form a ſyſtem of commercial regulations for the United States. Accordingly, ſeveral ſtates appointed commiſſioners, who, in 1786, aſſembled at Annapolis. But, as the ſtates were not all repreſented, and the commiſſioners thought their own powers too limited to authorize them to propoſe a proper remedy for the evils that preſſed upon their country, they agreed to recommend a general convention, to be held at Philadelphia the following year, with power to frame a general plan of government for the United States. In conſequence of this recommendation, in May 1787 delegates from all the ſtates, except Rhode Iſland, aſſembled at Philadelphia, and choſe General Waſhington for their preſident. They ſat four months, and deliberated in private. Their debates have never been publiſhed; but they are known to have been extremely animated. The public opinion was, at that period, by no means fixed with regard to the kind of government that ought to be adopted. At the commencement of the war, a conſiderable party diſliked the violent meaſures of their countrymen. At different periods about 30,000 men had been in the ſervice of Great Britain. This implied that a large body of royaliſts exiſted in America. Even of thoſe who diſliked the ſupremacy of Britain, and wiſhed to eſtabliſh American independence, many were by no means prepared to reliſh the whole principles of a republican government. When the queſtion, therefore, came to be agitated concerning the beſt political conſtitution for the United States, a variety of opinions were broached. Theſe, however, in a great meaſure reſolved themſelves into two ſyſtems: one party, at that time called *federaliſts*, wiſhed to eſtabliſh a conſtitution as purely republican as poſſible; and the other party,

389 Convention of Philadelphia.

America. party, then called *antifederaliſts*, wiſhed to give the new government a monarchical character and tendency. It is even ſaid that ſome were not wanting who eagerly deſired to copy cloſely the model of the Britiſh conſtitution. This was not wonderful. Under the principles of that conſtitution Britain had become a great nation, and America had proſpered. It was the moſt free form of government at that time known. The vices which had crept into it were evidently independent of its radical ſtructure, and might eaſily be avoided in a new country. By adopting this tried and well-known form of government, it was ſaid that the hazard of new experiments would be avoided, and the ſtates might at once place themſelves in a ſecure train of proſperity. But the feelings of the people at the time were, upon the whole, hoſtile to theſe reaſonings. Their ſufferings, in conſequence of Britiſh hoſtility, were too recent to permit them to regard with complacency, in ſpeculation, a ſyſtem which in practice they had taught themſelves to diſlike. Their pride would not ſuffer them to become the ſervile imitators of another nation; and the public ſentiments were ſo generally republican, as to lead them to diſlike all kinds of permanent or hereditary ranks and privileges. Hence, when in the early ſittings of the convention of Philadelphia a plan was preſented, which propoſed the eſtabliſhment of a preſident for life, and ſenators for life, and expreſſed a deſire to render theſe offices hereditary, and to ſubject the laws of the reſpective ſtates to the review of the general government, it met with no adequate ſupport; and a committee was appointed to prepare a plan of a new conſtitution for the United States.

In addition to the diviſions that exiſted among the members of this convention, from their tendency to republican or to monarchical principles, they were alſo divided in conſequence of the different intereſts of their conſtituents. The votes were given by ſtates, and when the delegates of a ſtate differed in opinion, the majority was reckoned the vote of the ſtate. The greater ſtates, after a conſiderable conteſt, carried the point, that in the new houſe of repreſentatives, the repreſentation ſhould ſtand upon the baſis of the population of each ſtate, though they were under the neceſſity of conceding to the leſſer ſtates, that each ſtate ſhould be equally repreſented in the new ſenate. Virginia and the ſouthern ſtates, with the aid of the antifederaliſts, in oppoſition to the federaliſt or republican party, obtained the ſtrange privilege, in a nation of freemen, of numbering three fifths of their ſlaves as a part of their population in all queſtions about the number of their repreſentatives. In other queſtions, however, the delegates of the great ſtates frequently voted with the federaliſt party, though, upon the whole, the more zealous republicans were greatly diſguſted by many articles of the new conſtitution. Of theſe the celebrated Dr Franklin was one. He had the integrity and the moderation, however, on this occaſion, to prefer the peace of his country to his private political opinions; and when the plan was completed, he propoſed that it ſhould be ſigned by all the members of the convention, that from their apparent unanimity, it might have the better chance of being accepted by the different ſtates. "In the long career I have already run" (ſaid that eminent ſtateſman and philoſopher), "I have more than once been compelled to abandon opinions I had openly maintained, and which I thought well founded from the deep conſideration I had given them. As I grow older I am more and more diſpoſed to queſtion my own judgment, and to pay reſpect to that of others. There are ſome men, as well as ſome religious ſects, who imagine that reaſon is entirely on their ſide; and that their opponents plunge deeper into error in proportion as they depart from their opinions. Struck with theſe examples, which are but too common, I accept of this conſtitution with all its faults, even ſuppoſing I am not miſtaken in my opinion of its faults; for I am perſuaded that a general government is neceſſary to our ſafety, and that no form of government that is well adminiſtered is incapable of producing the happineſs of the people; and I think there is reaſon to believe that this conſtitution will be well adminiſtered for a number of years, and that it will not end, as too many other governments have done, in deſpotiſm, unleſs the American people ſhall reach that degree of corruption in which, at once incapable of being directed by a free conſtitution, and unworthy of its bleſſings, deſpotiſm becomes neceſſary to their exiſtence. I therefore give my vote for this conſtitution, both becauſe, in the preſent circumſtances of this nation, I cannot hope to ſee one more perfect, and becauſe I am not ſure this is not as perfect as any it can have. I make a ſacrifice of the opinion I have expreſſed of its defects to the public happineſs. I have never uttered my objections out of this houſe; here they had their birth, and here I wiſh them to be for-ever buried. If every one of us who have oppoſed the conſtitution, when we return to our conſtituents, were to unfold the motives of our oppoſition, and endeavour to gain partiſans to our ſide, perhaps we might prevent the unanimous adoption of the conſtitution; but, by this, we ſhould only loſe the advantage which the appearance of unanimity will give us with foreign nations, and indeed with our own people. The general good opinion of a nation reſpecting its government is as neceſſary as the wiſdom and integrity of its adminiſtration, to the happineſs of its people. I truſt, therefore, both for our own ſafety as members of the community, and for the ſake of our poſterity, that we ſhall be of one mind, in recommending this conſtitution wherever our influence reaches; and that afterwards our whole thoughts will be bent to its happy adminiſtration. I cannot forbear to form the wiſh that ſuch of us as ſtill entertain objections to this conſtitution will follow my example, and doubt a little of their infallibility, and ſign this conſtitutional act, that no queſtion may be left of our unanimity." The authority and example of Franklin prevailed, and the following conſtitution was unanimouſly tranſmitted by the convention to the different ſtates for their acceptance.

390 Speech of Franklin.

391 Conſtitution.

"We, the people of the United States, in order to form a more perfect union, eſtabliſh juſtice, inſure domeſtic tranquillity, provide for the common defence, promote the general welfare, and ſecure the bleſſing of liberty to ourſelves, and our poſterity do ordain and eſtabliſh this conſtitution for the United States of America.

ARTICLE I.

"*Section* 1. All legiſlative powers herein granted ſhall be veſted in a congreſs of the United States, which ſhall conſiſt of a ſenate and houſe of repreſentatives.

America. " *Sect.* 2. The houſe of repreſentatives ſhall be compoſed of members choſen every ſecond year by the people of the ſeveral ſtates; and the electors in each ſtate ſhall have the qualifications requiſite for electors of the moſt numerous branch of the ſtate legiſlature.

" No perſon ſhall be a repreſentative who ſhall not have attained to the age of 25 years, and been ſeven years a citizen of the United States; and who ſhall not, when elected, be an inhabitant of the ſtate in which he ſhall be choſen.

" Repreſentatives, and direct taxes, ſhall be apportioned among the ſeveral ſtates which may be included within this union, according to their reſpective numbers, which ſhall be determined by adding to the whole number of free perſons, including thoſe bound to ſervice for a term of years, and excluding Indians not taxed, three-fifths of all other perſons. The actual enumeration ſhall be made within three years after the firſt meeting of the congreſs of the United States, and within every ſubſequent term of ten years, in ſuch manner as they ſhall by law direct. The number of repreſentatives ſhall not exceed one for every 30,000: but each ſtate ſhall have at leaſt one repreſentative: and until ſuch enumeration ſhall be made, the ſtate of New Hampſhire ſhall be entitled to chooſe three, Maſſachuſets eight, Rhode Iſland and Providence Plantations one, Connecticut five, New York ſix, New Jerſey four, Pennſylvania eight, Delaware one, Maryland ſix, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

" When vacancies happen in the repreſentation from any ſtate, the executive authority thereof ſhall iſſue writs of election to fill ſuch vacancies.

" The houſe of repreſentatives ſhall chooſe their ſpeaker and other officers; and ſhall have the ſole power of impeachment.

" *Sect.* 3. The ſenate of the United States ſhall be compoſed of two ſenators from each ſtate, choſen by the legiſlature thereof, for ſix years; and each ſenator ſhall have one vote.

" Immediately after they ſhall be aſſembled, in conſequence of the firſt election, they ſhall be divided, as equally as may be, into three claſſes. The ſeats of the ſenators of the firſt claſs ſhall be vacated at the expiration of the ſecond year; of the ſecond claſs, at the expiration of the fourth year; and the third claſs, at the expiration of the ſixth year; ſo that one-third may be choſen every ſecond year: and if vacancies happen by reſignation or otherwiſe, during the receſs of the legiſlature of any ſtate, the executive thereof may make temporary appointments until the next meeting of the legiſlature, which ſhall then fill ſuch vacancies.

" No perſon ſhall be a ſenator who ſhall not have attained to the age of 30 years, and been nine years a citizen of the United States, and who ſhall not, when elected, be an inhabitant of that ſtate for which he ſhall be choſen.

" The vice-preſident of the United States ſhall be preſident of the ſenate, but ſhall have no vote, unleſs they be equally divided.

" The ſenate ſhall chooſe their other officers, and alſo a preſident *pro tempore* in the abſence of the vice-preſident, or when he ſhall exerciſe the office of preſident of the United States.

" The ſenate ſhall have the ſole power to try all impeachments: When ſitting for that purpoſe they ſhall be on oath or affirmation. When the preſident of the United States is tried, the chief juſtice ſhall preſide: and no perſon ſhall be convicted without the concurrence of two-thirds of the members preſent. America.

" Judgment in caſes of impeachment ſhall not extend further than to removal from office, and diſqualification to hold and enjoy any office of honour, truſt, or profit under the United States; but the party convicted ſhall nevertheleſs be liable and ſubject to indictment, trial, judgment, and puniſhment according to law.

" *Sect.* 4. The times, places, and manners of holding elections for ſenators and repreſentatives ſhall be preſcribed in each ſtate by the legiſlature thereof; but the congreſs may at any time, by law, make or alter ſuch regulations, except as to the placing or chooſing ſenators.

" The congreſs ſhall aſſemble at leaſt once in every year; and ſuch meeting ſhall be on the firſt Monday in December, unleſs they ſhall by law appoint a different day.

" *Sect.* 5. Each houſe ſhall be the judge of the elections, returns, and qualifications of its own members; and a majority of each ſhall conſtitute a quorum to do buſineſs; but a ſmall number may adjourn from day to day, and may be authorized to compel the attendance of abſent members, in ſuch manner, and under ſuch penalties, as each houſe may provide.

" Each houſe may determine the rules of its proceedings, puniſh its members for diſorderly behaviour, and, with the concurrence of two-thirds, expel a member.

" Each houſe ſhall keep a journal of its proceedings, and from time to time publiſh the ſame, excepting ſuch parts as may in their judgment require ſecrecy; and the yeas and nays of the members of either houſe on any queſtion ſhall, at the deſire of one-fifth of thoſe preſent, be entered on the journal.

" Neither houſe during the ſeſſion of congreſs ſhall, without the conſent of the other, adjourn for more than three days, nor to any other place than that in which the two houſes ſhall be ſitting.

" *Sect.* 6. The ſenators and repreſentatives ſhall receive a compenſation for their ſervices, to be aſcertained by law, and paid out of the treaſury of the United States. They ſhall in all caſes, except treaſon, felony, and breach of peace, be privileged from arreſt during their attendance at the ſeſſion of their reſpective houſes, and in going to and returning from the ſame; and for any ſpeech or debate in either houſe, they ſhall not be queſtioned in any other place.

" No ſenator or repreſentative ſhall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which ſhall have been created, or the emoluments whereof ſhall have been increaſed during ſuch time: and no perſon holding any office under the United States ſhall be a member of either houſe during his continuance in office.

" *Sect.* 7. All bills for raiſing revenue ſhall originate in the houſe of repreſentatives; but the ſenate may propoſe or concur with amendments as on other bills.

" Every bill which ſhall have paſſed the houſe of repreſentatives and the ſenate, ſhall, before it becomes

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America. a law, be preſented to the preſident of the United States; if he approve, he ſhall ſign it, but if not, he ſhall return it with his objections to that houſe in which it ſhall have originated, who ſhall enter the objections at large on their journal, and proceed to re-conſider it. If after ſuch re-conſideration two-thirds of that office ſhall agree to paſs the bill, it ſhall be ſent, together with the objections, to the other houſe, by which it ſhall likewiſe be re-conſidered; and if approved by two-thirds of that houſe, it ſhall become a law. But in all ſuch caſes the votes of both houſes ſhall be determined by yeas and nays; and the names of the perſons voting for and againſt the bill ſhall be entered on the journal of each houſe reſpectively. If any bill ſhall not be returned by the preſident within ten days (Sundays excepted) after it ſhall have been preſented to him, the ſame ſhall be a law, in like manner as if he had ſigned it, unleſs the congreſs, by their adjournment, prevent its return; in which caſe it ſhall not be a law.

" Every order, reſolution, or vote, to which the concurrence of the ſenate and houſe of repreſentatives may be neceſſary, (except on a queſtion of adjournment), ſhall be preſented to the preſident of the United States; and before the ſame ſhall take effect, ſhall be approved by him, or, being diſapproved by him, ſhall be re-paſſed by two-thirds of the ſenate and houſe of repreſentatives; according to the rules and limitations preſcribed in the caſe of a bill.

" *Sect.* 8. The congreſs ſhall have power

" To lay and collect taxes, duties, impoſts, and exciſes, to pay the debts and provide for the common defence and general welfare of the United States; but all duties, impoſts, and exciſes ſhall be uniform throughout the United States.

" To borrow money on the credit of the United States:

" To regulate commerce with foreign nations, and among the ſeveral ſtates, and with the Indian tribes:

" To eſtabliſh an uniform rule of naturalization, and uniform laws on the ſubject of bankruptcies throughout the United States:

" To coin money, regulate the value thereof, and of foreign coin, and fix the ſtandard of weights and meaſures:

" To provide for the puniſhment of counterfeiting the ſecurities and current coin of the United States:

" To eſtabliſh poſt offices and poſt roads:

" To promote the progreſs of ſcience and uſeful arts, by ſecuring, for limited times, to authors and inventors, the excluſive right to their reſpective writings and diſcoveries:

" To conſtitute tribunals inferior to the ſupreme courts:

" To define and puniſh piracies and felonies committed on the high ſeas, and offences againſt the law of nations:

" To declare war, grant letters of marque and repriſal, and make rules concerning captures on land and water:

" To raiſe and ſupport armies; but no appropriation of money to that uſe ſhall be for a longer term than two years:

" To provide and maintain a navy:

" To make rules for the government and regulation of the land and naval forces: America.

" To provide for the calling forth the militia to execute the laws of the union, ſuppreſs inſurrections, and repel invaſions:

" To provide for organizing, arming, and diſciplining the militia; and for governing ſuch part of them as may be employed in the ſervice of the United States; reſerving to the ſtates, reſpectively, the appointment of the officers, and the authority of training the militia according to the diſcipline preſcribed by congreſs:

" To exerciſe excluſive legiſlation in all caſes whatſoever over ſuch diſtrict (not exceeding ten miles ſquare) as may, by ceſſion of particular ſtates and the acceptance of congreſs become the ſeat of government of the United States, and to exerciſe like authority over all places purchaſed by the conſent of the legiſlature of the ſtate in which the ſame ſhall be, for the erection of forts, magazines, arſenals, dockyards and other needful buildings:—and

" To make all laws which ſhall be neceſſary and proper for carrying into execution the foregoing powers, and all other powers veſted by this conſtitution in the government of the United States, or in any department or office thereof.

" *Sect.* 9. The migration or importation of ſuch perſons as any of the ſtates now exiſting ſhall think proper to admit, ſhall not be prohibited by the congreſs prior to the year 1808; but a tax or duty may be impoſed on ſuch importation not exceeding ten dollars for each perſon.

" The privilege of the writ of *habeas corpus* ſhall not be ſuſpended, unleſs when in caſes of rebellion or invaſion the public ſafety may require it.

" No bill of attainder, or *ex poſt facto* law, ſhall be paſſed.

" No capitation, or other direct tax, ſhall be laid, unleſs in proportion to the cenſus or enumeration herein before directed to be taken.

" No tax or duty ſhall be laid on articles exported from any ſtate:—No preference ſhall be given by any regulation of commerce or revenue to the ports of one ſtate over thoſe of another; nor ſhall veſſels bound to or from one ſtate be obliged to enter, clear, or pay duties in another.

" No money ſhall be drawn from the treaſury but in conſequence of appropriations made by law; and a regular ſtatement and account of the receipts and expenditures of all public money ſhall be publiſhed from time to time.

" No title of nobility ſhall be granted by the United States; and no perſon holding any office of profit or truſt under them, ſhall, without the conſent of the congreſs, accept of any preſent, emolument, office or title of any kind whatever, from any king, prince, or foreign ſtate.

" *Sect.* 10. No ſtate ſhall enter into any treaty, alliance, or confederation; grant letters of marque and repriſal; coin money; emit bills of credit; make any thing but gold and ſilver coin, a tender in payment of debts; paſs any bill of attainder, *ex poſt facto* law, or law impairing the obligation of contracts, or grant any title of nobility.

" No

America. " No ſtate ſhall, without the conſent of the congreſs, lay any impoſts or duties on imports or exports, except what may be abſolutely neceſſary for executing its inſpection laws; and the net produce of all duties and impoſts laid by any ſtate on imports or exports ſhall be for the uſe of the treaſury of the United States; and all ſuch laws ſhall be ſubject to the reviſion and controul of the congreſs. No ſtate ſhall, without the conſent of congreſs, lay any duty of tonnage, keep troops or ſhips of war in time of peace, enter into any agreement or compact with another ſtate or with a foreign power, or engage in war unleſs actually invaded, or in ſuch imminent danger as will not admit of delay.

ARTICLE II.

" *Sect.* 1. The executive power ſhall be veſted in a preſident of the United States of America. He ſhall hold his office during the term of four years, and together with the vice-preſident, choſen for the ſame term, be elected as follows:

" Each ſtate ſhall appoint, in ſuch manner as the legiſlature thereof may direct, a number of electors equal to the whole number of ſenators and repreſentatives to which the ſtates may be entitled in the congreſs; but no ſenator, or repreſentative, or perſon holding an office of truſt or profit under the United States ſhall be appointed an elector.

" The electors ſhall meet in their reſpective ſtates, and vote by ballot, for two perſons, of whom one at leaſt ſhall not be an inhabitant of the ſame ſtate with themſelves. And they ſhall make a liſt of all the perſons voted for, and of the number of votes for each; which liſt they ſhall ſign, and certify, and tranſmit, ſealed, to the ſeat of the government of the United States, directed to the preſident of the ſenate. The preſident of the ſenate ſhall, in the preſence of the ſenate and houſe of repreſentatives, open all the certificates, and all the votes ſhall then be counted. The perſon having the greateſt number of votes, ſhall be the preſident, if ſuch number be a majority of the whole number of electors appointed; and if there be more than one who have ſuch majority, and have an equal number of votes, then the houſe of repreſentatives ſhall immediately chooſe by ballot one of them for preſident; and if no perſon have a majority, then, from the five higheſt on the liſt, the ſaid houſe ſhall, in like manner, chooſe the preſident. But in chooſing the preſident, the votes ſhall be taken by ſtates, the repreſentations from each ſtate having one vote; a quorum for this purpoſe ſhall conſiſt of a member or members from two-thirds of the ſtates, and a majority of all the ſtates ſhall be neceſſary to a choice. In every caſe after the choice of the preſident, the perſon having the greateſt number of votes of the electors ſhall be the vice-preſident. But if there ſhould remain two or more who have equal votes, the ſenate ſhall chooſe from them by ballot the vice-preſident.

" The congreſs may determine the time of chooſing the electors, and the day on which they ſhall give their votes; which day ſhall be the ſame throughout the United States.

" No perſon except a natural-born citizen, or a citizen of the United States at the time of the adoption of this conſtitution, ſhall be eligible to the office of preſident; neither ſhall any perſon be eligible to that office who ſhall not have attained to the age of 35 years, and been 14 years a reſident within the United States. America.

" In caſe of the removal of the preſident from office, or of his death, reſignation, or inability to diſcharge the powers and duties of the ſaid office, the ſame ſhall devolve on the vice-preſident, and the congreſs may by law provide for the caſe of removal, death, reſignation, or inability both of the preſident and vice-preſident, declaring what officer ſhall then act as preſident; and ſuch officer ſhall act accordingly until the diſability be removed or a preſident ſhall be elected.

" The preſident ſhall, at ſtated times, receive for his ſervices a compenſation which ſhall neither be increaſed nor diminiſhed during the period for which he ſhall have been elected, and he ſhall not receive within that period any other emolument from the United States, or any of them.

" Before he enter on the execution of his office he ſhall take the following oath or affirmation.

" I do ſolemnly ſwear (or affirm) that I will faithfully execute the office of preſident of the United States, and will, to the beſt of my ability, preſerve, protect, and defend the conſtitution of the United States.

" *Sect.* 2. The preſident ſhall be commander in chief of the army and navy of the United States, and of the militia of the ſeveral ſtates when called into the actual ſervice of the United States; he may require the opinion in writing of the principal officer in each of the executive departments, upon any ſubject relating to the duties of their reſpective offices; and he ſhall have power to grant reprieves and pardons for offences againſt the United States, except in caſes of impeachment.

" He ſhall have power, by and with the advice and conſent of the ſenate, to make treaties, provided two-thirds of the ſenators preſent concur; and he ſhall nominate, and by and with the advice and conſent of the ſenate, ſhall appoint ambaſſadors, other public miniſters, and conſuls, judges of the ſupreme court, and all other officers of the United States, whoſe appointments are not herein otherwiſe provided for, and which ſhall be eſtabliſhed by law. But the congreſs may by law veſt the appointment of ſuch inferior officers as they think proper, in the preſident alone, in the courts of law, or in the heads of departments.

" The preſident ſhall have power to fill up all vacancies that may happen during the receſs of the ſenate, by granting commiſſions, which ſhall expire at the end of their next ſeſſion.

" *Sect.* 3. He ſhall from time to time give to the congreſs information of the ſtate of the union, and recommend to their conſideration ſuch meaſures as he ſhall judge neceſſary and expedient; he may, on extraordinary occaſions, convene both houſes, or either of them; and in caſe of diſagreement between them with reſpect to the time of adjournment, he may adjourn them to ſuch time as he ſhall think proper: he ſhall receive ambaſſadors, and other public miniſters; he ſhall take care that the laws be faithfully executed, and ſhall commiſſion all the officers of the United State.

" *Sect.* 4. The preſident, vice-preſident, and all civil

America vil officers of the United States ſhall be removed from office on impeachment for a conviction of treaſon, bribery, or other high crimes and miſdemeanours.

ARTICLE III.

" *Sect.* 1. The judicial power of the United States ſhall be veſted in one ſupreme court, and in ſuch inferior courts as the congreſs may from time to time ordain and eſtabliſh. The judges both of the ſupreme and inferior courts ſhall hold their offices during good behaviour, and ſhall at ſtated times receive for their ſervices, a compenſation which ſhall not be diminiſhed during their continuance in office.

" *Sect.* 2. The judicial power ſhall extend to all caſes in law and equity ariſing under this conſtitution, the laws of the United States, and treaties made or which ſhall be made under their authority; to all caſes affecting ambaſſadors, other public miniſters and conſuls; to all caſes of admiralty and maritime juriſdiction; to controverſies to which the United States ſhall be party; to controverſies between two or more ſtates, between a ſtate and citizens of another ſtate; between citizens of different ſtates, between citizens of the ſame ſtate, claiming lands under grants of different ſtates, and between a ſtate or the citizens thereof, and foreign ſtates, citizens or ſubjects.

" In all caſes affecting ambaſſadors, other public miniſters and conſuls, and thoſe in which a ſtate ſhall be party, the ſupreme court ſhall have original juriſdiction. In all the other caſes before mentioned the ſupreme court ſhall have appellate juriſdiction both as to law and fact, with ſuch exceptions and under ſuch regulations as the congreſs ſhall make.

" The trial of all crimes, except in caſes of impeachment, ſhall be by jury; and ſuch trial ſhall be held in the ſtate where the ſaid crime ſhall have been committed; but when not committed within any ſtate, the trial ſhall be at ſuch place or places as the congreſs may by law have directed.

" *Sect.* 3. Treaſon againſt the United States ſhall conſiſt only in levying war againſt them, or in adhering to their enemies giving them aid and comfort. No perſon ſhall be convicted of treaſon, unleſs on the teſtimony of two witneſſes to the ſame overt act, or on confeſſion in open court.

" The congreſs ſhall have power to declare the puniſhment of treaſon, but no attainder of treaſon ſhall work corruption of blood or forfeiture, except during the life of the perſon attainted.

ARTICLE IV.

" *Sect.* 1. Full faith and credit ſhall be given in each ſtate to the public acts, records, and judicial proceedings of every other ſtate, and the congreſs may by general laws preſcribe the manner in which ſuch acts, records, and proceedings ſhall be proved, and the effect thereof.

" *Sect.* 2. The citizens of each ſtate ſhall be entitled to all the privileges and immunities of citizens in the ſeveral ſtates.

" A perſon charged in any ſtate with treaſon, felony, or other crime, who ſhall flee from juſtice, and be found in another ſtate, ſhall, on demand of the executive authority of the ſtate from which he fled, be delivered up, to be removed to the ſtate having juriſdiction America, of the crime.

" No perſon held to ſervice or labour in one ſtate, under the laws thereof, eſcaping into another, ſhall, in conſequence of any law or regulation therein, be diſcharged from ſuch ſervice or labour, but ſhall be delivered up on claim of the party to whom ſuch ſervice or labour may be due.

" *Sect.* 3. New ſtates may be admitted by the congreſs into this union: but no new ſtate ſhall be formed or erected within the juriſdiction of any other ſtate; nor any ſtate be formed by the junction of two or more ſtates or parts of ſtates, without the conſent of the legiſlatures of the ſtates concerned as well as of the congreſs.

" The congreſs ſhall have power to diſpoſe of and make all needful rules and regulations reſpecting the territory or other property belonging to the United States; and nothing in this conſtitution ſhall be conſtrued as to prejudice any claims of the United States, or of any particular ſtate.

" *Sect.* 4. The United States ſhall guarantee to every ſtate in this union a republican form of government, and ſhall protect each of them againſt invaſion, and on application of the legiſlature or of the executive, (when the legiſlature cannot be convened) againſt domeſtic violence.

ARTICLE V.

" The congreſs, whenever two-thirds of both houſes ſhall deem it neceſſary, ſhall propoſe amendments to this conſtitution, or, on the application of the legiſlatures of two-thirds of the ſeveral ſtates, ſhall call a convention for propoſing amendments, which, in either caſe, ſhall be valid to all intents and purpoſes as part of this conſtitution, when ratified by the legiſlatures of three-fourths of the ſeveral ſtates, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be propoſed by the congreſs; provided that no amendment which may be made prior to the year 1808, ſhall in any manner affect the firſt and fourth clauſes in the ninth ſection of the firſt article; and that no ſtate, without its conſent, ſhall be deprived of its equal ſuffrage in the ſenate.

ARTICLE VI.

" All debts contracted and engagements entered into, before the adoption of this conſtitution, ſhall be as valid againſt the United States under this conſtitution as under the confederation.

" This conſtitution and the laws of the United States ſhall be made in purſuance thereof; and all treaties made, or which ſhall be made, under the authority of the United States, ſhall be the ſupreme law of the land; and the judges in every ſtate ſhall be bound thereby, any thing in the conſtitution or laws of any ſtate to the contrary notwithſtanding.

" The ſenators and repreſentatives before mentioned, and the members of the ſeveral ſtate legiſlatures, and all executive and judicial officers, both of the United States and of the ſeveral ſtates, ſhall be bound by oath or affirmation to ſupport this conſtitution; but no religious teſt ſhall ever be required as a qualification to any office or public truſt under the United States.

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ARTICLE VII.

"The ratification of the convention of nine ſtates ſhall be ſufficient for the eſtabliſhment of this conſtitution between the ſtates ſo ratifying the ſame.

"Done in convention, by the unanimous conſent of the ſtates preſent, the 17th day of September, in the year of our Lord 1787, and of the independence of the United States of America the 12th. In witneſs whereof, we have hereunto ſubſcribed our names:

George Waſhington, *preſident and deputy of Virginia.*

Dep. of New Hampſhire,	John Langdon
	Nicholas Gilman
Maſſachuſets,	Nathanel Gorham
	Rufus King
Connecticut,	William Samuel Johnſon
	Roger Sherman
New York,	Alexander Hamilton
New Jerſey,	William Livingſton
	David Brearly
	William Paterſon
	Jonathan Dayton
Pennſylvania,	Benjamin Franklin
	Thomas Miflin
	Robert Morris
	George Clymer
	Thomas Fitz-ſimons
	Jared Ingerſoll
	James Wilſon
	Gouverneur Morris
Delaware,	George Read
	Gunning Bedford, junior
	Richard Baſſett
	Jacob Broom
Maryland,	James Mac Henry
	Daniel St Thomas Jenifer
	Daniel Carroll
Virginia,	John Blair
	James Maddiſon, junior
North Carolina,	William Blount
	Richard Dobbſpaight
	Hugh Williamſon
South Carolina,	John Rutledge
	Charles Coteſworth Pinckney
	Charles Pinckney
	Pierce Butler
Georgia,	William Few
	Abraham Baldwin.

Atteſted, WILLIAM JACKSON, *ſecretary.*

To the conſtitution the following reſolutions were added:

"That the preceding conſtitution be laid before the United States in congreſs aſſembled, and that it is the opinion of this convention, that it ſhould afterwards be ſubmitted to a convention of delegates, choſen in each ſtate by the people thereof, under the recommendation of its legiſlature for their aſſent and ratification; and that each convention aſſenting to, and ratifying the ſame, ſhould give notice thereof to the United States in congreſs aſſembled.

"Reſolved, that it is the opinion of this convention, that as ſoon as the conventions of nine ſtates ſhall have ratified this conſtitution, the United States in congreſs aſſembled, ſhould fix a day on which electors ſhould be appointed by the ſtates which ſhall have ratified the ſame, and a day on which the electors ſhould aſſemble to vote for the preſident, and the time and place for commencing proceedings under this conſtitution. That after ſuch publication the electors ſhould be appointed and the ſenators and repreſentatives elected. That the electors ſhould meet on the day fixed for the election of the preſident, and ſhould tranſmit their votes certified, ſigned, ſealed, and directed, as the conſtitution requires, to the ſecretary of the United States in congreſs aſſembled; that the ſenators and repreſentatives ſhould convene at the time and place aſſigned; that the ſenators ſhould appoint a preſident of the ſenate for the ſole purpoſe of receiving, opening, and counting the votes for preſident; and that after he ſhall be choſen, the congreſs, together with the preſident ſhould proceed without delay to execute this conſtitution.

America.

392 Additions to the conſtitution.

The ten following articles were afterwards in 1789, propoſed by congreſs to be added to the conſtitution; and having received the ratification required by article fifth of the above conſtitution, they are to be regarded as forming a part of it.

ARTICLE I.

"Congreſs ſhall make no law reſpecting an eſtabliſhment of religion, or prohibiting the free exerciſe thereof; or abridging the freedom of ſpeech, or of the preſs, or the right of people peaceably to aſſemble, and to petition the government for a redreſs of grievances.

ARTICLE II.

"A well regulated militia being neceſſary to the ſecurity of a free ſtate, the right of the people to keep and bear arms ſhall not be infringed.

ARTICLE III.

"No ſoldier ſhall in time of peace be quartered in any houſe, without the conſent of the owner, nor in time of war, but in a manner to be preſcribed by law.

ARTICLE IV.

"The right of the people to be ſecure in their perſons, houſes, papers, and effects, againſt unreaſonable ſearches and ſeizures, ſhall not be violated: and no warrants ſhall iſſue but upon probable cauſe, ſupported by oath or affirmations; and particularly deſcribing the place to be ſearched, and the perſon or things to be ſeized.

ARTICLE V.

"No perſon ſhall be held to anſwer for a capital, or otherwiſe infamous crime, unleſs on a preſentment or indictment of a grand jury, excepting in caſes ariſing in the land or naval forces, or in the militia when in actual ſervice in time of war or public danger; nor ſhall be tried twice for the ſame offence; nor ſhall be compelled in any criminal caſe to be a witneſs againſt himſelf; nor be deprived of life, liberty or property, without due proceſs of law; nor ſhall private property be taken for public uſe, without juſt compenſation.

ARTICLE VI.

"In all criminal proſecutions, the accuſed party ſhall

America. shall enjoy the right to a speedy and public trial by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law; and to be informed of the nature and cause of the accusation, to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favour; and to have the assistance of counsel for his defence.

ARTICLE VII.

"In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved; and no fact tried by a jury shall be otherwise re-examined in any court of the United States, than according to the rules of the common law.

ARTICLE VIII.

"Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX.

"The enumeration in the constitution of certain rights, shall not be construed to deny or disparage others retained by the people.

ARTICLE X.

"The powers not delegated to the United States by the constitution, nor prohibited by it to the states, are reserved to the states respectively or to the people."

393 Opposition to the constitution.

The reference of the constitution to the several states to be adopted or rejected by them, in conventions assembled for that special purpose, occasioned the most violent debates. Pamphlets poured from the press, and the newspapers were daily filled with discussions of the merits and defects of the proposed plan of government. Three states, Delaware, New Jersey, and Georgia, accepted the constitution unanimously; but in the other states the parties were more nearly balanced. The conventions convoked by the state legislatures, went into an analysis of the constitution in detail. This took place more especially in Pennsylvania, New York, Massachusets, and Virginia; and every part of it was made the subject of separate votes. The objections stated against the constitution were chiefly the following: That the convention was only entitled to revise the articles of the original confederation, and had exceeded its powers in framing a new constitution, more especially, as it had declared the acceptance of this constitution by nine states sufficient to make it law: That the constitution ought to have been preceded by a declaration of rights to secure to the several states their particular constitution. It was alleged, that the proposed senate would possess excessive powers and privileges, by being authorized to make amendments in money bills, by its concurring America. with the president in the nomination to places, while its members were eligible to every appointment, and by its having the sole trial of impeachments entrusted to it. The prerogative given to the president to pardon criminals convicted of high treason, was represented as dangerous to public liberty, and his power of conferring appointments upon the members of both houses of legislature was accounted a source of corruption. It was said, that the jurisdiction given to the federal courts would prove vexatious, by drawing individuals from distant states to attend to suits instituted before them. The powers given to congress to impose all kinds of taxes, to regulate the election of its members, to maintain a standing army in time of peace, were alleged to be exorbitant. It was said, that the most important of all privileges, the trial by jury, and the liberty of the press, were not secured: And lastly, It was asserted, that the function of president being made capable of indefinite continuance in the same hands, might give an ambitious and artful man an influence dangerous to the congress, to individuals, and to the constitution itself.

Some of these objections do not appear very forcible, and others of them have been obviated by the articles afterwards added to the constitution, which have been already noticed; but it is said, that at the period in question they possessed considerable influence, and that a very great majority of the people of the United States was averse to the constitution. So sensible, however, were all parties of the extreme defectiveness of the existing government, and of the absolute necessity of putting an end to the anarchy in which the country was plunged, that a majority in the different states was prevailed upon to give their votes for its acceptance. In Connecticut, Maryland, and Pennsylvania, a minority voted against it, but it passed without any amendment. In Pennsylvania, where the opposition was strong, the minority withdrew and protested against the constitution. South Carolina, Virginia, New York, and Massachusets, accepted the constitution by a very small majority, but proposed several amendments. New York was on the eve of rejecting the constitution, when intelligence arrived, that it was already accepted by nine of the states; and this circumstance produced an acceptance there also. The convention of New Hampshire separated without coming to a resolution; and having afterwards assembled, gave its assent, with some proposals for amendment. North Carolina not only proposed amendments, but made them the condition of its acceptance. Some time afterwards, however, it accepted the constitution without reserve. Rhode Island, instead of calling a convention, referred the constitution to the assemblies of the towns, by a majority of which it was rejected; but a convention for the purpose being afterwards called, it accepted the constitution. The following table indicates the periods and the manner in which the constitution was accepted.

America.

America.

States.	Period of accepting the Conſtitution.	Manner of paſſing it.
Delaware	Dec. 31. 1787.	Unanimouſly
Pennſylvania	—— 13. ——	For 46 Againſt 23 Maj. 23
New Jerſey	—— 19. ——	Unanimouſly
Georgia	Jan. 2. 1788.	Ditto
Connecticut	—— 9. ——	For 128 Againſt 40 Maj. 88
Maſſachuſets	Feb. 6. ——	—— 187 —— 168 —— 19
Maryland	April 28. ——	—— 63 —— 12 —— 51
South Carolina	May 23. ——	—— 149 —— 73 —— 76
New Hampſhire	June 21. ——	—— 57 —— 46 —— 11
Virginia	—— 25. ——	—— 89 —— 79 —— 10
New York	July 26. ——	—— 30 —— 25 —— 5
North Carolina	Nov. 27. 1789.	—— 193 —— 75 —— 118
Rhode Iſland	May 29. 1790.	—— —— —— — —— 2

394 Executive officers in the American government.

Of the public officers appointed under the conſtitution of the United States, thoſe of preſident and vice-preſident are the moſt conſpicuous and important. In March 1792, the following law was enacted by congreſs for regulating the mode of their election.

395 Preſident and vice-preſident how elected.

"*Section* 1. The caſe of the election of preſident or vice-preſident of the United States before the uſual period of election, which caſe is herein after provided for, being accepted, the electors for chooſing the preſident and vice-preſident ſhall be named within 34 days immediately preceding the firſt Wedneſday of December 1792, and thenceforth within 34 days immediately preceding the firſt Wedneſday of December, in the fourth year after the laſt election. The ſaid electors ſhall be equal in number to that of the ſenators and repreſentatives in congreſs, of which the ſeveral ſtates ſhall have a right to compoſe their deputation at the time when the preſident and vice-preſident to be choſen ſhall enter into office: provided that, if the new apportioning of repreſentatives in virtue of the new enumeration of the inhabitants, ſhall not take place before the period for chooſing the electors, then the number of electors ſhall be proportioned to the number of ſenators and repreſentatives of the preſent congreſs.

"*Sect.* 2. The electors ſhall aſſemble and vote on the firſt Wedneſday of December in each ſtate, at ſuch place as ſhall be named by the legiſlature of the ſtate; and ſhall draw up and ſign three certificates of their reſpective votes, and ſhall fold up and ſeal the ſame ſeparately, and ſhall indorſe upon the cover of each packet a declaration, that it contains a liſt of the votes of the ſtate for the preſident and vice-preſident; and every elector, or majority of electors, ſhall appoint by ballot the perſon to whom they will entruſt one of the ſaid certificates, to be by him conveyed to the preſident of the ſenate, at the place of reſidence of the government, before the firſt Wedneſday of the January following; and ſhall addreſs another of the ſaid certificates, by the poſt, to the preſident of the ſenate at the place of reſidence of the government; and ſhall tranſmit the third of the ſaid certificates to the judge of the diſtrict in which their aſſembly ſhall be held.

"*Sect.* 3. The executive power, in each ſtate, ſhall cauſe to be drawn up, and properly certified, three liſts of the names of the electors of the ſtate, and ſhall tranſmit the ſame to the electors before the firſt Wedneſday of December; and the electors ſhall add one of the ſaid liſts to each of the before-mentioned liſts of their votes.

"*Sect.* 4. In the caſe of a liſt of the votes of a ſtate not arriving at the place of reſidence of the government in January, the ſecretary of ſtate ſhall deſpatch an expreſs to the judge of the diſtrict of ſuch ſtate in whoſe hands the third certificate ſhall have been depoſited, who ſhall tranſmit it by the ſame meſſenger to the place of reſidence of the government.

"*Sect.* 5. The congreſs ſhall commence its ſittings on the ſecond Wedneſday of February 1793; and thenceforth on the ſecond Wedneſday of the February following each aſſembly of electors; and the certificates, or as many of them as ſhall have arrived, ſhall be opened, the votes counted, and names of the perſons elected to fill the offices of preſident and vice-preſident declared and proclaimed, according to the forms of the conſtitution.

"*Sect.* 6. In the caſe of the preſident of the ſenate not being preſent at the place of reſidence of the government on the arrival of perſons charged with the liſts of the votes of the electors, ſuch perſon ſhall deliver the liſts to the ſecretary of ſtate, who ſhall carefully preſerve them, and remit them as ſoon as poſſible to the preſident of the ſenate.

"*Sect.* 7. The perſons appointed by the electors to convey the liſts to the preſident of the ſenate, ſhall receive, at the time of delivering the ſaid liſts, 15d. per mile, for the diſtance, by the high road, from the place of election to the reſidence of the government.

"*Sect.* 8. If any perſon being appointed to convey the votes of the electors to the preſident of the ſenate, and having accepted that truſt, ſhall neglect to diſcharge the ſame, he ſhall incur a penalty of 1000 dollars.

"*Sect.* 9. In the caſe of the removal, death, reſignation, or incapacity to fill his office of the preſident or vice-preſident, the proviſional preſident of the ſenate, or, where no ſuch officer has been appointed, the ſpeaker of the houſe of repreſentatives, ſhall fulfil the duties

America. duties of president of the United States, or vice-president, until the president or vice-president shall resume his functions, or a new election shall take place.

"*Sect.* 10. When the offices of president and vice-president shall become vacant at the same time, the secretary of state shall give notice of the same to the executive power of each state; and shall publish the said notice, in one gazette at least of each state, in which it shall be declared, that the electors for the president of the United States shall be appointed or chosen in the several states within the 34 days immediately preceding the first Wednesday of the month of December following, provided a space of two months shall intervene between the date of such notice, and the first Wednesday of the December following; but when the said space of time shall not so intervene, or if the term for which the late president and vice-president were elected does not expire on the third day of March following, then the secretary of state shall declare in such notice that the electors are to be appointed, or chosen, within the 34 days immediately preceding the first Wednesday of December in the following year; and the electors shall be appointed accordingly, and shall proceed as is provided in this act.

"*Sect.* 11. The only evidence that shall be required of the refusal to accept the office of president or vice-president, or resignation of either of said offices, shall be a declaration in writing to that effect, signed by the person refusing to accept or resigning such office, which shall be transmitted to, and deposited in the office of the secretary of state.

Sect. 12. The term for which the president and vice-president shall be chosen shall be four years: commencing, in all cases, on the 4th of March following the day of the election.

By this law, as well as by the constitution, the power of declaring the manner of nominating the electors who are to chuse the president and vice-president, was left to the legislatures of the several states; the result of which was that a uniform mode was not adopted. In some of the states the people were left to nominate the electors in the same manner as they voted for other representatives. In other states, that power was confined to the legislatures themselves. The following is a statement of the different modes which have been established in all the states including the three new states of Vermont, Kentucky, and Tenessee.

States in which the electors for the president and vice-president of the United States are named by the people.	*States in which the electors for the president and vice-president of the United States are named by the legislature.*
Massachusets	Vermont
Pennsylvania	New Hampshire
Virginia	Connecticut
Tenessee	Rhode Island
Kentucky	New York
South Carolina	Delaware
Georgia	New Jersey
	Maryland
	North Carolina

In the executive government of the United States there are three departments, the department of state, the department of finances, and that of war: a secretary is at the head of each of these, who acts under the authority of the president. The secretary of state is keeper of the seals of the union. It belongs to his office to counterfign the laws, and to promulgate them. He has the custody of all public papers, but his principal employment is to transact affairs with foreign powers. America. 396 Secretary of state.

At the head of the finances is a secretary of the treasury. This part of the public business was attended with many difficulties at the period when the constitution was formed, and for some years thereafter. The new congress, at the close of its first session, in September 1789, ordered the secretary of the treasury of the union, Mr Hamilton, to prepare a plan for the restoration of public credit. This duty was performed in January 1790, and after long debates, the congress, on the 4th of August of that year, passed the plan into a law. By this law, the debt due to foreign nations, as well as to the creditors at home, was funded, together with a long arrear of interest, and even interest upon interest. The debt due to foreign nations amounted to 11,908,188 dollars, and the domestic debt to 40,905,485 dollars, making together 52,813,673 dollars. The president of the United States was authorized to borrow 12,000,000 of dollars to pay the foreign debt. Another loan was made to extinguish the domestic debt, and in payment of this loan certificates of interest due, (one of the kinds of public paper then current) were received and funded at three *per cent.* The capital of the debt, including the rest of the paper money then in circulation, was funded at 6 *per cent.* interest, with a provision that for a third of the debt thus funded no interest should be paid till the year 1800. This part of the debt therefore received the name of *deferred stock.* The deferred stock was appointed to be redeemed in the proportion of eight *per cent. per annum.* For the rest of the debt two other funds were created, one of three *per cent.* and one of six *per cent.*—By this law the whole debts due by the several states to the union, and for which the credit of congress stood pledged to the public creditors, were adopted as the debt of the union. But as the debts due by the several states were very unequal, this part of the plan met with much opposition. It is understood, however, to have been at last carried, in consequence of a kind of compromise between the northern and southern states. The northern states, including New York, were the principal debtors. Massachusets alone owed 6,000,000 of dollars. The northern states therefore were deeply interested, that the public debt should be adopted by the whole union. The southern states, on the contrary, were all, with the exception of South Carolina, creditors of the union. But it was their favourite project to draw the seat of the federal government nearer to them. Virginia was more eager in the prosecution of this object than the rest, and Virginia was the principal public creditor. Accordingly, the deputies of the northern states made a compromise with the southern states, agreeing to vote that the seat of the federal government should be placed on the river Potowmack, on condition of the others voting for the consolidation of the debts. The state of Pennsylvania, though among the debtors, opposed this plan; but its opposition was got over by an agreement, that the seat of the federal 397 Treasury.

America. government ſhould continue at Philadelphia for ten years. Thus the plan for conſolidating the debts paſſed, and at the ſame time a law was enacted, authorizing the general government to accept, from the ſtate or ſtates to which it might belong, of a territory for the permanent ſeat of its reſidence, not exceeding ten miles ſquare at the confluence of the Potowmack and the Eaſtern Branch; authorizing, at the ſame time, the preſident of the United States to appoint commiſſioners to ſurvey the territory, and to prepare, againſt the firſt Monday of December 1800, the buildings neceſſary for transferring the congreſs and whole offices of the federal government thither. In honour of the preſident of the union, who had ſo long been the commander in chief of the armies of the ſtates, the new city was ordained to be called Waſhington.

The congreſs afterwards erected an office for the reduction of national debt: but a regular ſyſtem of taxation being now eſtabliſhed in the United States, it is probable that the government, finding itſelf rather ſtrengthened than weakened by the exiſtence of a public debt, or what is called the funding ſyſtem, has not been very anxious to accompliſh the payment of that debt, and accordingly it has rather increaſed than diminiſhed. The debt of the United States, which in 1790 amounted to 72,613,254 dollars, amounted in
398 1796 to 78,697,410 dollars.

National bank. A part of the general ſyſtem of finance, propoſed by Mr Hamilton, conſiſted of the eſtabliſhment of a national bank, in imitation of the bank of England, which was accordingly incorporated in 1791, with a capital of 10,000,000 of dollars. Of theſe 2,000,000 were ſubſcribed by the United States, but are not to be made good at the period impoſed on other ſubſcribers. The remaining 8,000,000 were furniſhed by individuals; one-fourth in ſpecie, and the reſt in certificates of public debt: ſo that, in this way, paper currency to the amount of 6,000,000 of dollars at once diſappeared. This bank is authorized, by its charter, to eſtabliſh aſſiſtant or branch banks, in ſuch parts of the United States as it may deem expedient; and accordingly, beſides the principal bank at Philadelphia, it ſoon eſtabliſhed four branches, at New York, Boſton, Baltimore, and Charleſtown. Its dividends are eight *per cent.* and its ſhares have riſen from a fourth to a fifth above the original value.

399 Army. Beſides the ordinary militia, the United States have a ſmall permanent military eſtabliſhment regulated by law. It is compoſed of a body of artillery and engineers, two companies of light dragoons, and four regiments of infantry. The corps of artillery and engineers, conſiſts of 764 men divided into four battalions, and each battalion into four companies: a captain, two lieutenants, and two cadets, are allowed to each company. Each battalion has a major; and the whole corps is commanded by an adjutant-general, who has a lieutenant-colonel under him. Each company of dragoons conſiſts of a captain, two lieutenants, and a cornet; 52 privates, and 11 ſerjeants, corporals, ſadlers, farriers, and trumpeters. The ſtaff of each regiment of infantry conſiſts of a lieutenant-colonel, two majors, an adjutant, a paymaſter, quartermaſter, ſurgeon, and two aſſiſtant ſurgeons. Each company conſiſts of a captain, lieutenant, and an enſign; with 62 ſerjeants, corporals, ſoldiers, and muſicians. This little army, therefore, conſiſts of 2774 ſoldiers, ſerjeants, muſicians, America. dragoons, and artillery men. The ſtaff of the whole conſiſts of a brigadier-general, a major of brigade, and an inſpector, a judge advocate, a quartermaſter, and a paymaſter general. Their pay would in Europe be accounted exorbitant. The privates receive four dollars a-day. In addition to this, each individual of every rank receives what is called a *ration*, conſiſting of a pound of beef, and a pound of bread, with a ſmall quantity of diſtilled ſpirits, and ſalt, vinegar, ſoap, and candles. A captain of infantry receives 40 dollars a-day, and three rations, and the other officers in proportion.

The navy is alſo a branch of the war department; but as yet it conſiſts only of a few veſſels, though there is no doubt that, in a caſe of neceſſity, the United States would ſoon render themſelves formidable as a maritime power. They poſſeſs in profuſion all the materials neceſſary for ſhip-building. They have abundance of naval architects, and great numbers of experienced ſeamen, in proportion to their population.

400 Law officers. For the adminiſtration of juſtice, an attorney general of the United States is by law attached to the executive government. His functions are, to proſecute, in the ſupreme court of the ſtates, all ſuits in which the government of the union is intereſted, and to aſſiſt the preſident with his opinion on queſtions of law. He is permitted, as in Great Britain, to purſue his profeſſion in the affairs of individuals. In the United States, juſtice is adminiſtered by diſtrict courts, circuit courts, and a ſupreme court. Theſe poſſeſs excluſive juriſdiction, in all ſuits that affect the intereſts of the union. The courts of diſtrict are held four times a year in each ſtate, by a judge appointed by the federal government, and reſiding in the ſtate. They have juriſdiction in crimes within the diſtrict and the adjoining ſea, where the penalty does not exceed 100 dollars, or a ſlight corporal puniſhment. They judge alſo in civil queſtions, in which the union or foreigners are intereſted to the amount of 100 dollars, and unleſs in admiralty caſes, the queſtion is tried by a jury.

The circuit courts are held by a judge of the ſupreme court, twice a year in each ſtate, along with the judges of the diſtrict. They have an excluſive cognizance of all crimes againſt the union, and they are courts of appeal from the diſtrict courts. They have cognizance, along with the courts of the different ſtates, of all civil cauſes, not exceeding 500 dollars in value, or where a foreigner is party, or the diſpute is between citizens of different ſtates.

The ſupreme court of the union conſiſts of a chief juſtice, and five judges. It ſits twice a year at the ſeat of government. It is a court of appeal from the circuit courts, and the tribunals of the ſeveral ſtates. It has excluſive juriſdiction in all civil cauſes, where one of the ſtates is a party, unleſs the adverſe party be a citizen of the ſame ſtate, and over all ſuits againſt foreign ambaſſadors or envoys, and their domeſtics, according to the law of nations. It may alſo try, but not excluſively, cauſes in which an ambaſſador, conſul, or other foreign miniſter, is intereſted as proſecutor.

On account of the diſtance of the ſtates of Kentucky and Teneſſee, and the province of Maine, their courts of diſtrict exerciſe the juriſdiction of courts of circuit, except in caſes of appeal, which are carried before the ſupreme federal court. Juries ſerving in the federal

America. federal courts, are chofen according to the forms obſerved in the ſtates where theſe courts happen to be held.

Crimes or offences of which the federal tribunals take cognizance, are treaſons, rebellions, refuſals to pay impoſts enjoined by the union, ſmuggling, frauds by officers of the revenue in matters of revenue, and in ſhort every offence commited againſt laws paſſed by the congreſs. In addition to theſe, the federal courts take cognizance of all offences committed within what is accounted not the territory of any particular ſtate, but of the union at large, ſuch as, the open ſeas, or forts or arſenals belonging to the union, and alſo the precincts of the federal city of Waſhington, which is conſidered as the common property of the American nation.

In civil matters, both in the courts of the union, and of the particular ſtates, the common law of England is conſidered as the law of America, where no ſpecial enactments exiſt to the contrary. The adminiſtration of juſtice, however, is underſtood to be no leſs embarraſſed by intricacies and delays in North America, than it is under ſome of the oldeſt governments of Europe. A reform in this reſpect will not readily be expected, when it is conſidered, that more than one half of the legiſlature of the union, as well as of the legiſlatures of the different ſtates, is always compoſed of lawyers.

401 The mint. In April 1792, the congreſs ordered the eſtabliſhment for the United States, of a public mint, by a law, which regulates the diviſion, the value, and the ſtandard of their money. The diviſion and value of theſe monies, are as follows.

Gold Coin.

The *Eagle*, value ten dollars.
The *Half-Eagle*, value five dollars.
The *Quarter-Eagle*, value two dollars and a half.

Silver Coin.

The *Dollar*, value a hundred cents.
The *Half-Dollar*, value fifty cents.
The *Quarter-Dollar*, value twenty-five cents.
The *Tenth of a Dollar*, value twelve cents and a half.
The *Half-Tenth*, value ſix cents and a quarter.

Copper Coin.

The *Cent*, value the hundredth part of a dollar.
The *Half-Cent*, value the two hundredth part of a dollar.

The weight of theſe is as follows. The eagle ought to contain 247½ grains of pure gold, or 270 grains of ſtandard gold, which is thus regulated; 11 parts of pure gold in $12\frac{1}{12}$ of alloy, of which one half ought to be of ſilver.

The half-eagle ought to contain 123¾ grains of pure gold, or 135 grains of alloy gold.

The quarter-eagle ought to contain 61 grains of pure gold, or 67½ grains of alloy gold.

The dollar ought to contain 371¼ grains of pure ſilver, or 416 grains of alloy ſilver.

The ſtandard of ſilver is 1485 parts of pure ſilver, and 179 parts of alloy which is of pure copper.

The half-dollar ought to contain $182\frac{5}{8}$ grains of pure ſilver, or 280 grains of ſtandard ſilver.

A quarter-dollar ought to contain $92\frac{11}{16}$ grains of pure ſilver, or 104 grains of ſtandard ſilver. America.

The tenth of a dollar ought to contain $37\frac{1}{8}$ grains of pure ſilver, or 52 grains of ſtandard ſilver.

The half-tenth ought to contain $18\frac{1}{16}$ grains of pure ſilver, or 26 grains of ſtandard ſilver.

The cent ought to contain 11 pennyweights of copper.

The half-cent ought to contain five and a half.

The gold and ſilver coins ought, according to law, to bear on one ſide an emblematical figure of liberty, and upon the other, the eagle of the United States, with the words "United States."

The copper coins, inſtead of the American eagle, bear an inſcription denominating their value.

The proportional value between gold and ſilver, when coined, to the coin of the United States, is determined by comparing one pound of the one to fifteen of the other; that is to ſay, one pound of coined gold is equal to fifteen pounds of coined ſilver.

All the counties of the United States are required to make uſe of theſe coins.

The Spaniſh dollar is the only piece of foreign coin which is current in the United States as money: all others, which had received a valuation by the law, are only received by weight ſince 1795. It does not appear, however, that the United States have hitherto made much uſe of their mint, at leaſt for the coinage of the more valuable metals.

402 History continued. The convulſions of nations and the calamities and the crimes of mankind, always form the moſt intereſting ſubject of hiſtory; and happy is that people concerning whom the hiſtorian finds little to relate. From the period of the acceptance of their conſtitution, the American ſtates have, in a great degree, enjoyed that fortunate ſituation. On the 13th of September 1788, the old congreſs having received the ratification of the conſtitution from eleven ſtates, declared it to be in force, and appointed the firſt Wedneſday of the following January for chooſing the electors, who were to aſſemble on the firſt Wedneſday in February following to elect the preſident and vice-preſident. The new congreſs was alſo appointed to meet on the firſt Wedneſday of March following at New York. Accordingly on the firſt Wedneſday of February 1789, George Waſhington, who had been the commander in chief of the armies of the United States and preſident of the convention of Philadelphia that framed the conſtitution, was elected preſident, and John Adams, who had ſeconded Mr Jefferſon in propoſing the original declaration of American independence, was at the ſame time elected vice-preſident. The popularity of the preſident was deſervedly very great; and, as all parties concurred in ſupporting the new conſtitution, much unanimity prevailed in the public councils. By degrees, however, it appeared, that two parties continued to exiſt, poſſeſſing the ſame radical principles as formerly. The party moſt attached to the principles that leaned towards monarchy, or rather towards ariſtocracy, concurred ſteadily in giving ſupport to the new authorities in all their exertions as ſoon as they were conſtituted, adopting for themſelves the appellation of *federaliſts*, which had by that time become popular. On the other hand, the more ſtrict and zeal-

403 Waſhington preſident.

404 Political factions.

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America. ous republicans, who had originally been called *federaliſts*, and who had only oppoſed the conſtitution, becauſe, in their opinion, it did not ſufficiently incorporate the whole ſtates into one nation, now began to receive the appellation of *antifederaliſts;* becauſe, from their temper and character, they frequently oppoſed the meaſures of the new federal government. In this way the names of the parties were changed, while their principles remained the ſame. It is not believed, however, that in the United States there exiſts any party that wiſhes to diſſolve the confederation; the word antifederaliſt being only uſed to expreſs the democratic or moſt zealous republican party, whereas the appellation of federaliſt is applied to thoſe of a more ariſtocratical character and tendency, who array themſelves moſt ſteadily on the ſide of eſtabliſhed authority, in oppoſition to every kind of innovation. In the earlieſt period of the conſtitution, the only extraordinary effort that we find to have been made by either of theſe parties, conſiſted of a propoſal made in the ſenate of congreſs, in which the ariſtocratical party, now called *federaliſts*, were very numerous, to give the titles of *illuſtrious highneſs* to the preſident of the United States, of *right honourable* to the members of the ſenate, and *honourable* to the members of the houſe of repreſentatives; but this project was abandoned by the ſenate itſelf, as the public opinion was found to be averſe to it, and as the houſe of repreſentatives was diſpoſed to impoſe a negative upon it. When the ſyſtem of finance, of which we have already taken notice, and which ſtill exiſts, was propoſed, it was vehemently combated by the oppoſition or the antifederaliſt party, on account of the tendency, which, in their opinion, it muſt have to introduce a funding ſyſtem, and by means of it an extravagant and expenſive government, in conſequence of the facility with which that ſyſtem enables miniſters to negotiate loans, and thereby rather to increaſe than diminiſh their own power by the dependance upon government which theſe loans produce. The ſame reaſons which induced the antifederaliſt party to oppoſe the new ſyſtem of finance, or the introduction of a funding ſyſtem, recommended it to the ſupport of the federaliſts, who, by means of it, expected to increaſe the ſtrength and influence of government. This laſt motive probably derived greater weight from the perſonal intereſts and prejudices of the individuals who uſually joined the federaliſt or ariſtocratical party.

405 Titles propoſed.

406 Character of the parties.

It is to be obſerved, that, in North America as in Europe, the political opinions of men are, in a great meaſure, formed by their ſituations. At the ſame time, local ſituation produces in America an effect preciſely the reverſe of what it does among the Europeans. In Europe the proprietors of land conſtitute the ariſtocracy of the country in which they live, and are the pillars of the government; whereas the inhabitants of towns, from being crowded into a narrow ſpace, and from their want of perſonal diſtinction, have a tendency to aſſume a more levelling and turbulent character. But, in America, unleſs when land is bought in large quantities to be ſpeedily diſpoſed of as an object of commercial ſpeculation, it is uſually held in property by the cultivators of it, who labour upon their own farms, and conſtitute a body of yeomanry in eaſy circumſtances, but not poſſeſſed of great wealth. Hence, in all political queſtions they are led to adopt equalizing notions, and a jealouſy of the conduct of thoſe entruſted with power. In the towns, on the contrary, a great diverſity of rank exiſts. By means of an extenſive commerce large fortunes are made, the owners of which live in a ſtile of great ſplendour, and along with the members of the learned profeſſions conſtitute the ariſtocracy of America. The commercial men being alſo intimately connected with Great Britain, are naturally led to approve of the inſtitutions that exiſt in it, and to favour her cauſe in every quarrel with European nations. America.

It was not till the ſecond period of the French revolution, or the fall of monarchy in that country, that the American parties became in any great degree exaſperated againſt each other. That extraordinary event, by which Europe was convulſed from its centre to its extremities, and by which all its nations were rouſed to arms, carried agitation and diſcord even beyond the ſhores of the Atlantic. The people of the American ſtates belonging to the race of Europe, and having ſo recently been an object of lively intereſt and of hoſtility between different ſtates, could not fail to have their minds occupied by the new events and ſpeculations which at that time engaged the attention of all ranks of men. The French had been the allies of America. Their troops had fought for the independence of that country, and Fayette and other names that were diſtinguiſhed in the early periods of the French revolution, were well known, and enjoyed much perſonal popularity among the Americans. It is not wonderful, therefore, that the antifederaliſt party in America regarded with favour the early progreſs of the French revolution, eſpecially as they conſidered the French ſoldiers as now engaged on the ſide of principles which they had learned in the ſchool of America. They contemplated with exultation the progreſs of republicaniſm in France, and fancied they beheld in it a confirmation of their own ſentiments, and the means of preventing their own government from acquiring an ariſtocratical or a monarchical tendency. When the governing party in France diſhonoured themſelves and human nature by the exceſs of their barbarity and of their crimes under Robeſpierre, the antifederaliſts in America being men of a better character, could not fail to regard the conduct of the European revolutioniſts with much horror. Still, however, they flattered themſelves that the diſorders of France were only temporary; and they vainly hoped that the ſpirit of freedom would in that country ſoon be rendered conſiſtent with the exiſtence of public order.

407 Antifederaliſts fond of the French political opinions.

On the other hand, the federaliſt party in America, whoſe objects were to ſtrengthen the government of the union, to increaſe the influence of the executive power, and to carry the conſtitution as far as poſſible towards ariſtocracy and monarchy, naturally conſidered the example and influence of the Engliſh government as a barrier againſt the ſyſtem of French republicaniſm. As many of the members of this party were ſtrongly bound to Great Britain by the ties of commercial intereſt, they ſoon became extremely eager to detach the United States from France, and to connect them with Britain. This party derived a great acceſſion of ſtrength from the crimes, which nobody pretended to juſtify, of the rulers of the French republic.

408 The federaliſts attached to Britain.

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America. They derived ſtill greater ſtrength from the diſorganizing ſyſtem with regard to foreign nations which the French adopted, and which they extended even to the republican ſtates of America. Their ambaſſador, M. Genet, and their conſuls at different ports, inſtituted political clubs in the towns and villages, and attempted to introduce everywhere the Jacobin practice of affiliation or fraternization. The ambaſſador alſo attempting to force the United States into a war with Great Britain, quarrelled openly with the preſident, and attempted, by the publication of official notes addreſſed to him, to excite diſcontents, and to introduce a diſtinction between the government and the people of the country. He was recalled by the French government, but not till his conduct had excited the diſapprobation of all parties in America. It would appear, however, that for a time the American government was diſpoſed to regard the French republic with favour. Payment was readily made to the republic of the debt incurred by the United States to the late French monarch; and as France ſuffered great diſtreſs from a ſcarcity of proviſions, the money was laid out in the purchaſe of grain and flour, which was conveyed from America to France in a fleet of 160 ſhips. It was in defence of this fleet that the French fought the naval engagement with Lord Howe on the 1ſt of June 1794, in which their ſhips of war were defeated; but they were ſucceſsful in conveying the tranſports loaded with grain into Breſt harbour. But the American government ſoon found itſelf much embarraſſed with regard to the part which it ought to act towards the contending powers of Europe. George Waſhington was ſtill at the head of affairs, having been re-elected

409 Conduct of the preſident. preſident in December 1792, though not altogether unanimouſly, as in the former inſtance. This prudent ſtateſman ſaw that the intereſt of his riſing country required that ſhe ſhould remain diſengaged from the deſtructive quarrels of the European nations. The reſtleſs ſpirit of the French, however, on the one hand, and the eagerneſs of Great Britain to force an univerſal combination againſt them on the other, rendered the preſervation of neutrality no eaſy taſk. He ſaw a confederacy of all Europe formed againſt France; and he could ſcarcely avoid ſuppoſing that it muſt be ſucceſsful againſt an anarchy ſtained with crimes and blood, aſſailed by choice troops, and having nothing to oppoſe this force but new ſoldiers and inexperienced generals, ſupported by a treaſury furniſhed only with a paper currency, which muſt ſpeedily be diſcredited. At the ſame time, the American commerce was greatly haraſſed by Great Britain, whoſe ſhips, with a view to diſtreſs France, ſeized all veſſels going thither with proviſions, which formed the chief article of American export. The debates which occurred in the houſe of repreſentatives in congreſs in conſequence of this ſtate of affairs were extremely violent; and the people without doors were greatly agitated throughout the whole extent of the United States. The general wiſh was, to preſerve peace and neutrality; but the complaints againſt Britain were very loud, eſpecially as the extenſive traders who were moſt attached to the Britiſh intereſts were the chief ſufferers by the interruption of commerce. The antifederaliſts on this occaſion became ſtill more attached to France, the contagion of whoſe anarchy among a virtuous people they declared they did not fear. If ſatisfaction could not be obtained from Britain, they propoſed a ſequeſtration of Britiſh property in America, an interruption of all commerce with Britain; and they imagined, that by arming American privateers, prohibiting the conveyance of proviſions to the Britiſh iſlands, and ſeizing on Canada, they poſſeſſed more certain means of injuring Britain, if ſhe was reſolved upon war, than any ſhe had with which to make repriſals upon the ſtates. The federaliſts, on the other hand, were eager to avoid all connexion with France, and propoſed the mildeſt meaſures of remonſtrance and negotiation with regard to England, deprecating the idea of entering into a conteſt with her; and the preſident appears at length to have adopted the reſolution of going fully into the meaſures of this laſt party. He diſmiſſed Thomas Jefferſon from the office of ſecretary of ſtate, he being of that party that had always avowed an attachment to pure republicaniſm, and that was at preſent moſt hoſtile to Great Britain. He at the ſame time reſolved to ſend Mr Jay to England for the purpoſe of negotiating with the Britiſh government. This laſt gentleman being known to be decidedly attached to the federaliſt party, indicated to the public in very clear terms the meaſures which the government had reſolved to adopt. America.

410 Rebellion at Pitſburg. About this time ſome internal diſorders broke out in one part of America, and, as political factions render every event ſubſervient to their mutual hatred, the federaliſts accuſed their adverſaries, though evidently without reaſon, of being the contrivers and authors of the diſturbance, the hiſtory of which was this:—Among the different objects of taxation which preſented themſelves to congreſs during the ſeſſion of 1790, none had appeared more proper than the diſtilleries throughout the United States. As a revenue from this ſource could only be collected by an exciſe, this form was adopted: The duty was light, and the object unexceptionable. But at all times this form of collecting a revenue has been unacceptable to the people in general. By fixing the duty not on the raw material, but on the manufactured commodity, the capital of the trader is leſs deeply involved, and the price is commonly rendered leſs burdenſome to the conſumer; but from the right which, under this form of taxation, it is neceſſary to confer upon the revenue officers, of entering into private buildings, and of interfering with the operations there going on, it has always been ſubmitted to with reluctance at its firſt introduction. This tax, however, was peaceably ſubmitted to throughout the whole American continent, excepting in one quarter, that is to ſay, in the four weſtern counties of Pennſylvania beyond the Alleghany mountains, near the junction of the three great rivers Alleghany, Yohogany, and Monongahela, whoſe confluence at Fort Pit forms the river Ohio. This diſtrict had been ſettled for a conſiderable time, and is tolerably populous. The inhabitants at firſt refuſed to pay the tax, but they were not altogether unanimous in this reſpect; and government for ſome time avoided to preſs the matter by proſecutions, in the hopes that by degrees the authority of law would be eſtabliſhed without trouble or alarm. Petitions in the mean time were tranſmitted to congreſs againſt the tax, and ſome modifications of it had taken place; ſo that the government at laſt endeavour-

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America. ed generally to put it in force. The marſhal was ordered to proceed by legal proceſs againſt all rioters and delinquent diſtillers who ſhould be found to reſiſt or evade the tax; but no ſooner was he underſtood to be engaged in this duty than the vengeance of armed men was aimed at his perſon, and the perſon and property of the inſpector of the revenue. They fired on the marſhal, arreſted him, and detained him ſome time as a priſoner. The houſe and papers of the inſpector of the revenue were burnt; and both theſe officers were obliged to fly to Philadelphia. In a few days thereafter, in the month of Auguſt 1794, a general meeting was held at Pitſburgh, conſiſting of ſix or ſeven thouſand men in arms. A ſtrong remonſtrance was drawn up, to be preſented to congreſs. Committees were appointed to correſpond with the counties of Waſhington, Fayette, and Alleghany; and a reſolution was entered into, againſt having any intercourſe or dealings with any man who ſhould accept of any office for the collection of the duty.

The American government on this emergency acted with much prudence. Commiſſioners were deſpatched to confer with the leaders of the oppoſition in the diſaffected counties, but the conference was unfortunately without effect. A committee of 60 perſons was elected to confer with the commiſſioners, but of theſe only a ſmall number voted in favour of the conciliatory propoſition. The others threatened, that if the tax was not repealed, the people of the weſtern counties would ſeparate from the American union, and place themſelves under the protection of Great Britain. The conduct of the populace was ſtill more outrageous. They ſurrounded the houſe where the commiſſioners reſided, broke the windows, and groſsly inſulted them; ſo that they were under the neceſſity of departing without effecting an accommodation.

Nothing now remained but to repeat the tax, or to reduce the refractory counties by force. The former was neither judged prudent nor ſafe; and as a trifling force might have been ineffectual, and therefore extremely pernicious, by encouraging and extending the inſurrection, the militia of all the adjacent ſtates were embodied, and different detachments, amounting in all to 15,000 men, were ordered to rendezvous at Carliſle, the principal town of Cumberland county. Governor Mifflin, formerly general, marched thither in the middle of September, at the head of 6000 volunteers, who, for the honour of their country, engaged on this occaſion to ſupport the laws of the federal government. In the beginning of October, the preſident joined the army at Carliſle, of which Governor Lee of Virginia was commander in chief; and Governor Mifflin was ſecond in command. From Carliſle the army proceeded immediately, amounting in all to 15,000 men in two diviſions; and the reſult was, that the inſurgents, after a variety of conſultations by repreſentative committees, came to a reſolution to diſband, and ſubmit to the law; and their leaders diſappeared. On the 25th of October, a conſiderable meeting was held at Pitſburg, of the inhabitants of the weſtern counties, in which they entered into a ſolemn engagement to ſupport order and obedience to the laws of the republic by every means in their power. A ſmall force was, however, ſtationed in the counties in which the diſturbance had taken place. A conſiderable number of the inſurgents who had been made priſoners were tried, and convicted of high treaſon; but they were all afterwards pardoned. Thus did this rebellion, which at one time exhibited a formidable aſpect, terminate without bloodſhed, and almoſt without violence or damage to the public. America.

411 War with the Indians.

During the ſame ſummer, a part of the weſtern territory of the United States was ravaged by a deſperate incurſion of the Indians. To repel this attack, Major General Wayne was deſpatched with a moderate force early in the ſummer, and about the middle of Auguſt he penetrated to the Miami river, where the Britiſh had lately re-occupied a fort within the territory which, according to the treaty of 1783, undoubtedly belonged to the American ſtates. Along with the Indian general, Wayne found a number of Canadian ſettlers encamped without the fort; and he aſſerted in his correſpondence, that Colonel M'Hee, the Britiſh Indian agent, was the principal inſtigator of the war between the ſavages and the United States. The ſavages, with a few white auxiliaries, amounted to 2000 men, while General Wayne had only 900; but he reſolved not to retreat, and, after a laſt overture for peace, which was rejected, he advanced to the attack on the 20th of Auguſt. His advanced guard was at firſt thrown into diſorder by a ſevere fire from the Indians, but the ſecond line was immediately brought forward, while the firſt line was directed to rouſe the Indians from their coverts by the bayonet; while the cavalry were directed to turn their flank. The effect of the charge of the infantry, however, was, that the ſavages were routed and immediately diſperſed, the battle terminating under the guns of the Britiſh garriſon, commanded by Major Campbell. This laſt gentleman and General Wayne now reciprocally accuſed each other as guilty of hoſtility in time of peace. The one complained that a fort was occupied within the American territory; and the other, that ſo near an approach was made to a garriſon poſſeſſed by the troops of his Britannic majeſty. It was agreed, however, that the point ſhould be left to be diſcuſſed by the ambaſſadors of their different nations; and General Wayne retired. Theſe occurrences excited ſtrong apprehenſions in the American government that the Britiſh miniſtry ſeriouſly meditated hoſtilities againſt the United States.

412 Jay's treaty.

Theſe apprehenſions, however, were ſoon done away by the treaty which Mr Jay concluded with Great Britain in the end of the year 1794. By this treaty the Britiſh government agreed to indemnify the American merchants for the illegal ſeizure of their ſhips and property that had taken place during the war; the forts within the American territory which had been occupied by the Britiſh, and which had never been evacuated, were agreed to be given up, and the boundary line to be clearly aſcertained. On the other hand, the American government conſented, that French property on board American veſſels might be lawfully ſeized, and that no privateers belonging to a nation at war with either party ſhould be allowed to bring their prizes into the ports of the other, unleſs forced by ſtreſs of weather; and at all events, that they ſhould not be allowed to ſell their prizes there. Various articles favourable to the American commerce were at the ſame time ſtipulated in the treaty.

When this treaty was laid before the legiſlature of the

America. the United States, it occaſioned the moſt violent debates. The ſenate, however, approved of it, which was all that was neceſſary, according to the conſtitution, to render it binding. The houſe of repreſentatives at firſt refuſed to concur in the arrangements neceſſary for carrying it into effect, though they at laſt agreed to depart from their oppoſition, from the dread of involving their country in a war with England, and from the great reſpect which the country at large entertained for the judgment of the preſident.

413 Diſputes with France. In the mean time, this treaty, along with other events, had nearly involved the United States in what was undoubtedly at that time leſs formidable; a war with France. The French had repeatedly made remonſtrances to the American government againſt the conduct of the Britiſh, in ſeizing American veſſels, even in their own rivers and bays, when they found either French perſons or French property, without any reſiſtance being made on the part of the American ſtates. When the above treaty, authorizing ſuch ſeizures, in a manner ſo hoſtile to the intereſts of France, and even to the ſpirit of neutrality which it was the intereſt of the American government to obſerve, came to be publicly known, the French at firſt entertained hopes that it would not be ſanctioned by the American legiſlature. Their indignation was greatly rouſed when they underſtood that a legalized preference was ſhown to the Engliſh intereſt, by allowing them to ſeize French property in American veſſels; while France ſtood engaged by treaty, not to ſeize American property in Engliſh veſſels, or in the veſſels of any other nation with which France might happen to be at war. Still, however, the French government regarded leſs the treaty itſelf, than the ſpirit from which it roſe, of a greater attachment to Great Britain than to France. Their indignation in this reſpect was increaſed, by an intercepted letter from the preſident of the United States addreſſed to Mr Morris, who had lately been the American ambaſſador in France, and who was then the private agent of the American government in London. This letter, dated at Philadelphia, December 2. 1795, was a detailed anſwer to various letters of Mr Morris. The preſident complained highly of the haughty conduct of the Engliſh adminiſtration, and of the arbitrary meaſures which they were continuing to purſue with reſpect to American navigation. He requeſted Mr Morris to repreſent to the miniſter not only the injuſtice, but the impolicy of this conduct; particularly at a moment when it was ſo much the intereſt of England to conciliate the minds of the inhabitants of the United States to the acceptance of the treaty. He detailed the efforts he had made, and the difficulties he had encountered to overcome the wayward diſpoſition of his countrymen towards French politics, the abettors of which were the chief opponents of the treaty in queſtion; which, however, he ſaid, had the approbation and ſanction of the greater and more reſpectable part of the community. His only object, he obſerved, was peace, which he was moſt anxious to preſerve; and if America was happy enough to keep herſelf out of European quarrels, ſhe might, from the increaſe of her trade, vie in 20 years with the moſt formidable powers of Europe.

This letter, ſaved from the wreck of the Boſton packet, which had foundered on the coaſt of France, was conſidered as deciſive evidence of the diſpoſitions of the American government towards the French republic. Their ambaſſador, M. Adet, was therefore directed to make ſtrong repreſentations againſt the privileges granted to Great Britain, of ſeizing French property in American veſſels. The anſwer given by the American government, ſtated in juſtification of their conduct, that a ſpecial treaty made with France in 1778, formally expreſſed, that neutral veſſels ſhould neutralize the cargo; whereas the treaty lately concluded between the United States and England, contained no ſimilar regulation. The American government therefore aſſerted, that it acted in perfect conformity to both treaties, and though it was lawful for the Engliſh to ſeize French property on board American veſſels, the French, without a breach of their treaty with America, could not be permitted to make repriſals in ſimilar circumſtances on the Engliſh. This mode of reaſoning, which was undoubtedly conſiſtent with the letter of the treaties, if not with political honeſty, did not ſatisfy the French directory; and, accordingly, they entered into a formal reſolution to ſuſpend the execution of their treaty with America, and declared, that they would treat all neutral veſſels in the ſame manner, as they ſhould ſuffer the Engliſh to treat them. The only effect of this threatening, was to augment the maritime power of Great Britain; merchants belonging to neutral ſtates being thereby induced on all occaſions to entruſt their goods to the Britiſh flag, as the only power capable of affording them full protection. Still, however, by the management of the American ambaſſador Mr Monroe, who was known to belong to the antifederaliſt party, the French directory was preſerved in tolerable temper with the Americans; but upon his being recalled, and Mr Pinckney, a man of the oppoſite faction, appointed his ſucceſſor, they manifeſted their indignation, by refuſing to receive him, or even to ſuffer him to reſide as a private citizen at Paris. They proceeded to no farther hoſtility, however, in expectation that a change favourable to their intereſts might occur in the American government. For now in the month of October 1796, George Waſhington, the preſident, publicly announced his reſolution of retiring from political affairs on account of the infirmities of age, and requeſted his friends not to nominate him in the next election of preſident.

414 New preſident. The election of a new preſident to ſucceed a man of ſuch diſtinction as George Waſhington, afforded abundant aliment for the animoſity of the political parties in America. The federaliſts wiſhed to advance to the office of preſident Mr Pinckney of South Carolina, a man whoſe perſonal character was much reſpected, and who had lately been ambaſſador in England. He had alſo been engaged in ſome negotiations with Spain, in which his conduct gave general ſatisfaction. His name was aſſociated by the federaliſts, in their votes, along with that of John Adams, the vice-preſident. They conſidered it as probable, that he would have the ſecond greateſt number of votes in the north, where it was expected that John Adams would have the majority; and it was hoped, that he would at leaſt have the ſecond number of votes in the ſouthern ſtates,

America. if Mr Jefferſon ſhould have the majority. Upon the whole, however, the federaliſts generally profeſſed a wiſh that Mr Adams ſhould be preſident, although it is ſaid, that the views of their leaders were privately directed to procure the elevation of Mr Pinckney.

The antifederaliſts, on the contrary, openly and unanimouſly ſupported Mr Jefferſon. He is well known to the public as a man of letters. He had been ſecretary of ſtate and ambaſſador in France, and was active in procuring the original declaration of independence. The two parties ſtrained every nerve to ſupport their reſpective candidates. They mutually accuſed each other of tricks to invalidate votes, of frauds in the returns, and of all the other unfair proceedings ſo well underſtood in the parent ſtate of which they are coloniſts. The leaders of the federaliſts were deceived in their expectation of gaining a majority for Mr Pinckney. John Adams had only one vote beyond an abſolute majority of the whole which is required by the conſtitution, and was declared preſident; and Mr Jefferſon having the ſecond greateſt number of votes, or three votes fewer than Mr Adams, was declared vice-preſident.

When the news arrived in America of the French directory's refuſal to receive Mr Pinckney as miniſter from the United States, their conduct was repreſented by Mr Adams the preſident, in a ſpeech to congreſs, as a high and aggravated inſult to the dignity of the American people. The federaliſt party, by whom he was ſupported, had a majority in congreſs, and ſome preparations for war were voted; but as the parties were nearly balanced, the opinions of the oppoſition very frequently prevailed, and the miſſion of three ambaſſadors to demand an explanation from the French government was ſcarcely followed by any preparations for hoſtility. But by this time the perſons who retained the poſſeſſion of the ſupreme power in France, under the appellation of an executive directory, had diſplayed a character which deeply wounded the intereſts of their country with all foreign nations, and ultimately overturned the republican conſtitution which had been attempted to be eſtabliſhed. Their conduct was inſolent and corrupted, while at the ſame time they were unable to compenſate theſe defects by the ability of their management. Their negotiation with the American ambaſſadors terminated in an obſcure and unprincipled intrigue, in which it appeared that the directory wiſhed to levy a ſum of money upon America, as the price of their forbearance; a part of which ſum was to go into the public treaſury, and a part was to be received privately by the individual members of the directory. They alſo, from a ſhort-ſighted policy, authorized their privateers and cruizers to ſeize all neutral veſſels in which any article of Britiſh produce or manufacture ſhould be found, to whomſoever it belonged. As the Britiſh manufactures were in great demand in every country, this was equivalent to a declaration of hoſtility againſt all nations, while, at the ſame time, the abſolute dominion which the Britiſh navy had at this period acquired over the ocean, converted it into an impotent menace.

In conſequence of theſe events, the American congreſs, towards the end of their ſeſſion in 1798, by a ſmall majority, enacted a law, to break off all commercial relation with France or its dependencies, and to forbid the entrance of French veſſels into the American ports till the end of the ſittings of next congreſs. America. A premium was alſo offered for the capture of French armed ſhips by American veſſels. Still, however, though the preſident, Mr Adams, ſupported by the leaders of the federaliſt party, continued to urge the neceſſity of a war with France, yet, as the majority of the people appeared decidedly averſe to this meaſure, he had the good ſenſe to depart from his own ſentiments, and to attempt a new negotiation. As the French directory, by their miſconduct, ſpeedily brought their country to the greateſt embarraſſments, by once more arming all Europe againſt France, that nation found it neceſſary, for the ſake of its ſafety, to relinquiſh thoſe hopes of freedom for which it had made ſo many ſacrifices, and to ſubmit the whole power of the ſtate to Bonaparte, who had been the moſt ſucceſsful commander of its armies. He repaired the errors in the directory by more moderate and better management, and ſettled all differences with the American ſtates.

415 Yellow fever.

During theſe political tranſactions, the two greateſt cities of theſe ſtates, Philadelphia and New York, had ſuffered very ſeverely by a peſtilential diſorder called the *yellow fever*. It is underſtood to have been brought originally by veſſels employed in the ſlave-trade on the weſtern coaſt of Africa to the Weſt India iſlands. After producing the moſt dreadful mortality in that quarter, it was conveyed to the two great cities in America already mentioned, in conſequence of their frequent intercourſe with the iſlands. From them it at times extended itſelf to the other maritime towns. Having once begun, it returned during different ſeaſons towards the end of ſummer, and many thouſand perſons periſhed by it, beſides thoſe whoſe health was permanently injured. More than half the inhabitants fled from the cities; but thoſe infected fortunately either did not infect the inhabitants of the country to whoſe houſes they went, or the infection produced a leſs dangerous form of diſeaſe. The rents of houſes ſunk about one half in Philadelphia and New York, and their rapid increaſe was conſiderably retarded. In conſequence, however, of the adoption of thoſe meaſures of precaution which have been ſo long practiſed in Europe, but which have been neglected in America, the danger of a return of the ſame calamity ſeems to be ſomewhat diminiſhed, though from the lateſt accounts it is by no means done away.

416 Waſhington, or the federal city.

It has been already mentioned, that a reſolution was very early adopted in America of endeavouring to eſtabliſh a federal city, as it is called, as the capital of the United States, which ſhould be the ſeat of government independent of every particular ſtate, and having its ſovereignty veſted in the whole union; and we have ſtated the circumſtances which led to its eſtabliſhment on the banks of the Potowmack. Congreſs accordingly commenced its ſittings at Waſhington at the end of the year 1800. For ſeveral years preceding that period the commiſſioners of congreſs had been employed in making out a plan of the city, and in erecting public buildings for the accommodation of the government. As the deſire of wealth is a prevailing paſſion in America, and as the people there readily engage in extenſive ſpeculations upon every ſubject, the federal city of Waſhington was for ſome time made the object of an endleſs variety of purchaſes and ſales of lots of

building

America. building ground. The public papers both in Europe and America were filled with exaggerated praiſe of the new city, and with fictitious accounts of the rapidity of its progreſs towards completion. After various perſons had ſuffered conſiderably by unſucceſsful ſpeculations, it was diſcovered that it was an eaſier matter to exhibit upon paper a magnificent and beautiful city, fitted from its extent to be the capital of the world, than to rear its buildings and to fill them with inhabitants. The perſons who had obtained property in the intended capital of the United States, became at laſt convinced, therefore, that the immenſe extent of ground marked out in the plan would not be ſo ſpeedily covered with houſes as the ſanguine ſpirit of the Americans had originally led them to expect. The proprietors of different lots therefore became rivals. Inſtead of boaſting of the excellencies of the federal city in general, every ſpeculator began to boaſt of the advantages of that ſide of the city where his own property lay, and to depreciate every other quarter. Hence the buildings have been begun in ſituations very remote from each other, ſo as rather to form a ſet of ſcattered hamlets than a ſingle town.

The federal city is ſituated in a kind of triangular peninſula, formed by the junction of the rivers called *Potowmack* and *Eaſt Branch*. The plan includes 4124 acres; of theſe 712 are allotted to 16 ſtreets, ſeverally bearing the names of the 16 ſtates, and to other ſtreets of leſs magnitude, with ſquares and public gardens. The 3412 acres which remain, being the property of the union, and of the original proprietors of the ſoil, contain 23,000 lots of houſes, excluſive of 3000 feet of lots ſet aſide for quays. The capitol, where congreſs aſſembles, is at the diſtance of a mile and a half from the preſident's houſe, and three quarters of a mile at leaſt from thoſe parts of the rivers that are moſt convenient for commerce. It is alſo to be obſerved that, in the neighbourhood of the ſpot choſen for the federal city, there previouſly exiſted a village called *Georgetown upon the Potowmack*. From theſe circumſtances, various quarters of the new city were regarded as more or leſs likely to become ſpeedily populous; and, according to the different notions entertained by individuals, have become more or leſs favourite points for building upon. The inhabitants of Georgetown, who had purchaſed many lots of the intended city in the quarter neareſt themſelves, repreſented their own port, and the commerce already belonging to it, as a favourable opening to the commerce of the city of Waſhington, which would therefore naturally fix itſelf in that quarter. The proprietors of lots near the point of the peninſula contended, that their ſituation on the banks of both rivers, being at an equal diſtance between the capitol and the preſident's houſe, and being moſt airy, healthy, and beautiful, would ſoon be preferred to all others. The proprietors on the Eaſt Branch decried the port of Georgetown, and the whole banks of the Potowmack, as not ſecure in winter from ſhoals of ice. They repreſented the point placed between two rivers as incapable of enjoying completely the advantages of either: at the ſame time they boaſted of the great depth and ſafety of their own port, and of their vicinity to the capitol, where all the members of congreſs muſt aſſemble once every day, and from which their diſtance is not more than three quarters of a mile. Amidſt theſe contending ſpeculations, however, though the federal city of Waſhington is underſtood to be advancing with conſiderable rapidity, it is nevertheleſs ſtill in its infancy, and for many years the greateſt part of it muſt remain ſubject to the plough or the hoe. Its proſperity muſt depend in a great degree upon the ſtability of the federal government, and the perſeverance which ſhall be manifeſted by congreſs in continuing its ſittings there amidſt the inconveniences ariſing from defective accommodation. Theſe laſt will no doubt ſpeedily diminiſh, and the government has great inducements to perſevere in ſettling itſelf upon a ſpot without the limits of every particular ſtate; and the police of which is entirely in the hands of congreſs, a circumſtance which greatly tends to ſecure the tranquillity of the deliberations of that body. Neither does there ſeem to exiſt any reaſon for doubting the permanency of the federal government. The ſeveral ſtates are ſo cloſely connected with each other by ſituation, and commercial and ſocial intercourſe, that it is impoſſible for them to enjoy any tolerable degree of tranquillity or order without ſubmitting to a common head. If they ſhall become incapable of governing themſelves as a republic, the evils of anarchy will no doubt ſpeedily compel them to ſubmit to a maſter, but their natural connexion will preſerve them as a ſingle nation; and when a capital is once eſtabliſhed, with public buildings for the accommodation of all the branches of national government, it is never eaſily altered. America.

417
Preſent ſtate of parties.

In the mean time it appears that the moſt ſtrictly republican or democratic intereſt in America is gradually acquiring an aſcendancy. At the election of preſident of the United States in 1800, the antifederaliſts, or, as they are ſometimes called by their antagoniſts, the jacobin party, were ſucceſsful, though after an eager ſtruggle, in raiſing their favourite candidate, Mr Jefferſon, to that ſupreme office. The two factions are underſtood to be greatly irritated againſt each other; but this circumſtance does not appear at all to diſturb the tranquillity of the ſtate, or the power of the laws. Indeed it is probable that the ſucceſs of the moſt violent party may be the firſt ſtep towards its acquiring a moderate character, as the experience of mankind in other countries ſufficiently demonſtrates, that one of the ſureſt means of inſpiring popular leaders with a reſpect for conſtituted authorities often conſiſts in admitting them to a participation of power.

As the United States of America, though they have received emigrants from all countries, were originally a Britiſh colony, and upon the whole peopled from the Britiſh iſlands, every circumſtance in their ſituation and hiſtory muſt always be highly intereſting to the inhabitants of this country. We are connected with them by the ties of conſanguinity, as well as by the poſſeſſion of a common language, laws, and religion. It is only in Great Britain, of all the countries on earth, that a native of the United States can find himſelf as it were at home, or among a kindred people, poſſeſſing the ſame manners, inſtructed by the ſame books, and conſequently poſſeſſing the ſame general features of character and thought. On the other hand, it muſt always be to the Britiſh nation a ſubject of fair and juſtifiable pride, to reflect, that whatever may hereafter be the deſtiny of Europe, amidſt its wars, debts, taxes, and uſurpations, Britain has eſtabliſhed in a ſecure and unaſſailable

America. assailable position, a body of people of its own race and character, who may hereafter be the guardians and preservers of civilization and of letters to mankind.—Temporary hostilities did indeed exist between the two countries; and our neighbours the French were abundantly industrious in endeavouring to ripen the seeds of discord, and to convert them into a source of permanent animosity: but their attempts have been ultimately unsuccessful, being founded upon casual and passing circumstances, which could not long prevail against so many bonds of union that are founded upon the most lasting sentiments and qualities of the human mind. It had been better, no doubt, both for Britain and for the colonies, that the war had been avoided. In the natural course of things, American independence must have taken place. Had the colonies waited another century, till they should possess five times the population of the parent state, one of two things must have occurred; either the British monarch would have deserted his little islands, to reside amidst the great mass of his people beyond the Atlantic, as his ancestor James VI. deserted Edinburgh to go to live at London; or the separation would have cost America only a trifling effort, and would have saved her all the calamities of the war of the revolution, and the difficulties which followed it. But young nations, like young men, are frequently in too great a haste to act a part upon the great theatre of the world, and for a while, as happened to the United States, they sometimes suffer by their rashness. This rashness, or, as it may perhaps be called, this generous ardour, on the part of America, at the reluctance on the part of Britain to relinquish so flourishing a branch of her empire, will be regarded by future generations of Britons, and of Americans, as sentiments which naturally resulted from the situation of the parties, and as no cause of continued dislike. Though two nations, they must for ever be one people; and, as the husbandmen of America must for ages be the employers of the manufacturers of Britain, it is probable that the intercourse and amity of the countries, founded upon ties both of interest and inclination, will long continue to exist and to increase. We think it here necessary, therefore, as far as our information extends, to give a general account of the present situation of the United States.

In the treaty of peace concluded in 1783, the limits of the United States are thus defined: "And that all disputes which might arise in future on the subject of the boundaries of the said United States may be prevented, it is hereby agreed and declared, that the following are and shall be their boundaries, viz. from the north-west angle of Nova Scotia, viz. that angle which is formed by a line drawn due north from the source of St Croix river to the Highlands, along the said Highlands, which divide those rivers that empty themselves into the river St Lawrence, from those which fall into the Atlantic ocean, to the north-westernmost head of Connecticut river; thence down along the middle of that river to the 45th degree of north latitude; from thence by a line due-west on said latitude until it strikes the river Iroquois or Cataraquy; thence along the middle of said river into Lake Ontario, through the middle of said lake, until it strikes the communication by water between that lake and Lake Erie; thence along the middle of said communication into Lake Erie, through the middle of said lake, until it arrives at the water communication between that lake and Lake Huron; thence through the middle of said lake to the water communication between that lake and Lake Superior; thence through Lake Superior, northward of the isles Royal and Phillipeaux to the Long Lake; thence through the middle of the said Long Lake, and the water communication between it and the Lake of the Woods, to the said Lake of the Woods; thence through the said lake to the most north-western point thereof, and from thence on a due west course to the river Mississippi; thence by a line to be drawn along the middle of said river Mississippi, until it shall intersect the northernmost part of the 31st degree of north latitude. South, by a line to be drawn due east from the determination of the line last mentioned, in the latitude of 31 degrees north of the equator, to the middle of the river Apalachicola or Catahouche; thence along the middle thereof to its junction with the Flint river; thence straight to the head of St Mary's river, and thence down along the middle of St Mary's river to the Atlantic ocean. East, by a line to be drawn along the middle of the river St Croix, from its mouth in the bay of Fundy to its source; and from its source directly north to the aforesaid Highlands, which divide the rivers that fall into the Atlantic ocean from those which fall into the river St Lawrence, comprehending all islands within twenty leagues of any part of the shores of the United States, and lying between lines to be drawn due east from the points where the aforesaid boundaries between Nova Scotia on the one part and East Florida on the other, shall respectively touch the bay of Fundy, and the Atlantic ocean, excepting such islands as now are, or heretofore have been, within the limits of the said province of Nova Scotia."

418 Description of the boundaries of the United States.

America.

In this description there are some trifling inaccuracies; in particular it now apppears, that a line drawn due west would not touch the river Mississippi, but would pass to the northward of its source. Neither was it well understood, by the negotiators, what river was meant under the name of St Croix. These points, however, were adjusted in the treaty between Great Britain and the United States, which was entered into in 1795, and commissioners were appointed to point out the river which should be considered as the boundary, and to fix upon a line of junction between the Lake of the Woods and the river Mississippi. The result of the whole is, that the territory of the United States of America may be considered as a vast triangle, of which the Atlantic ocean on the east forms the base. The southern side is formed by the river Mississippi, and the northern by a very irregular line wholly formed by a long chain of lakes and rivers, excepting at its eastern part, which consists of a piece of territory called New Brunswick, reserved by Great Britain near the sea coast. In this way, excepting on the corners touching New Brunswick belonging to Britain on the north-east, and Florida belonging to Spain on the south-east, the United States are almost entirely surrounded by water. Parallel to the Atlantic ocean, from Georgia on the south to the most northern states, runs a tract of mountainous country, which receives the general appellation of the *Alleghany mountains*. The principal chain of these mountains is crossed by no river. On the eastern side of it a vast variety of streams of the greatest magnitude are formed, which descend into the Atlantic ocean. Beyond this chain of mountains, and parallel

419 Errors in the description.

to

America. to it, at a conſiderable diſtance, is the great river Ohio. All the rivers that take their origin among the Alleghany mountains, beyond the principal ridge, flow weſtward into the Ohio. This laſt river, after paſſing along the weſtern ſide of the Alleghany mountains, falls into the Miſſiſſippi, which paſſes round the ſouthern extremity of theſe mountains into the Atlantic ocean at the gulf of Mexico. The territory of the United States weſt of the Ohio may alſo be conſidered as forming a triangle, of which the river Ohio, on the eaſt, forms the baſe; while the two ſides are formed by the chain of lakes already mentioned, and by the river Miſſiſſippi. This weſtern country, which is of immenſe extent, is ſtill in a great meaſure poſſeſſed by the Indians. The whole territory of the United States contains, by computation, a million of ſquare miles, in which are - 640,000,000 of acres,
Deduct for water, 51,000,000

Acres of land in the United States, 589,000,000

The territory to the weſtward of the river Ohio amounts to about 220,000,000 of acres, after deducting upwards of 40,000,000 for water. The whole of this immenſe extent of unappropriated territory belongs to congreſs, as the head of the union, and is ſet apart for the payment of the public debts of the confederation. It is meant, when peopled, to be divided into new ſtates to form a part of the union.

420 The country well watered.

No part of the world has ſo many navigable waters adjoining to its territory, or paſſing through it, as the United States of America. The Atlantic ocean, which forms their eaſtern boundary, is indented with numerous bays, ſome of which are of very conſiderable extent, and advance to a conſiderable diſtance into the country. On the northern or north-eaſterly part of the ſtates is the bay of Fundy, between Nova Scotia and New England, chiefly remarkable for its tides, which riſe to the height of 50 or 60 feet, and flow ſo rapidly as to overtake animals that feed upon the ſhore. Next to it, on the ſouthward, are the bays called *Penobſcot* and *Caſco*, extending along the coaſt of the province of Main, which is the moſt northern territory of the United States. Maſſachuſets bay follows theſe, which waſhes the town of Boſton, and is comprehended between Cape Ann on the north, and Cape Cod on the ſouth. Various ſmall bays ſucceed to theſe, to the ſouthward, after which is Long Iſland ſound. This is a kind of inland ſea, from three to 25 miles broad, and about 140 miles long, extending the whole length of the iſland, and dividing it from Connecticut. It communicates with the ocean at both ends of Long Iſland, and affords a very ſafe inland navigation. Near the weſt end of this ſound, about eight miles eaſtward of the city of New York, is the ſtrait called *Hell Gate*. It is remarkable for its whirlpools, which make a tremendous roaring at certain times of the tide. They are occaſioned by the narrowneſs and crookedneſs of the paſs, and by a bed of rocks that extends quite acroſs it; but, a ſkilful pilot can with ſafety conduct a ſhip of any burden through this ſtrait, with the tide, or at ſtill water, with a fair wind. Still proceeding to the ſouth, is Delaware bay, 60 miles in length, which is ſo wide in ſome of its parts that a ſhip in the middle cannot be ſeen from the land. But of all the American bays, the Cheſapeak is the largeſt. Its entrance America. is between Cape Charles, and Cape Henry in Virginia, 12 miles wide, and it extends 270 miles to the northward, dividing Virginia from Maryland. It is from ſeven to 18 miles broad, and generally as much as nine fathoms deep, affording many commodious harbours and a ſafe and eaſy navigation. It receives the waters of the Suſquehannah, Potowmack, Rappahannock, York, and James' Rivers, which are all large and navigable. To the ſouth of the Cheſapeak, on the coaſt of North Carolina, are the three bays or ſounds called *Albemarle*, *Pamlico*, and *Core*. Of theſe Pamlico ſound, which lies between the other two, is the greateſt. It is a kind of lake, or inland ſea, from 10 to 20 miles broad, and nearly 100 miles in length. It is ſeparated from the ſea in its whole length by a beach of ſand, hardly a mile wide, and generally covered with ſmall trees and buſhes. Through this bank are ſeveral ſmall inlets by which boats may paſs. But Ocrecok inlet is the only one that will admit veſſels of burden into the moſt important diſtricts of Edenton and Newbern. This inlet is in lat. 35° 10′, and opens into Pamlico ſound, between Ocrecok iſland, and Core bank; the land on the north is called *Ocrecok*, and on the ſouth *Portſmouth*. A bar of ſand having 14 feet water at low tide croſſes this inlet; and ſix miles within this bar the channel is croſſed by a ſhoal called the *Swaſh*, having only eight or nine feet water at full tide. Few mariners, though acquainted with the inlets, chooſe to bring in their own veſſels, as the bar often ſhifts during their abſence on a voyage. To the north of Pamlico ſound, and communicating with it, Albemarle ſound extends 60 miles in length, and is from eight to 12 in breadth. Core ſound, which lies to the ſouth of Pamlico, likewiſe communicates with it. Theſe ſounds are ſo large, when compared with their inlets from the ſea, that no tide can be perceived in any of the rivers which empty into them, nor is the water ſalt even in the mouths of theſe rivers. A tract of low marſhy territory between Pamlico and Albemarle ſounds is called *Diſmal Swamp*. The ſame name, however, is alſo given to another tract at ſome diſtance to the northward of Albemarle ſound. A part of this laſt tract is in North Carolina, and the reſt within the boundaries of Virginia.

As already ſtated, the northern or north-weſtern boundary of the United States, conſiſts almoſt entirely of a chain of lakes dividing the country from Canada. Theſe lakes conſiſt of by far the largeſt collections of freſh water that are to be found in the world. The uppermoſt or moſt weſterly is called the *Lake of the Woods*, from the great foreſts upon its banks. Its length from eaſt to weſt is about 70 miles, and in ſome places it is 40 miles wide. To the eaſtward of it is Rainy or Long Lake, which is nearly 100 miles long, but never more than 20 miles wide. To the eaſtward of this is Lake Superior, juſtly termed the *Caſpian of America*. It is undoubtedly the largeſt baſon of freſh water in the world, being 1500 miles in circumference. The water is pure and tranſparent, and appears generally to reſt upon a bed of huge rocks. A great part of its coaſt is likewiſe rocky and irregular. It contains many iſlands, two of which are very conſiderable. The one, called *Iſle Royal*, is about 100 miles long, and in many places 40 miles broad. The lake abounds with fiſh, particularly trout and ſturgeon. It

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America. is affected by ſtorms in the ſame manner as the ocean. Its waves run as high, and the navigation is equally dangerous. It diſcharges its waters from the ſouth-eaſt corner, by a ſtrait called *St Marie*, of about 40 miles long, into Lake Huron; but this ſtrait is not navigable, on account of its having at one part what the Americans call a *rapid*, that is, a quick deſcent of the waters among rugged rocks. It does not appear, however, that above one-tenth of the waters which are conveyed by about 40 rivers into Lake Superior, paſs out of it by the ſtrait of St Marie, which nevertheleſs is its only viſible outlet. Conſiderable quantities of copper ore are found in beds upon many ſmall iſlands in Lake Superior, but it has not hitherto become an object of commerce.

Lake Huron is next in magnitude to Lake Superior, being about 1000 miles in circumference. On the north ſide of it is an iſland 100 miles in length, and no more than eight miles broad. This iſland is conſidered as ſacred by the Indians. On its ſouth-weſt ſide Lake Huron ſends out a bay, called *Saganum Bay*, into the country, of about 80 miles in length and about 18 in breadth. At its north-weſt corner, this lake communicates with Lake Michigan by the ſtraits of Michillimakinac.

Lake St Claire receives the waters of the three great lakes Superior, Michigan, and Huron, and diſcharges them, through a river or ſtrait called *Detroit*, into Lake Erie. It is about 90 miles in circumference. Its navigation is obſtructed by a bar of ſand near the middle, which prevents loaded veſſels from paſſing.

Lake Erie is nearly 300 miles long from eaſt to weſt, and about 40 in its broadeſt part. Its iſlands and banks are much infeſted with rattle-ſnakes. Near the iſlands the water is covered for many acres together with the large pond lilly, on the leaves of which, in the ſummer ſeaſon, lie myriads of water ſnakes baſking in the ſun. The American geographers tell us of a remarkable ſnake found in this lake, called the *hiſſing ſnake*. It is about 18 inches long, and ſmall and ſpeckled. When approached it flattens itſelf, and the ſpots upon its ſkin become viſibly brighter. At the ſame time it blows from its mouth with great force a ſubtile wind, ſaid to be of a nauſeous ſmell, which, if drawn in by the breath of the traveller, infallibly brings on a decline, that in a few months proves fatal. This lake is of more dangerous navigation than any of the others, on account of the many pependicular ſharp rocks which it contains. It communicates with Lake Ontario by the river Niagara, which is about 30 miles in length; and which being croſſed by a branch of the Alleghany mountains, conſiſting of limeſtone rock, forms the celebrated falls of Niagara, one of the moſt wonderful natural objects in the world, on account of the immenſe weight of water that is at once precipitated from a height which different travellers have eſtimated variouſly, from 137 to 160 feet. It has been often deſcribed; but as every traveller ſeems to view it with greater aſtoniſhment than his predeceſſors, we ſhall ſtate the terms in which it is mentioned

421 Deſcription of Niagara. by the duke de la Rochefoucault Liancourt, who viſited it in 1795. "At Chippaway the grand ſpectacle begins. The river which has been conſtantly expanding from Fort Erie to this place, is here upwards of three miles wide; but on a ſudden it is narrowed, and the rapidity of the ſtream redoubled by the declivity of the ground on which it flows, as well as the ſudden contraction of its bed. The channel is rocky; and the interſperſed fragments of rocks increaſe the violence of the ſtream. The country is flat and even to this point; but here a range of white rocks ariſes on each ſide of the river, which is contracted to half a mile's breadth. This range is a branch of the Alleghany mountains, which proceeding from Florida, previouſly to their reaching this point, interſect the whole continent of America. The river, more cloſely hemmed in by the rocks on the right encroaching upon its channel, branches into two arms, one of which flows along the bank formed by the rocks on the right; and the other, far more conſiderable, being ſeparated by a ſmall iſland, makes ſtraight on to the left, and ſweeps through a baſon of ſtone which it fills with much foam and noiſe. At length, being again obſtructed by other rocks which it meets on its right, it alters its courſe with redoubled violence; and, along with the right arm, ruſhes down a perpendicular ledge of rocks 160 feet high, nearly half concave, and probably worn out by the inceſſant impetuoſity of the waters. Its width is nearly equal to that of its bed, the uniformity of which is only interrupted by an iſland which ſeparates the two arms, reſts unſhaken on its rocky baſis, and ſeems, as it were, to ſwim between the two ſtreams which ruſh down at once into this ſtupendous chaſm. The waters of the lakes Erie, Michigan, St Claire, Huron, and Lake Superior, and of the numerous rivers emptying themſelves into theſe lakes, inceſſantly replace the water that thus daſhes down. The water of the falls tumbles perpendicularly on the rocks. Its colour is at times a dark green; at others a foaming white, brilliant throughout, and diſplaying a thouſand variegations as it is ſtruck by the rays of the ſun, or, according to the time of the day, the ſtate of the atmoſphere, the force of the wind, &c. The water which ruſhes down the rocks riſes in part in a thick column of miſt, often towering above the height of the falls and mixing with the clouds. The remainder, broken in its perpendicular deſcent by fragments of rocks, is in continued agitation, ſpouts and foams, and caſts on ſhore logs of wood, whole trees, boats, and wrecks, which the ſtream has ſwept along in its courſe. The bed of the river formed by the two ridges of rocks, which extend a great way farther, is ſtill more narrowed, as if part of this mighty ſtream had vaniſhed during the fall, or were ſwallowed up by the earth. The noiſe, agitation, irregularity, and rapid deſcent of the ſtream, continue ſeven or eight miles farther on; and the river does not become ſufficiently placid for a ſafe paſſage, till it reaches Queenſtown nine miles from the falls. It is ſuperfluous to mention, that notwithſtanding the ſeverity of the winter in this country, the *cataract* as well as the river above it are never frozen. But this is not the caſe with the lakes and ſmaller rivers that ſupply it with water. Enormous flakes of ice ruſh conſtantly down this cataract when the thaw ſets in, without being entirely daſhed to pieces on the rocks; and thus are frequently piled in huge maſſes up to half its height. With the noiſe occaſioned by the falls, we were leſs ſtruck than we expected; and Mr Guillemard, as well as myſelf, who had both ſeen the Rhine fall near Schafhauſen, could not but acknow-

ledge

America. ledge that the noiſe it pro'uces is far more ſtriking. Yet I muſt repeat it again and again, that nothing can ſtand the teſt of compariſon with the falls of Niagara. Let no one expect to find here ſomething pleaſing, wildly beautiful, or romantic; all is wonderfully grand, awful, ſublime: every power of the ſoul is arreſted; the impreſſion ſtrikes deeper the longer you contemplate, and you feel more ſtrongly the impoſſibility of doing juſtice to your perceptions and feelings."

Lake Ontario, which is the loweſt of the great lakes that form the northern frontier of the United States, is of an oval form, and abounds with fiſh of an excellent flavour. It diſcharges itſelf on the north-eaſt into the river Iroquois, which, at the town of Montreal, takes the name of the river St Lawrence; and paſſing by Quebec, falls into the Atlantic ocean at the gulf of St Lawrence.

The river Miſſiſſippi, which forms the third or ſouth-weſtern boundary of the United States, divides their territory from the country of Louiſiana, which belonged to Spain, but has recently been ceded to France. This river is ſuppoſed, when its windings are included, to be upwards of 3000 miles in length, and to extend nearly 2000 in a direct line. It is navigable to the falls of St Anthony in about lat. 44° 30′. About lat. 29°, a large river called the *Illinois*, belonging to the United States, falls into it; and it is ſoon afterwards joined by a larger river than itſelf from the ſouth, called the *Miſſouri*, which has a greater length of navigation. At the diſtance of 230 miles below its junction with the Miſſouri, the river Ohio, which is a mile in breadth, falls into the Miſſiſſippi. From the mouth of the Ohio it continues to deſcend 1005 miles to the town of New Orleans, after paſſing which it falls into the gulf of Mexico. In ſpring floods the Miſſiſſippi riſes to a great height and overflows its banks, depoſiting upon them immenſe quantities of fertilizing mud or ſlime. After its junction with the Miſſouri, its waters become ſo loaded with the earthy particles, that in a half-pint tumbler they have been found to depoſite a ſediment of two inches of ſlime. Its banks, to a great diſtance from its mouth, appear to have been gradually formed by the depoſition of trees and mud, which its floods bring down from the higher country. The ſoil is accordingly extremely ſoft, rich, and moiſt. It is apt to be broken up by the periodical floods of the river, which ſometimes appears to alter its channel.

When in flood, the current of the Miſſiſſippi is ſo ſtrong that with difficulty it can be aſcended. The current deſcends at the rate of five miles an hour; but it is obſerved, that at this period there is a counter current which runs at the rate of about two miles an hour, cloſe to the banks of the river, which greatly aſſiſts the aſcending boats. In autumn, when the waters are low, it does not deſcend faſter than two miles an hour, unleſs where the ſtream is narrowed by cluſters of iſlands, ſhoals, and ſand banks. The circumference of many of theſe ſhoals being ſeveral miles, the voyage is rendered more tedious and dangerous in autumn than in ſpring, when the water covers them to a great depth. The upper parts of the Miſſiſſippi are uſually navigated in veſſels carrying about 40 tons, and rowed by 18 or 20 men; and what is remarkable, the depth of the river increaſes as it is aſcended. The voyage from New Orleans, near the mouth of the Miſſiſſippi, upwards to the river Illinois is uſually performed in eight or ten weeks. The river Miſſouri is ſaid to be navigable about 1200 or 1300 miles beyond its junction with the Miſſiſſippi, but no part of it is within the territory of the United States. By a treaty concluded with Spain in 1795, it was agreed that the navigation of the Miſſiſſippi ſhould be enjoyed in common by the ſubjects of Spain and the citizens of America. America.

The waters in the interior of the United States are no leſs convenient for navigation than thoſe upon the extremities of the country.

422 Lakes in the interior.

The lakes in the interior, however, are by no means equal in extent to thoſe upon the frontier. They are chiefly ſituated in the ſtate of New York or in its vicinity. Lake Champlain is the largeſt. It lies nearly to the eaſt of Lake Ontario, and is about 80 miles in length from north to ſouth, and 14 miles over at its broadeſt part. It is well ſtored with fiſh, and the land around it is good. Crown Point and Ticonderago are ſituated on the ſouthern bank of this lake. Lake George lies in a mountainous country ſouth-weſt of Lake Champlain, and is about 55 miles long from north-eaſt to ſouth-weſt, but narrow. The lakes Seneca and Cayoga are each about 30 or 40 miles in length. Lake Oneida extends to 25 miles. Beſides theſe there are ſeveral others of leſs magnitude, though uſeful for inland navigation, called *Oſego*, *Chatoque*, *Caniaderago*, and *Uſtayantho*. There is alſo in Orange County an amphibious tract called the *Drowned lands*, conſiſting of about 40,000 or 50,000 acres. The waters which deſcend from the ſurrounding hills, being but ſlowly diſcharged by the river Wallkill, cover theſe vaſt meadows every winter, ſo that the ſurface of them can be navigated. They were thus rendered extremely fertile, but the inhabitants in the neighbourhood are expoſed to intermittent fevers.

423 Eaſtern rivers.

It has been already mentioned that, to the eaſtward of the Alleghany mountains, all the rivers flow into the Atlantic ocean. Of theſe, beginning with the north, and going ſouthward, the following are the moſt remarkable. In the ſtates to the eaſtward of New York, which were formerly called the *New England colonies*, and which are now divided into the five ſtates of New Hampſhire, Maſſachuſets, Rhode Iſland, Connecticut, and Vermont, there is only one river of any importance, called *Connecticut river*. It riſes in lat. 45° 10′, long. 71° weſt from London. Its length in a ſtraight line is nearly 300 miles. At its mouth is a bar of ſand which obſtructs the navigation. Ten feet water at full tides is found upon this bar. The river is navigable to Hartford, which is 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 the ſtream, and of ſo light a make as to be portable in carts. They are taken out of the river for ſeveral miles at different carrying-places.

To the ſouth of Connecticut river is Hudſon's river, one of the largeſt and fineſt in the United States. It riſes in the mountains between the lakes Ontario and Champlain, and is 250 miles in length, falling into the ocean near New York, which ſtands upon it. About 60 miles above New York the water becomes freſh; but

America. but the tide flows a few miles beyond the flouriſhing town called *Albany*, 160 miles above New York, and to this diſtance the river is navigable by ſloops of 80 tons burden. From Albany to the neighbourhood of Lake George is 65 miles, and to this diſtance the river is navigable by light boats; but there are two portages, or carrying-places in the way, of half a mile each. By this river the produce of the remoteſt farms is eaſily and ſpeedily conveyed to a certain and profitable market at the great trading city of New York. Its banks are populous to a conſiderable diſtance, and a flouriſhing inland trade is carried on upon it between Albany and New York in nearly 100 veſſels of about 70 tons burden, the greater part of which belong to the inhabitants of Albany. They make ten voyages in a year, are navigated by a maſter, a mate, and two men, who receive of wages, the maſter 20, the mate 15, and the ſeamen 9 dollars a-month each.

The next great river to the ſouthward is the Delaware. It riſes in the ſtate of New York in Lake Utſtayantho, and takes its courſe ſouth-weſt, till it croſſes into Pennſylvania, in latitude 42°. Thence it ſtill proceeds ſouthward, dividing the ſtates of New York and New Jerſey, paſſing into the ocean through Delaware bay, having New Jerſey on the north-eaſtern ſide, and Pennſylvania and Delaware on the weſt. From the mouth of Delaware bay, between Cape Henlopen and Cape May, to the city of Philadelphia, is about 118 miles. So far there is a ſufficient depth of water for a 74 gun ſhip. At Philadelphia the river is extremely beautiful, paſſing through a rich and populous country. It is three miles broad, and the water is perfectly freſh. From Philadelphia upwards to Trenton Falls, where the ſloop-navigation ends, is 35 miles. The river is navigable 40 miles farther for boats that carry eight or nine tons; and, with ſome carrying-places, it is navigable for Indian canoes, or ſuch boats as we have already mentioned to be in uſe upon Connecticut river, for 150 miles. The tide reaches Trenton Falls, and riſes ſix feet at Philadelphia. Three miles below this city, the Delaware receives the river Schuylkill, which is navigable about 85 or 90 miles.

The Suſquehannah river alſo riſes in the ſtate of New York, croſſes the ſtate of Pennſylvania, and flows into the great bay of Cheſapeak, after receiving many large ſtreams, ſeveral of which are navigable for 50 miles; this river itſelf being navigable to an immenſe extent, though ſometimes interrupted by rocks, which form troubleſome rapids.

Next to theſe follow the Virginian rivers, the greater part of which flow into the bay of Cheſapeak. The value of theſe ſtreams can only be underſtood by an inſpection of the map of the country. Almoſt every farm houſe, to the eaſtward of the Alleghany mountains, has a navigable river at its door; the reſult of which has been, that few towns of any conſequence exiſt there, the inhabitants having been induced to extend themſelves everywhere along the banks of the rivers, by means of which they enjoy at once all the advantages of agriculture and of commerce; every planter being in ſome meaſure a merchant as well as a cultivator of the ſoil. The moſt northerly of the Virginian rivers is the Potowmack, upon which the federal city of Waſhington is placed. It is ſeven miles and a half broad at the mouth. The diſtance from the capes of Virginia to the termination of the tide-water in this river America. is above 300 miles, and it is navigable for ſhips of the greateſt burden nearly to that extent. Thereafter, it is obſtructed by four conſiderable falls, or rather rapid deſcents of the ſtream among rocks, which for a few miles interrupt the navigation. At theſe falls, however, navigation is continued, by means of canals ſupplied with locks; ſo that this river affords a water communication for many hundred miles above the termination of the tide. It alſo receives a great variety of navigable ſtreams; one of which is the Shenandoah, which is ſaid to be navigable for ſmall veſſels for upwards of 100 miles. The Rappahannock, York river, and James's river, with their various tributary ſtreams, follow in ſucceſſion. In a multitude of directions, they afford a communication acroſs the firſt ridges of mountains, called the *Blue Mountains*, to the foot of the great middle ridge, or the proper Alleghany mountains. In their courſe they not only facilitate the intercourſe of the inhabitants, but, in ſeveral ſituations, exhibit inſtances of ſplendid and beautiful ſcenery. The junction of two of theſe rivers is thus deſcribed by an American writer: "The paſſage of the Potowmack through the Blue Ridge is perhaps one of the moſt ſtupendous ſcenes in nature. You ſtand on a very high point of land. On your right comes up the Shenandoah, having ranged along the foot of the mountain 100 miles to ſeek a vent. On your left approaches the Potowmack, in queſt of a paſſage alſo. In the moment of their junction, they ruſh together againſt the mountain, rend it aſunder, and paſs off to the ſea. The firſt glance of this ſcene hurries our ſenſes into the opinion, that this earth has been created in time: that the mountains were formed firſt: that the rivers began to flow afterwards: that in this place particularly they have been dammed up by the Blue Ridge of mountains, and have formed an ocean which filled the whole valley: that, continuing to riſe, they have at length broken over at this ſpot, and have torn the mountain down from its ſummit to its baſe. The piles of rock on each hand, but particularly on the Shenandoah, the evident marks of their diſruption and avulſion from their beds by the moſt powerful agents of nature, corroborate the impreſſion. But the diſtant finiſhing which nature has given to the picture is of a very different character. It is a true contraſt to the foreground. It is as placid and delightful as that is wild and tremendous. For the mountain being cloven aſunder, ſhe preſents to your eye, through the cleft, a ſmall catch of ſmooth blue horizon, at an infinite diſtance in the plain country, inviting you, as it were, from the riot and tumult roaring around, to paſs through the breach, and participate of the calm below. Here the eye ultimately compoſes itſelf; and that way too the road happens actually to lead. You croſs the Potowmack above the junction, paſs along its ſide through the baſe of the mountain for three miles, its terrible precipices hanging in fragments over you, and within about twenty miles reach Fredericktown, and the fine country round it."

To the ſouthward of Virginia, that is, in the ſtates of North Carolina and Georgia, a great variety of rivers flow into the ocean. As the face of the country, however, is very level, the ſand which they bring down in ſpring floods, or which is caſt up by the ocean upon

America. the coaſt, is apt to obſtruct the entrance into them; ſo that they are deeper within the country than at the ſhore. One general rule obtains with regard to them: They are navigable by any veſſel that can paſs the bar at their mouths; and while a river continues broad enough for a veſſel to turn round, there is generally a ſufficient depth of water for it to proceed. In North Carolina, the principal rivers are, the Roanoke, which is navigable for ſmall veſſels about ſixty or ſeventy miles; the Pamlico, which is navigable for 90 miles; Neus river, which carries ſmall boats to the diſtance of 250 miles; and Trent river, which is navigable for 40 miles. In South Carolina are the Sante, the Savannah, and the Pedee, which riſe from various ſources in that ridge of mountains which divides the waters which flow into the Atlantic ocean from thoſe which fall into the Miſſiſſippi. They are navigable to a great diſtance, as well as a variety of others of leſs note. In Georgia there are alſo ſeveral rivers, which are navigable to the diſtance of eighty or ninety miles; but the entrance into them from the ocean is very difficult, as the extreme flatneſs of the country prevents the ſtream from having ſufficient force to keep their current clear of obſtructions at their confluence with the ſea-tides.

424 Weſtern waters. The weſtern waters of the United States, or thoſe beyond the Alleghany range, are not leſs abundant, or leſs convenient for navigation, than thoſe on the eaſtern ſide of the mountains. We have already remarked, that at Fort Pitt the great river Ohio commences; being there formed by the confluence of two, or rather three rivers, the Alleghany, the Monongahela, and the Yohogany; which laſt runs into the Monongahela, about fifty miles above Fort Pitt. Theſe three rivers, previous to their junction, afford an inland navigation of many hundred miles. The Monongahela is no leſs than 400 yards wide at its mouth. At the diſtance of 100 miles above this, it is ſtill 300 yards in breadth, and affords good navigation for boats. For 50 miles higher it is ſtill navigable; though the navigation is apt to be interrupted during dry ſeaſons. The Alleghany alſo affords a very diſtant navigation, extending at times in very ſmall veſſels to within 15 miles of Lake Erie, on the northern boundary of the United States. The Ohio, being formed by the junction of theſe rivers, proceeds along the back, or weſtern ſide, of the Alleghany, to the diſtance of 1188 miles before it falls into the Miſſiſſippi, receiving in its courſe a great variety of tributary ſtreams, both from its eaſtern and weſtern ſides. It is ſaid to be one of the moſt beautiful rivers on earth; its current is gentle; its waters are clear; and its boſom ſmooth and unbroken by rocks and rapids: a ſingle inſtance excepted. It is one quarter of a mile wide at Fort Pitt, and increaſes gradually to one mile in width at its mouth; though at various places it is occaſionally broader and narrower. At the rapids or rocky part of its channel, which for about a mile diſturb the navigation, it is only a quarter of a mile in breadth. Theſe rapids are in latitude 38° 8′. It affords at all times a ſufficiency of water for light boats to Fort Pitt. The inundations of the river begin about the laſt of March, and ſubſide in July. During theſe, were it not for the rapidity of the current, and the ſudden turns of the river, a firſt rate man of war might aſcend from the ocean to the rapids. But at this place the riſe of the water does not exceed ten or twelve feet. The water there deſcends about thirty feet in a mile and a half. The bed of the river is a ſolid rock, and is divided by an iſland into two branches. But it is ſaid that the ſouthern branch is at moſt ſeaſons navigable in ſmall boats, when conducted by ſkilful pilots. America.

The following are the chief rivers which flow into the Ohio from the eaſt: The Great Kanhaway, and the Little Kanhaway; the navigation of which laſt is much interrupted by rocks. The former, however, affords a tolerable navigation of about 90 miles, and is 280 yards wide at its mouth. The Little Kanhaway is 150 yards broad; but it is navigable only for 10 miles.—After theſe are the rivers called Sandy, Licking, and Kentucky. The former conſtitutes the eaſtern boundary of Kentucky, and reaches the Alleghany mountains. It is of no great ſize. Licking river is 100 miles in length, and 100 yards broad at its mouth. The Kentucky is a very crooked ſtream, of 200 miles in length. It falls into the Ohio by a mouth of 100 yards broad.

Below the rapids of the Ohio, in the rich country of Kentucky, is Salt river, 90 miles in length, and 80 yards wide. Green river falls into the Ohio 120 miles below the rapids. Its courſe is upwards of 150 miles. Cumberland river falls into the Ohio 413 miles below the rapids. Its length is upwards of 550 miles. Theſe rivers are navigable for boats almoſt to their ſources, without rapids or interruptions for the greateſt part of the year. Their banks are generally high, and compoſed of limeſtone. Below theſe is the Teneſſee, which runs into the Ohio a ſhort way below the mouth of the Cumberland. The Teneſſee is 600 yards wide at its mouth, and upon aſcending it, to the diſtance of 260 miles, it widens to between two and three miles; which width it continues for nearly thirty miles. Thus far it is navigable by veſſels of great burden. Here, however, it is interrupted by certain ſhoals, called the *Muſcle Shoals*, from the great quantity of ſhellfiſh with which they are covered. Theſe ſhoals can only be paſſed in ſmall boats; above which, however, the river again becomes navigable for boats of forty or fifty tons burden for ſome hundred miles; and it is eaſily navigated at leaſt 600 miles above the Muſcle Shoals.

Of the rivers that flow into the Ohio from the weſt the following are the chief: The Muſkingum, which is a gentle ſtream, confined by high banks. With a portage or carrying-place of about one mile, it affords a communication with a ſmall navigable ſtream called *the Cayahoga*, which flows into Lake Erie. Thereafter is the river Hockhocking, inferior to the Muſkingum, but navigable for large boats about ſeventy miles, and for ſmall ones much farther, through a country abounding with coal, iron ſtone, and other minerals. Next is the Sioto, which can be navigated with large barges for 200 miles. Then follows the Great Miami, which is navigable to an immenſe diſtance, even to the neighbourhood of Lake Erie. The Wabaſh falls into the Ohio by a mouth 270 yards wide, 1020 miles below Fort Pitt. The Wabaſh is a beautiful river, with high and fertile banks. It can be navigated with boats drawing three feet water, 412 miles, and by large canoes 197 miles farther. Beſides theſe ſtreams which fall into the Ohio, a variety of

America. rivers of great size and importance are to be found still farther to the westward within the territory of the United States. They either fall into the Mississippi on the south-west, or into the great northern lakes; but they are not yet sufficiently known to admit of accurate description. One of the chief of them is the Illinois, which falls into the Mississippi, 176 miles above or to the westward of the Ohio, by a mouth about 400 yards wide. It is navigable to a great distance, and interlocks with the rivers that fall into the northern lakes, in such a way as to furnish a communication with Lake Michigan, with the aid of two portages, the longest of which does not exceed four miles. It receives a number of rivers, which are navigable for boats from 15 to 180 miles.

One general remark must be made with regard to all the American rivers; that, in consequence of the immense torrents of rain which fall at certain seasons of the year, they are liable to swell, and to overflow their banks in a most violent manner; arising, in a short time, 10 or even 20, or 25 feet in height. This renders their navigation not a little difficult, on account of the great force that is necessary to convey a vessel upwards against the rapidity of the stream. These great floods also render it difficult to establish canals at those parts of any river where falls, or, as the Americans stile them, rapids, occur; because the locks, which, in such situations, are necessary upon the canals to raise and let down the vessels, are in great danger of being swept away by the sudden swelling and overflowing of the river. Notwithstanding this inconvenience, however, it is abundantly evident, that no country on earth possesses the same advantages, in point of internal communication, with the United States of America. Even the great Alleghany ridge, which seems to form a barrier between the east and the west, is so closely approached on both sides by navigable streams, that the land carriage necessary in crossing it extends, in some situations, to little more than 40 miles; and, when the increasing population of the country shall have rendered such a measure useful or necessary, it will probably be found not difficult to complete the communication by water by the aid of artificial canals.

425 Face of the country. With regard to the general face of the country within the territory of the United States, it is very various. We have already stated, that a great chain of mountains runs from the state of Georgia northward, parallel to the Atlantic ocean, all the way to the great northern lakes. These mountains are not solitary, or scattered in a confused manner; but are formed into different ridges, receiving various appellations in different states. In Pennsylvania, Virginia, and North Carolina, the principal ridges, beginning on the east, are called, first, the *Kittatinny* or *Blue mountain*, at the distance from 120 to 130 miles from the sea. It is about 4000 feet high, and the country rises from the sea so slowly and gradually towards it, as to appear altogether level. Back from this first ridge, and nearly parallel to it, are the ridges called *Peters*, *Tuscorara*, and *Nescopek*; but these names are not in all places adhered to. Then follows the ridges called in Pensylvania *Shareman's hills*, *Sidelong hills*, *Ragged*, *Great-warriors*, *Erits and Wills mountains*; then the great Alleghany ridge which gives its name to the whole. Beyond it are the Laurel and Chesnut ridges, and various others. These ridges being parallel to each other are themselves incapable of cultivation; but they are divided by rich plains of various breadth and of immense length, containing rivers of different degrees of magnitude. On the east of the mountains, from the lowest ridge to the ocean, the country, as already mentioned, descends very gradually; and in the southern states, for 150 miles from the ocean, is almost entirely level, consisting of a low flat country, apparently formed by sand thrown up by the tides, and by particles of mud deposited by the rivers in their spring floods. In the southern states, that is, those to the south of New York, the soil near the rivers is coarse or fine, according to its distance from the mountains. Near them it contains a large mixture of coarse sand; but on the banks of the rivers towards the sea, it consolidates into a fine clay; which, when exposed to the weather, falls down into a rich mould. In the states of South Carolina and Georgia, for many miles from the ocean, when a pit is dug to the depth of 20 feet, every appearance of a salt marsh is usually found, such as marsh grass, marsh mud, and brackish water. America.

Beyond the Alleghany mountains the country to the westward is irregular, broken, and variegated, but without great mountains. Various small ridges, however, descend to the westward, between which flow the rivers that run into the Ohio. In some situations, particularly in the neighbourhood of Pitsburg, the variety of its surface is said to render the country extremely beautiful.

Towards the north part of the state of New York and in the New England states, the country, different from the rest of America, is rough and hilly, or even mountainous; though, upon the whole, their mountains are trifling when compared to those in other parts of the world. Nor does it appear, that in almost any part of the United States, any such thing is to be met with as mountains entirely rugged and barren, reaching their naked summits to the clouds. Even to the top of the Alleghany ridge the whole country is one waving forest, though the trees are of different size and species, according to the variety of soil upon which they stand. Notwithstanding this general regularity of the surface of the country, to the eastward of the mountains, it is not destitute of objects which mark it to have undergone convulsions or changes. Of these we may mention one instance, being a curiosity worthy of attention, in the state of Virginia, called *Natural Bridge* or *Rockbridge*. It is on the ascent of a hill, which seems to have been cloven through its length by some great convulsion. The fissure just at the bridge is, by some admeasurements, 270 feet deep, by others only 205. It is about 45 feet wide at the bottom, and 90 feet at the top. The breadth of the bridge in the middle is about 60 feet, but more at the ends, and the thickness of the mass at the summit of the arch is about 40 feet. A part of this thickness consists of a coat of earth which gives growth to many large trees. The residue, with the hill on both sides, is one solid rock of limestone. Though the sides of this bridge are provided in some places with a parapet of fixed rocks, yet few men have resolution to advance, without creeping upon their hands and feet, to look over into the abyss. To a spectator from the low ground, the arch appears beautiful and light as if springing

426 Natural bridge.

America. springing towards heaven; affording through it a pleaſing view of the mountains at five miles diſtance. The water paſſing under the bridge is called *Cedar Creek*, and the bridge itſelf is a part of a public road, as it affords a commodious paſſage acroſs a valley. The county, in which it is ſituated, is called from it the

427 *County of Rockbridge.*

Caverns. In the ſame ſtate of Virginia, there are ſome caverns mentioned by the American geographer, Dr Morſe, which are not unworthy of notice as natural curioſities. The moſt noted is that called *Maddiſon's Cave*, on the north ſide of the mountains denominated the *Blue Ridge*, near the river Shenandoah. It is in a hill of about 200 feet perpendicular height, the aſcent of which on one ſide is ſo ſteep, that you may pitch a biſcuit from its ſummit into the water which waſhes its baſe. The entrance of the cave is in this ſide, about two-thirds of the way up. It extends into the earth about 300 feet, branching into ſubordinate caverns, ſometimes aſcending a little, but more generally deſcending, and at length terminates in two different places, at baſons of water of unknown extent, nearly on a level with the water of the river, of which, however, they do not ſeem to be refluent water, as they are never turbid, and do not riſe and fall in correſpondence with it, in ſeaſons of rain or drought. The vault of the cave is of ſolid limeſtone, from 20 to 40 and 50 feet high, through which water is continually percolating. This water has depoſited a cruſt, forming the appearance of an elegant drapery, on the ſides of the cave, and in dropping from the roof of the vault, generates on that and on the baſe, ſtalactites of a conical form, ſome of which have met and formed maſſy columns.

There is another cave, in the North Ridge or North Mountain, which enters from the ſummit of the ridge. The deſcent is at firſt 30 or 40 feet perpendicular, as into a well, from whence the cave extends nearly horizontally 400 feet, preſerving a breadth of from 20 to 50 feet, and a height of from five to 12 feet. The heat of the cave is permanently at about 57° of Fahrenheit's thermometer.

In another ridge is a blowing cave in the ſide of a hill. It is about 100 feet diameter, and conſtantly emits a current of air, of ſuch force, as to keep the weeds proſtrate to the diſtance of 20 yards before it. The current is ſtrongeſt in froſt, and weakeſt after long rains. It probably communicates with a waterfall in the bowels of the earth, the daſhing of which generates the current of air, as we know that at the mines, called *Lead Hills*, in Scotland, for more than a century paſt, a ſmall waterfall at the bottom of a mine, has been uſed for the purpoſes of ventilation, the air generated from the water being conveyed in large tubes to any place where it is wanted. The blowing engine, called the *trompe*, which is uſed at ſome founderies, is alſo conſtructed on the ſame principle.

Rochefoucault's Travels, vol. ii. On the firſt of June 1796, a pretty remarkable phenomenon occurred in the vicinity of the town of Katſkill, in the ſtate of New York. The country in the neighbourhood is a ſucceſſion of little hills, or rather ſmall elevations, detached from each other, and only connected a little at the baſis. One of theſe hills, the neareſt to Katſkill Creek, and elevated about 100 feet above the level of the creek, ſuddenly ſuffered a ſinking of more than half its declivity. It might have meaſured about 150 feet, from its ſummit to the extremity of its baſe, following the line of inclination. A breadth of about 80 fathoms fell in, beginning at about 3 or 4 fathoms from the top. The ſunken part gave way all of a ſudden, and fell ſo perpendicularly that a flock of ſheep feeding on the ſpot, went down with it without being overturned. The trunks of trees that remained on it in a half rotten ſtate, were neither unrooted, nor even inclined from their former direction, and now ſtand at the bottom of this chaſm, of above four acres in extent, in the ſame perpendicular poſition, and on the ſame ſoil. However, as there was not ſufficient ſpace for all this body of earth, which before had lain in a ſlope, to place itſelf horizontally between the two parts of the hill that have not quitted their ſtation, ſome parts are cracked, and as it were furrowed. But a more ſtriking circumſtance is, that the lower part of the hill, which has preſerved its former ſhape, has been puſhed and thrown forward by the ſinking part making itſelf room; that its baſe has advanced five or ſix fathoms beyond a ſmall rivulet, which before flowed at the diſtance of above 10 fathoms from it; and that it has even entirely ſtopped the courſe of its ſtream. The greateſt elevation of the chaſm, is about 50 or 60 feet: in its ſides it has diſcovered a blue earth, exhibiting all the characteriſtics of marl. In ſome of the ſtrata of the marl is found ſulphat of lime in minute cryſtals. The ſinking of the hill made ſo little noiſe, as not to be heard at the proprietor's houſe, at the diſtance of 300 fathoms, nor at the town, which is ſeparated from the hill only by the narrow ſtream of the creek.

428 Soil. The ſoil of the United States is not leſs various than in other countries. In the New England ſtates, in conſequence of the irregularity of the ſurface, rich and poor territory are interſperſed; but in the ſouthern ſtates, the limits of the fertile and of the more unproductive parts of the country are more diſtinctly marked. In general the ſoil is leſs deep and rich as the land approaches towards the mountains. The neighbourhood of the ſea conſiſts of great ſwamps, which being overflowed by the adjoining rivers, render the land unhealthy, though fit for the cultivation of rice and other valuable productions. Hence, as the firſt or loweſt ridges of mountains poſſeſs a conſiderable degree of fertility, they are better inhabited, becauſe more healthful than the low country. The long vallies between the ridges of the Alleghany mountains are everywhere fertile; but they are ſometimes very narrow. Beyond the mountains from Fort Pitt to the northern lakes in the back parts of the ſtate of New York, the country is fertile but moiſt, and lies low. Around Fort Pitt itſelf, as already mentioned, to a conſiderable diſtance, the country has a beautiful variegated aſpect. On the eaſtern ſide of the Ohio, however, below Fort Pitt, the country ſpeedily becomes rugged; and, for ſome hundred miles is little inhabited, to the borders of the fertile country of Kentucky, which in a few years has been ſettled, rendered populous, and aſſumed into the number of the United States. To the weſtward of the Ohio little is known, excepting that the country is covered with foreſts and abounds in game, which laſt circumſtance is always a ſufficient proof of the exiſtence of abundance of vegetable food, and conſequently of a fertile ſoil. In general, however, concerning

America. the whole American territory, it may be obſerved, that wherever the land is tolerably level, it muſt have been originally fertile. Being covered with foreſts, it received every year a bed of leaves ſpread over its ſurface; which, by continually rotting in ſucceſſion, have formed a vegetable mould of great fertility.

429 Minerals. The mineral productions of the territory of the United States are various, as in other parts of the world. The form of mountains, rocks, and beds, of different minerals, is the ſame here as elſewhere. There are found different ſpecies of granite, combined and varied as in the mountains of Europe; innumerable kinds of ſchiſts, of limeſtones, more or leſs perfect, and minerals of almoſt every ſpecies. In general, however, it may be remarked, that American mineralogy offers few varieties for obſervation, as the ſame ſubſtances uſually pervade a conſiderable tract of country. The great mountains, that is to ſay, the moſt elevated, particularly the central ridge of the Alleghany, and the higheſt mountains of New England, are generally formed of granite. Thoſe of inferior altitude ſucceſſively exhibit ſchiſtus more or leſs perfect, ſlate, feldtſpath, calcareous ſtone, and ſome ſand ſtones of extreme hardneſs, and in a ſtate of great perfection. The whole territory to the eaſtward of the Alleghany mountains, appears to emboſom vaſt quantities of iron ore. The iron ore is of two kinds: one is capable of being manufactured into malleable iron, and is found in the mountains, and alſo in low barren ſoils. The other kind of iron is called *bog-ore*. It is produced in rich valleys. It is ſaid to conſiſt of iron united with the phoſphoric acid. In the furnace it yields iron of a hard brittle quality. In conſequence of the abundance of timber ſtill to be found in the country, a conſiderable number of iron mines are wrought to the eaſtward of the mountains; the fuel uſed in which conſiſts of charcoal. Their produce, however, is very trifling; none of them make more than to the amount of 1600 tons of pig iron annually, and about 150 of bar iron. The toughneſs of the caſt iron manufactured in ſome of the Virginian furnaces, is ſaid to be very remarkable. Pots and other utenſils, caſt thinner than uſual of this iron, may be ſafely thrown into or out of the waggons in which they are tranſported. Salt pans made of it, and no longer wanted for that purpoſe, cannot be broken up to be melted again, unleſs previouſly drilled in many parts.

Coal mines are wrought in the eaſtern part of Virginia; but, upon the whole, little coal is found in the United States to the eaſtward of the mountains, where iron ores are extremely abundant. On the contrary, to the weſtward of theſe mountains, iron has ſcarcely been perceived; whereas coal is in the greateſt plenty. In the fine country round Pitſburg, at the head of the Ohio, 320 miles weſt from Philadelphia, coal is not only extremely plentiful, but of a very ſuperior quality. A bed of it in that neighbourhood was on fire for about twenty years, but little damage appears to have been produced. Coal has been diſcovered in ſo many places to the eaſtward of the Ohio, as to produce an opinion, that the whole tract of country beyond the mountains, from Pitſburg to the Miſſiſſippi, abounds with it. Immenſe beds of limeſtone rock are to be found in the moſt eaſtern tract of mountains. Below theſe mountains it ſeldom appears; but in Virginia, from the Blue Ridge weſtward, the whole country ſeems to be founded on a rock of limeſtone, beſides great quantities on the ſurface both looſe and fixed. It is formed into beds which range as the mountains and ſea coaſt do, from ſouth-weſt to north-eaſt; the laminæ of each bed declining from the horizon towards a parallelism with the axis of the earth. In ſome inſtances, however, but rarely, they are found perpendicular and even reclining the other way. But ſuch caſes are always attended with ſigns of convulſion, or other circumſtances of ſingularity. Limeſtone is alſo found on the Miſſiſſippi and Ohio. Indeed that mineral appears to pervade the whole length of the ridges of the Alleghany mountains, and towards the lakes Erie and Ontario, the whole country reſts upon limeſtone. It is not found on the high ridges themſelves of the Alleghany mountains; but it occupies the fertile vallies between them, and is ſeen at the banks of the rivers which paſs along theſe vallies. It ſometimes appears to the eaſtward, in the form of very fine marble, chiefly coloured, quarries of which are wrought to adorn the houſes of the wealthier citizens in the great towns. America.

Copper has been found in a variety of ſituations to the eaſtward of the mountains. At the diſtance of eight or ten miles from New York is a pretty rich copper mine. The ore is irregularly ſcattered through a kind of ſand-ſtone, often reſembling grit, and ſometimes the pudding-ſtone. It yields from 60 to 70 pounds of fine copper per cwt. Previous to the revolution it uſed to be carried to England, where it bore a higher price than any other ore of the ſame metal. The mine has been ſeveral times wrought, abandoned, and reſumed. Some workmen, moſtly Germans, were brought over from Europe for the purpoſe within theſe few years, and paid from 15 to 20 dollars per month. But the high price of labour and the difficulty of obtaining well executed machinery, impoſe in the United States great difficulties upon all mineralogical enterpriſes. At New Brunſwick in New Jerſey, a copper mine was at one time wrought, in which large quantities of virgin copper were diſcovered. In particular, in the year 1754, two lumps of virgin copper are ſaid to have been found, which together weighed 1900 pounds. In the courſe of a few years preceding, within a quarter of a mile of New Brunſwick, ſeveral pieces of virgin copper, from five to thirty pound weight, in whole upwards of 200 pounds, were even turned up in a field by the plough; but the mine has ceaſed to be wrought, and the ſearch for the metal diſcontinued.

Conſiderable quantities of black lead are found, and occaſionally taken for uſe from a place, called *Winterham*, in the county of Amelia in Virginia. No work is eſtabliſhed there; but thoſe who want the mineral go and procure it for themſelves.

To the weſtward of the mountains ſome lead mines have been found, which will probably hereafter become valuable. In the weſtern part of the ſtate of Virginia, one mine has been for ſome time wrought by the public. The metal is mixed ſometimes with earth and ſometimes with rock, which required the force of gunpowder to open it. The proportions yielded are from 50 to 80 pounds of pure metal, from 100 pounds of worked ore. The moſt common proportion is that of 60 to 100 pound. The lead contains a portion of ſilver, too ſmall to be worth ſeparation under any proceſs known

to

America. to the American workmen. The veins are at times very flattering, and afterwards diſappear ſuddenly and totally. They enter the ſide of the hill and proceed horizontally. Only about 30 labourers have been employed, and they cultivate their own corn. They have produced 60 tons of lead in a year, but the general quantity is from 20 to 25 tons. Lead mines are alſo ſaid to have been diſcovered on the upper parts of the Miſſiſſippi, extending over a great length of country; but they are not wrought. Silver mines are alſo ſaid to have been found in the territory of New York, and in the weſtern country, particularly on the Wabaſh river; but they are too poor to be worth working. In the territory of New York zinc has been found, and likewiſe manganeſe, with various kinds of pyrites; alſo petriſied wood, plaſter of Paris, talc, cryſtals of various kinds and colours, aſbeſtos, and ſeveral other foſſils; alſo a ſmall black ſtone, which vitrifies with little heat and makes good glaſs.—A kind of mica, called by the Americans *iſinglaſs*, has alſo been found, which is tranſparent, and capable of being divided into thin laminæ or ſheets, which may be uſed as a convenient ſubſtitute for window glaſs. Amethyſts have been frequently found in Virginia; and even the emerald is not unknown. In the north mountains are immenſe bodies of ſchiſt, containing impreſſions of ſhells of various kinds. Petrified ſhells are alſo found in very elevated ſituations at the firſt ſources of the Kentucky river. On the banks of Savannah river in South Carolina, about 90 miles from the ſea in a direct line, and 150 or 200 as the river runs, there is a remarkable collection of oyſter ſhells of an uncommon ſize. They run in a north-eaſt and ſouth-weſt direction, nearly parallel with the ſea coaſt, in three diſtinct ridges, which together occupy a ſpace of ſeven miles in breadth. Such a phenomenon cannot eaſily be accounted for in any other way than by ſuppoſing the whole of this flat country to have been at one period an appendage of the ocean.

430 Sulphur and nitre found in the weſtern territory.

Sulphur is ſaid to be found in ſeveral places of the weſtern territory; and nitre is obtained, as in Spain, by lixiviating the fat earth that is found upon the banks of the rivers. But the moſt valuable mineral that has hitherto been found in Kentucky and other parts of the weſtern territory, conſiſts of the ſalt that is obtained by the evaporation of the water of certain ſprings. Such ſprings appear to be unknown to the eaſtward of the mountains; but they abound upon the Ohio, where they are more neceſſary on account of the great diſtance from the ſea. They were diſcovered in the following curious manner:—The firſt inhabitants found, that the wild beaſts of the foreſt, eſpecially the buffaloes and deer, were accuſtomed to come in great crowds to certain ſpots, and there to employ themſelves, apparently with much pleaſure, in licking the ground. On examining the ſoil at theſe places, it was found to poſſeſs a conſiderable impregnation of ſea ſalt, of which almoſt all animals that feed upon vegetables are known to be fond. The want of this commodity was a ſource of much diſtreſs to the firſt emigrants to Kentucky, and was one of the chief obſtacles to the ſettlement of the country; but the example of the inferior animals indicated a mode of relieving their wants. The ſpots frequented by the buffaloes were called *licks*, and at every lick it was found that an area

431 Salt ſprings, or licks, in Kentucky.

of from five to ten acres is impregnated with common ſalt; ſo that by digging wells ſalt water might be obtained, from which ſalt can be extracted by evaporation. At leaſt 12 of theſe licks, or ſalt ſprings, have been found in the new ſtate of Kentucky; the principal of which are, Bullet's Lick, or Salt River, 20 miles from the rapids of the Ohio; Drinnon's Lick, about a mile and a half from the mouth of the Kentucky. On what is called *Licking Creek* there are two ſprings, called the *Upper* and *Lower Blue Licks*; and there is one called *Great Bone Lick*, from the bones of animals of a monſtrous ſize, of a ſpecies that no longer exiſts, that have been found ſcattered in its neighbourhood. The water obtained from theſe ſprings is by no means ſo ſtrong as ſea water. It requires nearly 400 gallons to make one buſhel of ſalt, which is more by one half than would be wanted of ſea water in the ſame latitude to produce that quantity. In conſequence, however, of the abundance of fuel that exiſts in a country where the fineſt timber is ſtill conſidered as a nuiſance, ſalt is here manufactured in plenty, and is ſold tolerably cheap.

America.

432 Names of the ſalt ſprings.

433 Mineral ſprings.

Various ſprings of water impregnated with other mineral ingredients have been found in the territory of the United States, ſome of which are much frequented by valetudinarians. In 1794, a ſulphureous ſpring was diſcovered at a few yards diſtance from the banks of the river Chippaway, which falls into the Niagara, a little above the falls. On the approach of a firebrand, the vapour or ſteam kindles, aſſumes the form of burning ſpirit of wine, and burns down to the bottom. In the ſtate of New York, the ſprings of Saratoga are much noted. They are eight or nine in number, ſituated on the margin of a moraſs, about twelve miles weſt from the confluence of a ſtream called *Fiſh Creek*, with Hudſon's river. They are ſurrounded by a limeſtone rock, apparently formed of petrifactions depoſited by the water. One of the ſprings particularly attracts attention: It ſometimes riſes above the earth in the form of a pyramid. The aperture in the top which diſcovers the water is perfectly cylindrical, about nine inches diameter. In this the water is about twelve inches below the top, except at its annual diſcharge, which is commonly at the beginning of ſummer. At all times it appears to be in as great agitation as if boiling in a pot, although it is exremely cold. The ſame appearances obtain in the other ſprings, except that the ſurrounding rocks are of different figures, and the water flows regularly from them. The air which riſes in the ſprings, and cauſes the ebullition, appears to conſiſt in part at leaſt of carbonic acid gas, with which the water is ſtrongly impregnated, as well as with lime, diſſolved by the acid. It alſo contains a chalybeate impregnation. In the chain of the Alleghany mountains called the *Laurel Ridge*, about latitude 36°, there is a ſpring of water 30 feet deep, very cold, and as blue as indigo; but the nature of the impregnation has not been aſcertained.

There is in Pennſylvania, beyond the mountains, a ſtream called *Oil Creek*, which flows into the Alleghany river. It iſſues from a ſpring, on the top of which floats an oil ſimilar to that called *Barbadoes tar*, and from which one man may gather ſeveral gallons in a day. The troops ſent to guard the weſtern poſt halted at this ſpring, collected ſome of the oil, and bathed their

America. their joints with it. This gave them great relief from the rheumatic complaints with which they were affected. The waters, of which the troops drank freely, operated as a gentle purge.

In the county of Auguſta in Virginia, near the ſources of James's river, are two ſprings, diſtinguiſhed by the appellation of *Warm* and *Hot*. They are eight miles diſtant from each other, and are ſtrongly impregnated with ſulphur. They are ſaid to be uſeful for rheumatic, and ſome other complaints. The *warm ſpring* iſſues with a very bold ſtream, ſufficient to work a griſt mill, and to keep the waters of its baſon, which is 30 feet in diameter, at blood heat, or 96° of Fahrenheit. The *hot ſpring* is much ſmaller, and has been ſo hot as to boil an egg. Some believe its degree of heat to be leſſened. It raiſes the mercury in Fahrenheit's thermometer to 112°. It ſometimes relieves where the warm ſpring fails. A fountain of common water iſſuing near its margin gives it a ſingular appearance. What are called the *ſweet ſprings* are in the county of Botetourt in the ſame ſtate, at the eaſtern foot of the Alleghany, 42 miles from the warm ſprings. They are quite cold, like common water, and their nature is little known; but all the three ſorts of ſprings are much frequented. On the Potowmack, and on York river, are alſo ſome ſprings, ſuppoſed to be medicinal; but in favour of whoſe virtues little is known.

In the low grounds of the river called Great Kanhaway, 67 miles above its mouth, is a hole in the earth, of the capacity of thirty or forty gallons, from which iſſues conſtantly a bituminous vapour, in ſo ſtrong a current as to give to the ſand about its orifice the motion which it has in a boiling ſpring. On preſenting a lighted candle or torch within 18 inches of the hole, it flames up in a column of 18 inches diameter, and four or five feet in height, which ſometimes burns out within 20 minutes, and at other times has been known to continue three days, and then has been left ſtill burning. The flame is unſteady, of the denſity of that of burning ſpirits, and ſmells like burning pit coal. Water ſometimes collects in the baſon, which is remarkably cold, and is kept in ebullition by the vapour iſſuing through it. If the vapour be fired in that ſtate, the water ſoon becomes ſo warm that the hand cannot bear it, and evaporates wholly in a ſhort time. On Sandy River there is a ſimilar hole that ſends forth a bituminous vapour, the flame of which is a column of about twelve inches diameter and three feet high.

In the ſtate of Georgia, in the county of Wilkes, about a mile and a half from the town of Waſhington, a ſpring riſes from a hollow tree, four or five feet in length. The inſide of the tree is incruſted with a coat of nitre an inch thick, and the leaves around the ſpring are incruſted with a ſubſtance as white as ſnow, which has not been analyzed. It is recommended for ſcurvy and ſcrophulous diſorders.

434 Vegetables.

The vegetable kingdom in the United States of America is ſo extremely rich, that even an enumeration of its remarkable objects would greatly exceed the bounds which we have here preſcribed to ourſelves. Indeed, it does not appear that, excepting the ſugar cane, any valuable vegetable production is known which cannot be reared within ſome part of the territory of the ſtates. With regard to the natural growth of theſe countries, it conſiſts of an endleſs variety of trees and ſhrubs, and leſſer plants. Each tract of different ſoil is uſually diſtinguiſhed by its peculiar vegetation, and is pronounced good, middling, or bad, from the ſpecies of trees which it produces; and one ſpecies generally predominating in each ſoil, has produced the deſcriptive names of *Oak Land*, *Birch*, *Beech*, and *Cheſnut Lands*, *Pine Barren Land*, *Maple*, *Aſh*, and *Cedar Swamps*. Intermingled with theſe, which in the New England ſtates are the predominating ſpecies, we find in that northern territory others, as walnut, firs, elm, hemlock, mooſe wood, ſaſſafras, and many others. Walnut and cheſnut trees indicate the beſt lands; beech and oak grow upon the ſecond; the fir and pitch pine upon the third; barberry and other buſhes upon lands of the next quality; and marſhy ſhrubs upon the worſt. Along with theſe are found a variety of flowering trees and ſhrubs, including all thoſe known in Europe. Among the fruits which grow wild in all the ſtates are ſeveral kinds of grapes, which are ſmall, ſour, and thick ſkinned. The vines on which they grow are very luxuriant, and often overſpread the higheſt trees of the foreſt. They are extremely tough, and poſſeſs almoſt the ſtrength of cordage. On the more fertile ſoils, the largeſt trees ſeldom puſh their roots into the earth beyond the depth of one foot, being no doubt fed by the rich mould which is formed on the ſurface by the perpetual ſhedding of the leaves and the rotting of the graſs. In the northern ſtates, the fragrance of the woods from flowering ſhrubs and trees is not ſo remarkable as in the ſouth; nor is the timber ſo valuable. In South Carolina, indeed, the luxuriance of the woods ſtands unrivalled. There are 18 different ſpecies of oak, particularly the live oak, palmetto, or cabbage tree, cucumber tree, deciduous cypreſs, liquid amber, hiccory, &c.; in ſhort, all the ſpecies of trees which are ſo exceſſively dear in Europe, ten of which are planted to ſave one, for which both ſituation and ſoil are carefully ſelected, and which yet never attain any conſiderable height, are here the natural produce of the country, and vegetate with the utmoſt rapidity. Equally ſtriking to Europeans is the pleaſing luxuriance of ſhrubs, plants, and various kinds of graſs; moſt of which diffuſe an exquiſite fragrance.

Of the ſmaller vegetables, maize, or Indian corn, is a native of America. It agrees with all climates, from the equator to latitude 45°, but flouriſhes beſt between latitudes 30° and 40°. The wild rice is a grain which grows in great plenty in ſome of the interior parts of the ſtates, and ſeems the moſt valuable of the ſpontaneous productions of the country. It grows in the water, where it is about two feet deep, with a rich muddy bottom. In its ſtalk, ears, and manner of growing, it very much reſembles oats. It is gathered by the Indians in the following manner: About the time that it begins to turn from its milky ſtate, and to ripen, they run their canoes into the midſt of it, and, tying bunches of it together, juſt below the ears, they leave it in this ſituation for three or four weeks, till it is perfectly ripe. At the end of this time, commonly about the laſt of September, they return to the river, and, placing their canoes cloſe to the bunches of rice, in ſuch a poſition as to receive the grain when it falls, they

America. they beat it out with pieces of wood. Thereafter they dry it with ſmoke, and laſtly tread or rub off the outſide huſk; after which it is fit for uſe.

435 American birds. We have already enumerated the American quadrupeds, and have ſeen, that of theſe a conſiderable number is peculiar to America. Upwards of 130 American birds have been enumerated, and many of them deſcribed by Cateſby, Jefferſon, and Carver. The following catalogue will ſhow the aſtoniſhing variety that exiſts in the American ſtates, of this beautiful part of the creation:

Blackbird.
Razor-billed do.
Baltimore bird.
Baſtard Baltimore.
Blue bird.
Buzzard.
Blue jay.
Blue groſbeak.
Brown bittern.
Creſted do.
Small do.
Booby.
Great booby.
Blue Peter.
Bullfinch.
Bald coot.
Cutwater.
White curlew.
Cat bird.
Cuckow.
Crow.
Cowpen bird.
Chattering plover or kildee.
Crane or blue heron.
Yellow-breaſted chat.
Cormorant.
Hooping crane.
Pine creeper.
Yellow-throated creeper.
Dove.
Ground dove.
Duck.
Hathera duck.
Round-creſted do.
Sheldrake or canvaſs do.
Buffels-head do.
Spoonbill do.
Summer do.
Blackhead do.
Blue-winged ſhoveller.
Little brown duck.
Sprigtail.
White-faced teal.
Blue-winged teal.
Pied-bill dobchick.
Eagle.
Bald eagle.
Flamingo.
Fieldfare of Carolina, or robin.
Purple finch.
Bahama finch.
American goldfinch.
Painted finch.
Creſted fly-catcher.
Black-cap do.
Little brown do.
Red-eyed do.
Finch creeper.
Storm finch.
Goatſucker of Carolina.
Gull.
Laughing gull.
Gooſe.
Canada gooſe.
Hawk.
Fiſhing hawk.
Pigeon do.
Night do.
Swallow-tailed do.
Hangbird.
Heron.
Little white heron.
Heath cock.
Humming bird.
Purple jackdaw or crow blackbird.
King bird.
Kingfiſher.
Loon.
Lark.
Large lark.
Blue linnet.
Mock bird.
Mow bird.
Purple martin.
Nightingale.
Noddy.
Nuthatch.
Oyſter-catcher.
Owl.
Screech owl.
American partridge or quail.
Pheaſant or mountain partridge.
Water pheaſant.
Pelican.
Water pelican.
Pigeon of paſſage.
White-crowned pigeon.
Parrot of paradiſe.
Paroquet of Carolina.
Raven.
Rice bird.
Red bird.
Summer red bird.
Swan.
Soree.
Snipe.
Redſtart.
Red-winged ſtarling.
Swallow.
Chimney do.
Snow bird.
Little ſparrow.
Bahama do.
Stork.
Turkey.
Wild turkey.
Tyrant.
Creſted titmouſe.
Yellow do.
Bahama do.
Hooded do.
Yellow rump.
Towhe bird.
Red thruſh.
Fox-coloured thruſh.
Little thruſh.
Tropic bird.
Turtle of Carolina.
Water wagtail.
Water hen.
Water witch.
Wakon bird.
Whetſaw.
Large white-billed woodpecker.
Large red-creſted do.
Gold-winged do.
Red-bellied do.
Hairy do.
Red-headed do.
Yellow-bellied do.
Smalleſt ſpotted do.
Wren.

Of all theſe, it has been remarked, that the birds of America generally exceed thoſe of Europe in the beauty of their plumage; but are much inferior to them in the melody of their notes. The buzzard, commonly called the turkey buzzard, from its reſemblance to a turkey in plumage and ſhape, is very common all over South Carolina. It appears, that the police of Charleſtown is extremely deficient in thoſe meaſures which ſhould not be neglected in a populous town, in ſo hot a climate. Hence the bodies of dead animals are frequently left expoſed in the neighbourhood, together with the refuſe of ſlaughterhouſes. But the voracity of the turkey buzzard alleviates the effects of this negligence. It ſpeedily devours every thing, and leaves only the bones of any carcaſe that it finds. Hence it is accounted a kind of ſacred bird: no law has been enacted prohibiting it to be killed; but among the whole inhabitants of the town, the public opinion ſufficiently protects its ſafety. 436 The Turkey buzzard.

In all parts of the United States, conſiderable numbers of ſnakes are found. But they are neither ſo numerous nor ſo venomous in the northern as in the ſouthern ſtates. The following is given as a liſt of them. 437 American ſnakes.

Rattle ſnake.
Small rattle ſnake.
Yellow rattle ſnake.
Water viper.
Black do.
Brown do.
Copper-bellied ſnake.
Bluiſh-green do.
Black do.
Ribbon do.
Spotted ribbon do.
Chain do.
Joint do.
Green-ſpotted do.
Coachwhip do.
Corn ſnake
Hognoſe do.
Houſe do.
Green do.
Wampum do.
Glaſs do.
Bead do.
Wall or houſe adder
Striped or garter ſnake.
Water do.
Hiſſing do.
Thorn-tailed do.
Speckled do.
Ring do.
Two-headed do.

The joint ſnake is a curioſity. Its ſkin is as hard as parchment, and as ſmooth as glaſs. It is beautifully ſtriped 438 The joint ſnake.

America. striped with black and white. Its joints are ſo few and ſtiff, that it can hardly bend itſelf into the form of a hoop. When ſtruck, it breaks like a pipe's ſtem, and with a whip it may be broken from the tail to the bowels into pieces not an inch long, without producing the leaſt tincture of blood. It is not venomous. It is not known whether the two-headed ſnake be a diſtinct ſpecies, or only a monſtrous production, very few of them having ever been ſeen. But of all the American ſnakes, the rattle ſnake is the chief, as being the moſt frequent and the moſt dangerous. It is a peaceful animal however, and never bites but on being irritated. In the northern ſtates it is little regarded, and its bite ſeems not be fatal. "We found, (ſays the duke de la Rochefoucault Liancourt), a young man, who about ſix weeks before had been bitten on the knee by a rattle ſnake, while he was fiſhing on the banks of Lake Cauandaqua. At firſt he did not feel much pain in the part affected; but an hour afterwards a ſwelling appeared, which gradually extended all along the leg to the foot, and both became ſo ſtiff that he was unable to move them. A cure was effected within the ſpace of only ſix days by the juice of ſnake-root laid on the wound and ſwelling, as a poultice, mixed with milk, together with a few drops of that juice, pure and unmixed, taken internally. Inſtances of ſuch bites occur but very ſeldom, and only, it ſeems, when the animal has been touched; otherwiſe it conſtantly retires, and may be killed by a blow with the ſlendereſt ſtick." But in the ſouthern ſtates, particularly in South Carolina, the inhabitants are more afraid of theſe animals than in New York or Pennſylvania; as inſtances are known in that ſouthern climate of people having died a quarter of an hour after they were bitten by the rattle ſnake. The juice of *plantago Virginiana*, *Linn.* or the root and branches of mahuba bruiſed, are the remedies moſt commonly applied. Either of theſe plants is ſufficient; but they are deemed more efficacious when they are applied jointly. A tobacco leaf ſteeped in rum, or a ſingle leaf of one of the above plants, takes off the pain and ſwelling. Cæſar, a negro, diſcovered this cure in South Carolina; he proved its efficacy to the aſſembly of the ſtates, in 1780, by cauſing a rattle ſnake to bite him; and obtained for this arcanum his liberty, and a penſion of 100 guineas a-year.

439 Rattle ſnake.

440 Inſects. An aſtoniſhing variety of inſects is found in the United States. Of theſe, during the ſummer, the muſketo is the moſt troubleſome. In the back parts of the ſtate of New York, the lands are frequently viſited by a ſpecies of locuſts which fix chiefly on the trees, and conſume the leaves. They are ſo extremely numerous, that every attempt to deſtroy or remove them is apparently fruitleſs. Flies, likewiſe, in moiſt ſituations, are very troubleſome, being found in ſuch prodigious ſwarms, eſpecially about noon, that the farmers are obliged to keep large fires burning near their houſes, where the cattle find ſhelter from theſe tormenting inſects till the cool of the evening, when the latter diſappear, and retire into the woods.

441 Bees. Bees are found in the woods in ſwarms, which produce large quantities of honey, of different qualities, according to the kinds of flowering ſhrubs and plants that prevail in the neighbourhood. It is ſaid, however, that this valuable inſect is moſt uſually found in the vicinity of cultivated places, where a part at leaſt of the timber has been cut down, and that hence, when the ſavages perceive a ſwarm of bees, they ſay, that it is time for them to remove, as the approaches of cultivation not only bring white men, who are always in ſome meaſure their enemies, but alſo tend to narrow their hunting grounds. The planters not only rear enough of bees to ſupply themſelves with honey of an excellent quality, but conſiderable quantities are brought to the coaſt for exportation. America.

442 Poiſonous honey. *Philoſoph. Mag.* March 1802. An account has been given by an American phyſician, Dr Benjamin Smith Barton, of a poiſonous or injurious kind of honey collected by bees in the territory of the United States, which is, perhaps, worthy of attention both for philoſophical and for commercial reaſons. "The honey which I call *deleterious*, (ſays he) or *poiſonous honey*, produces, as far as I have learned, the following ſymptoms, viz. In the beginning a dimneſs of ſight, or vertigo ſucceeded by a delirium, which is ſometimes mild and pleaſant, and ſometimes ferocious, ebriety, pain in the ſtomach and inteſtines, profuſe perſpiration, foaming at the mouth, vomiting and purging, and, in a few inſtances, death. In ſome perſons a vomiting is the firſt effect of the poiſon. When this is the caſe, it is probable that the perſons ſuffer much leſs from the honey than when no vomiting is induced. Sometimes the honey has been obſerved to produce a temporary palſy of the limbs: an effect which I have remarked in animals that have eaten of one of thoſe very vegetables, the *kalmia latifolia*, from whoſe flowers the bees obtain a pernicious honey. Death is very ſeldom the conſequence of eating this kind of honey. The violent impreſſion which it makes upon the ſtomach and inteſtines often induces an early vomiting or purging, which are both favourable to the ſpeedy recovery of the patient. The fever which it excites is frequently relieved, in a ſhort time, by the profuſe perſpiration, and perhaps by the foaming at the mouth. I may add, that, as the human conſtitution reſiſts to an aſtoniſhing degree the effects of the narcotic or other poiſonous vegetables that are beſt known to us, ſo we need not wonder, that it alſo reſiſts the effects of the deleterious honey that is produced from ſuch vegetables.

"It deſerves to be mentioned, that the honey which is formed by two different hives of bees in the ſame tree, or at a little diſtance from each other, often poſſeſſes the moſt oppoſite properties. Nay, the honey from the ſame individual combs is ſometimes not leſs different in taſte, in colour, and in its effects. Thus one ſtratum or portion of it may be eaten without the leaſt inconvenience, whilſt that which is immediately adjacent to it ſhall occaſion the ſeveral effects which I have juſt enumerated. I have taken ſome pains to learn what are the ſigns by which the deleterious honey may at firſt view be diſtinguiſhed from innocent honey. I am informed, that there is no difficulty in the matter.

"The poiſonous honey is ſaid by ſome to be of a crimſon colour; by others, it is ſaid to be of a reddiſh brown colour, and of a thicker conſiſtence than common innocent honey. Theſe are the ſigns by which I am told the moſt experienced hunters in the ſouthern parts of North America are enabled to diſtinguiſh pernicious from innocent honey."

America. Dr Barton, however, juſtly doubts the infallibility of theſe ſigns, ſo far as they depend upon the colour of the honey, as Mr Bruce found honey red like blood at Dixan in Abyſſinia, which he does not ſay was poiſonous; and the honey collected in Scotland from the flowers of the *erica*, or blooming heather, is uſually of a dirty brown colour, though it was never known to poſſeſs any noxious property. He proceeds to ſtate, that a friend of his, Mr William Bartram, who has written upon the natural productions of North America, informed him, that "in the Carolinas and Floridas the poiſonous honey is often ſo ſimilar in colour, taſte, and odour, to the common or innocent honey, that the former cannot be diſtinguiſhed from the latter. It is owing, he ſays, to this circumſtance that ſo many accidents daily happen from the uſe of the wild honey. He was informed, that it is experience alone which enables the hunters and others to determine whether the honey which they find in the woods be poiſonous or innocent. They have obſerved that the injurious effects manifeſt themſelves, in a ſhort time, after the honey is taken into the ſtomach. They are accuſtomed, therefore, to eat a ſmall quantity before they venture to ſatisfy their appetite. Should this produce any diſagreeable effects, they do not think it prudent to continue the uſe of it: but, if in a ſhort time it ſhould occaſion no inconvenience, they think they may, with perfect ſafety, indulge their appetite to the full.

"I have been informed, that the poiſonous honey, by boiling and ſtraining, may be rendered as innocent as any honey whatever. It is likewiſe ſaid, that, by long keeping, it becomes harmleſs. It is poiſonous to dogs as well as to men. Hitherto I have not been able to obtain any certain information concerning the means to be purſued in the treatment of perſons labouring under the effects of the poiſonous honey. It is ſaid, that the Indians and ſome of the whites uſe cold bathing with advantage. As the effects produced by this honey are ſimilar to thoſe produced by ſeveral narcotic vegetables that are well known to us; ſuch as opium, *hyoſciamus niger* or henbane, *datura ſtramonium* or thorn-apple, &c. it is probable that the ſame means of treatment will apply to both caſes. In South Carolina, Georgia, and the two Floridas, but more eſpecially in Eaſt Florida, the inſtances of injury from the eating of wild honey are more numerous than in any other parts of North America that are known to us. There is a tract of country, included between the rivers St Illa and St Mary's in Eaſt Florida, that is remarkable for immenſe numbers of bees. Theſe inſects, which were originally introduced into Florida by the Spaniards, have increaſed into innumerable ſwarms from the facility with which they procure their food, in, perhaps, the richeſt flowered country of North America. In this tract of country the alarming effects of the wild honey are often experienced by the ſettlers, by wandering hunters, and by ſavages.

"It is highly probable that this poiſonous honey is procured from a conſiderable number of the flowers of the countries which I have mentioned. A complete liſt of theſe flowers would be acceptable; but ſuch a liſt it will be difficult to procure at preſent. Meanwhile I am happy to have it in my power to mention ſome of the vegetables from whoſe flowers the bees extract a deleterious honey, not only in the country between the St Illa and St Mary's, but alſo in ſome other parts of North America. Theſe vegetables, are the *kalmia auguſtifolia* and *latifolia* of Linnæus, the *kalmia hirſuta* of Walter, the *andromeda mariana*, and ſome other ſpecies of this genus. *Flora Caroliniana*, p. 138.

America.

"Every American has heard of the poiſonous properties of the kalmia auguſtifolia and latifolia. The former of theſe plants is known in the United States by the names of *dwarf laurel*, *ivy*, *lambkill*, &c. It has long been known that its leaves, when eaten by ſheep, prove fatal to them. The following fact likewiſe will ſhew, that the flowers alſo are endued with a poiſonous property. About 20 years ſince, a party of young men, ſolicited by the proſpect of gain, moved with a few hives of bees from Pennſylvania into the Jerſeys. They were induced to believe, that the ſavannahs of this latter country were very favourable to the increaſe of their bees, and conſequently to the making of honey. They accordingly placed their hives in the midſt of theſe ſavannahs, which were finely painted with the flowers of the kalmia auguſtifolia. The bees increaſed prodigiouſly; and it was evident, that the principal part of the honey which they made was obtained from the flowers of the plant which I have juſt mentioned. I cannot learn that there was any thing uncommon in the appearance of the honey; but all the adventurers, who ate of it, became intoxicated to a great degree. From this experiment they were ſenſible that it would not be prudent to ſell their honey; but, unwilling to loſe all their labour, they made the honey into the drink well known by the name of *metheglin*, ſuppoſing that the intoxicating quality, which had reſided in the honey, would be loſt in the metheglin. In this reſpect, however, they were miſtaken: the drink alſo intoxicated them, after which they removed their hives. In North Carolina, this ſpecies of kalmia, and the andromeda mariana are ſuppoſed to be the principal vegetables from which the bees prepare the poiſonous honey that is common in that part of the United States.

"The kalmia latifolia, known in the United States by the names of *laurel*, *great laurel*, *winter green*, *ſpoon haunch*, *ſpoon wood*, &c. is alſo a poiſon. Its leaves indeed are eaten with impunity by the deer, and by the round-horned elk; but they are poiſonous to ſheep, to horned cattle, and to horſes. In the former of theſe animals they produce convulſions, foaming at the mouth, and death. Many of General Braddock's horſes were deſtroyed by eating the leaves and the twigs of this ſhrub in the month of June 1755, a few days before this unfortunate general's defeat and death. In the ſevere winter of the years 1790 and 1791, there appeared to be ſuch unequivocal reaſons for believing that ſeveral perſons in Philadelphia had died in conſequence of their having eaten our pheaſant, in whoſe crops the leaves and buds of the kalmia latifolia were found, that the mayor of the city thought it prudent, and his duty, to warn the people againſt the uſe of this bird by a public proclamation. I know, that by many perſons, eſpecially by ſome lovers of pheaſant fleſh, the circumſtance juſt mentioned was ſuppoſed to be deſtitute of foundation: but the foundation was a ſolid one. This might be ſhown by ſeveral well authenticated facts. It is ſufficient for my preſent purpoſe to obſerve,

America. observe, that the collection of a deleterious honey from the flowers of this ſpecies of kalmia gives ſome countenance to the opinion, that the fleſh of pheaſants that had eaten the leaves and the buds of this plant may have been impregnated with a pernicious quality.

" In Georgia and Florida the kalmia hirſuta is ſuppoſed to be the principal vegetable from which the deleterious honey in thoſe parts of our continent is procured. The andromeda mariana or broad-leaved moorwort is a very common plant in many parts of North America. The leaves are poiſonous to ſheep. The petioli or footſtalks of the leaves, and the ſeeds within the ſeed veſſel, are covered with a brown powder ſimilar to that of the kalmia. This powder, applied to the noſtrils, occaſions violent ſneezing. From the flowers of this plant the bees extract conſiderable quantities of honey; and it deſerves to be mentioned, that this honey, as well as that obtained from ſome other American ſpecies of andromeda, has frequently the very ſmell of the flowers from which it is obtained."

In addition to the above plants, from whoſe flowers the bees are known to obtain poiſonous honey, the ſame writer mentions ſome others which are ſuſpected to be dangerous, as the *rododendron maximum* or Pennſylvania mountain laurel. The ſeeds of this plant and the footſtalks of the leaves are covered, like ſome of the andromedæ and kalmiæ, with a brown powder which excites ſneezing; and, it is ſingular, that Dioſcorides mentions ſneezing as one of the ſymptoms produced by honey made about Heraclea Pontica. The azalea nudiflora, called in the United States the *wild honeyſuckle*, is alſo ſuſpected of producing poiſonous honey. A ſpecies of this genus, the azalea pontica of Linnæus, is ſuppoſed to be the ogolethron of Pliny, who mentions it as the plant from which the poiſonous honey about Heraclea Pontica is prepared. The datura ſtramonium, called in America *James-town weed, gymſin, ſtink weed*, or *French cheſnut*, produces in the tube of its flower a conſiderable quantity of honey, which is ſuſpected to be of a bad quality; becauſe the plant itſelf is known to poſſeſs poiſonous properties. Upon the whole, from what is known upon the ſubject in America, Dr Barton is led to ſuſpect, that every flower that is poiſonous to man may produce a honey injurious to man, ſince the properties of the fluid are ſo dependant upon the properties of the plant from which it is produced. Hence he thinks, that there is more of poetry than philoſophy in the following lines of Pope.

> In the nice bee, what ſenſe ſo ſubtly true,
> From poiſonous herbs extracts the healing dew?
> *Eſſay on Man.*

443 The kaiman. The kaiman, a ſpecies of the alligator, or crocodile, is alſo found in the ſouthern rivers of the United States. Some of the kaimans are of ſo monſtrous a ſize as to exceed five yards in length. They devour all living animals that they can catch. They are fond of the fleſh of hogs and dogs. When baſking on the ſhore, they keep their huge mouths wide open, till they are filled with muſquetoes, flies, and other inſects; when they ſuddenly ſhut their jaws, and ſwallow their prey. They are great deſtroyers of fiſh in the rivers and creeks, which they catch with the ſame addreſs. Eight or ten of them lie at the mouth of the river or creek, whilſt others go to a diſtance up the river, and chaſe the fiſh downward; by which means, none of any bigneſs eſcape them. They are ſaid, however, to remain torpid during the winter in dens which they find in the banks of the rivers, having previouſly ſwallowed a large number of pine knots, which forms their only ſuſtenance till the period of their revival or wakening. The kaiman ſeldom touches a man, however near it may lie to him. It conſtantly flees when at land; but in the water it is fiercer, and has been known to bite off the leg of a perſon bathing. It more frequently attacks dogs. Sometimes when hounds, in purſuit of a ſtag, ſwim through the water, the kaimans ſeize both hounds and deer, and pull them down to the bottom, without their ever appearing again. The ſcales with which they are coated render them invulnerable, unleſs the wound be inflicted in the interſtices of the ſcales, or at the extremities. America.

444 Climate. The climate of the great territory belonging to the United States, muſt neceſſarily be various, in conſequence of the difference of latitude and ſoil that takes place in it. The ſnow covers Vermont and the province of Maine, during five or ſix months of the year; and the winter there laſts ſeven months, while there is hardly any winter in South Carolina, and ſtill leſs in Georgia. Should any ſnow fall in the latter of theſe ſtates, it does not remain two days upon the ground. The ſudden variation of temperature which frequently occurs, is the moſt remarkable characteriſtic of the climate of the whole ſtates. It is uſual to ſee the thermometer riſe or fall 25° of Fahrenheit's ſcale in 24 hours. In April 1796, it fell in 12 hours from the 77th degree of Fahrenheit to 44½°, and this obſervation was made at Wilmington in Delaware, and in Baltimore. The river Delaware at Philadelphia, 3 miles in breadth, is ſometimes frozen over in one night, and the ſame thing occurs in all the rivers of Virginia and to the northward. The ſeaſons, in the United States, are only three: ſummer, winter, and autumn, or what the Americans more expreſſively call the fall, from the falling of the leaves in the foreſts. The tranſition, from the locking up of all vegetation in winter to the ſudden burſt of it again to life at the beginning of ſummer, is ſo rapid as utterly to exclude that progreſſive and delightful ſeaſon, which, in the more moderate climate of Europe receives the appellation of ſpring. Within a week or ten days after the melting of the ſnow, the woods and orchards are in full bloom. Both the heat and the cold are more intenſe in America than in Europe. The froſt is ſtronger and more durable. The ſunſhine is more ardent and permanent, and the heat is far more oppreſſive and inſupportable. It may be remarked, that in the different latitudes of the United States, the heat differs more in its duration than in its power. In 1795 at Newark, on the frontiers of Upper Canada, the duke de la Rochefoucault Liancourt ſaw the thermometer of Fahrenheit riſe in July to the 92°. In the month of Auguſt the ſame year, he ſaw it at 96° at Albany in the ſtate of New York. At Savannah in Georgia, it ſeldom riſes above that height; though from Newark or Albany, to Savannah, there is a difference of 14° of latitude. But the thermometer remains during a month or two at Savannah at this height, and very ſeldom two days together in the northern ſtates. The following

America. following remarks and facts, relative to the climate and seasons in America and Europe, are given by Dr Holyoke of Salem in the state of Massachusets; and completely demonstrate the intenseness both of the heat and the cold that are experienced in the most northerly states of the American union.

"The following table exhibits the mean or medium degree of greatest heat and cold by Fahrenheit's thermometer:

	Lat. north.	Mean of gr. heat.	Mean of gr. cold.
Stockholm	59° 20′	83.98	10.19*b*
Copenhagen	55 40	81.77	2.98*a*
Berlin	52 32	89.37	0.62*b*
Mons	50 25	89.15	1.18*a*
Prague	50 4	92.7	12.77*b*
Wurtzburg	49 46	93.87	4.*b*
Manheim	49 27	89.6	1.2*a*
Ratisbon	48 56	79.7	2.42*b*
Buda	47 40	90.7	4.26*a*
Geneva	46 12	88.9	10.2*a*
Rochelle	46 0	90.5	16.93*a*
Padua	45 22	91.4	16.93*a*
Marseilles	43 17	89.6	27.5*a*
Rome	41 53	85.43	33.46*a*
Salem in Massachusets	42 31	97.2	2.42*b*

"These European cities, except Rome, are all north of the latitude of Salem. But in the whole middle region of Europe, which is from 7 to 10 degrees north of Salem, the heat in summer and cold in winter is, on an average, less than at Salem by a difference of 5, 8, and 10 degrees. Comparing the temperature of the European atmosphere under nearly the same parallel of latitude with Salem, viz. at Rome, Padua, and Marseilles, it is found that the mean of greatest heat in Europe falls short of ours by 8 degrees, and the mean of greatest cold by more than 30 degrees. It is also found, by observations made at different times and places, that in America there falls a greater quantity of rain annually than in Europe; we have notwithstanding more fair weather, and fewer cloudy, foggy, and rainy days. The medium quantity of rain that falls yearly in Europe does not exceed 30 inches of water, whereas in America the medium quantity is at least 50 inches.

"The mean number of fair days, according to observations made in 20 cities of Europe, amounts only to 64. Several observations in America make the mean number of fair days to be about 130. The mean number of cloudy days in the same cities of Europe (all which are upon the continent) was, in 1785, 113; in America there are about 80 or 90. The number of rainy days in the same cities was, on a mean, 122; the number in America is 85 or 90. These facts seem to prove that the atmosphere of Europe is more humid than that in America; and this may be one cause why the European climate is more temperate under the same parallels of latitude, and less subject to extremes of heat and cold.

"The following facts concerning the temperature of our own climate are extremely curious. From observations made at four different hours in the day for seven years, it is found that the mercury in Fahrenheit America. rose to 80° and upwards.

In 1786. Days.	In 1787. Days.	In 1788. Days.
June 13	June 10	June 5
July 11	July 13	July 13
Aug. 8	Aug. 13	Aug. 8
Sept. 2	Sept. 2	Sept. 1
Oct. 1		
35	38	27

In 1789. Days.	In 1790. Days.	In 1791. Days.	In 1792. Days.
May 1	May 1	May 7	May 7
June 12	June 5	June 15	June 10
July 13	July 14	July 16	July 15
Aug. 11	Aug. 7	Aug. 15	Aug. 10
Sept. 1	Sept. 2	Sept. 1	Sept. 2
		Oct. 1	
38	29	55	44

The thermometer was at and above 90°,

In 1786, 4 days.	1790, 2 days.
1787, 2 do.	1791, 12 do.
1788, 1 do.	1792, 8 do.
1789, 4 do.	

During the same years in winter, the thermometer was at and below 32°, the freezing point;

In 1786,	108 days, and below 0,	4 days.
1787,	111 do. do.	4 do.
1788,	108 do. do.	6 do.
1789,	105 do. do.	3 do.
1790,	119 do. do.	5 do.
1791,	111 do. do.	1 do.
1792,	102 do. do.	3 do.

The mean of the mean temperature of each month during the seven years is as follows:

Jan.	24.8 tenths.	July	71.
Feb.	25.	Aug.	69.7
Mar.	36.	Sept	61.
April	45.	Oct.	49.5
May	56.8	Nov.	40.
June	67.	Dec.	27.

Mean temperature of each season.

	Winter.	Spring.	Summer.	Autumn.
1786,	25°7	45°9	70°6	50°9
1787,	25.8	45.7	68.1	50.3
1788,	25.5	45.2	68.9	52.1
1789,	24.9	43.9	70.2	49.5
1790,	29.2	43.6	67.9	49.5
1791,	23.3	48.6	71.0	49.0
1792,	25.5	49.4	68.7	51.3

Total mean temperature of each year:

1786,	48°53	1790,	46°43
1787,	47.88	1791,	48.96
1788,	47.67	1792,	48.44
1789,	47.68		

Total mean temperature of the seven years, 47.94.

America. As the obſervations in the morning were not made at ſunriſe, but at eight o'clock, Dr Holyoke ſuppoſes a ſmall abatement muſt be made; and the mean temperature of the ſeven years fixed at 47·5.

Mean temperature at the time of each obſervation:

At eight o'clock A. M.	46.55.
At noon, - -	54.15.
Sunſet, - -	47.60.
At ten o'clock P. M. -	43.7.

"Whence it appears, that the mean temperature of the day is at ſunſet, and that the temperature of the month of April is very little below the mean temperature of the year."

The very great variations of climate here indicated are ſaid not to extend themſelves in an equal degree beyond the tract of the Alleghany mountains; ſo that in the ſame latitude the climate is much more mild upon the banks of the Ohio than on the ſhores of the Atlantic ocean. As that part of the country, however, is yet leſs inhabited, or has only been ſo for a ſhort period, very few authentic documents have reached us concerning it.

445 Effect of the climate on the inhabitants. The extremes of heat and cold which ſo rapidly ſucceed each other in America at different ſeaſons, and which perſevere ſo ſteadily when they are once begun, do not fail to affect very ſenſibly the health of the inhabitants of the United States. In general, people become old in America ſooner than in Europe. In the more northern parts of the country, that is, in the New England ſtates, and alſo near the mountains, this is leſs ſenſibly the caſe, but excepting in theſe ſituations, it is more rare to ſee men of a great age there than in Europe. The influence of the climate upon females is ſtill more ſenſible. When young, they are generally beautiful, and more particularly ſo at Philadelphia, and in the other middle ſtates. But after 20 years of age they ſoon begin to loſe their freſh colour. At 25, many of them might be taken for Europeans of 40; as their bloom is faded, and their form has already ſuffered a change. If they have previouſly been mothers, which in this riſing country is uſually the caſe, their alteration is ſtill more premature. Yet, it is admitted, that neither nightly revels, the abuſe of ſpirituous liquors, the want of exerciſe, nor an exceſs of it, can be brought to account for this early change. In the northern ſtates, the period of their beauty is indeed lengthened, but only for a few years. Whereas, in the ſouthern ſtates it is ſhortened. In South Carolina, at the age of 30, a woman appears old; and both men and women ſoon loſe the bloom of youth, and feel the infirmities of age. At the age of 50, in that exhauſting climate, the hair becomes entirely white. The number of children that die in their infancy is ſaid to be proportionally much greater than in Europe; though this does not prevent the population from advancing with nearly twenty times the rapidity that it does with us. Colds, hooping-coughs, and diſorders of the throat, carry off great numbers of children. The moſt common mortal diſeaſes in all the ſtates are dropſies of the cheſt, conſumptions, and bilious and putrid fevers. Of diſeaſes that are not mortal, the moſt frequent of all is the ague or intermitting fever, which, however, ſometimes degenerates into a bilious fever. Theſe intermitting fevers are undoubtedly the reſult of a climate abounding in moiſture, ariſing from immenſe rivers, ſwamps, and foreſts, acted upon by the intenſe heat of a burning ſun. In ſuch a ſituation the human ſtrength is exhauſted, ſo as to be at all times liable to fall into this ſimpleſt and leaſt dangerous form of fever. Though it is experienced by almoſt every ſtranger, and at times by moſt of the natives, it is ſeldom hazardous; but at the ſame time it undoubtedly enfeebles the conſtitution, and prepares it for ſinking under other diſeaſes. It is always towards the end of ſummer, when the heat is moſt intenſe, and the health of the people moſt weakened by the hot and moiſt climate of America, that the dreadful diſeaſe, the yellow fever, makes its appearance. It thus comes at a period when intermittent fevers at all times abound; and the extreme mortality which it produces is probably to be accounted for, not leſs from the ſtate of debility and relaxation with regard to general health, than from any peculiar malignity of the diſtemper, which never fails to yield to the reſtorative and ſtrengthening power of a few froſty days, or even of rainy. It is a ſingular circumſtance, that of the great number of French who were in Philadelphia during the different periods at which it was deſolated by this fatal ſcourge, ſometimes none, and never more than four or five in a ſeaſon, ſuffered by the yellow fever, though none of them deſerted the city on that occaſion. The only plauſible, though probably inadequate, account which has ever been given of the cauſe of their eſcaping that calamity, is their habitual abſtinence from ſpirituous liquors; in the uſe of which the Americans of all ranks, that is the men, not the women, indulge very freely, and thereby no doubt increaſe the degree of debility which the climate has a tendency to produce, and conſequently expoſe themſelves in a greater degree to the influence of any contagious diſtemper. Under all its advantages, however, the climate of America allows the full exertion and enjoyment of all the human faculties. Men of ſound conſtitutions in every part of it attain to old age. Even in South Carolina in 1787, of the 9600 white inhabitants of Charleſtown 200 were above 60 years; and in the New England ſtates inſtances of great longevity abound.

America.

446 American manufactures. The manufactures that are carried on in the United States are extremely few. A year ſeldom paſſes away, without attempts being made by individuals to eſtabliſh cotton-works, glaſs-houſes, and other extenſive manufactories, but without ſucceſs. Sometimes, particular ſtates aſſiſt in the moſt liberal manner, with the public money, the undertakers of theſe plans; but the money is ſoon ſpent, and the work obliged to be dropped. The reaſon is obvious. In the European nations, men and women abound, and the lower claſſes are, therefore, under the neceſſity of giving their induſtry, and the reſult of their ſkill, for little more than what is barely ſufficient to afford them ſubſiſtence. In America the caſe is different. Men are few, the ſoil is fertile and unoccupied, and ſubſiſtence is eaſily procured. Every man aſpires, therefore, to the poſſeſſion of ſomething beyond the gratification of his preſent wants, or the mere neceſſaries of life. He endeavours to become independent, by obtaining and cultivating a portion of the ſoil for his

America. his own uſe. To withdraw him from an enterpriſe of this kind, which is ſo flattering to the paſſions of all men, a large reward is neceſſary, or, in other words, if an ordinary tradeſman in America do not receive high wages, he will go to the woods, and ſettle as a farmer, or ſmall proprietor, which in that country he can do upon eaſy terms. Hence it happens, that the manufacturers of Europe find it eaſy to underſell all thoſe who attempt to rival them in America. Even, when a ſkilful European manufacturer conveys his capital and his tools acroſs the Atlantic, the caſe is not altered. His ſervants and labourers muſt be carried along with him. Suppoſing this difficulty to be ſurmounted, he muſt immediately give them three times the wages that they received in Europe, or they will not remain in his ſervice, as they can eaſily obtain ſuch a price for their induſtry there. In conſequence of high wages, they are enabled, in a year or two, to accumulate enough of money to enable them to purchaſe or obtain credit for a ſmall farm, in a fertile though remote part of the country. They never fail, therefore, ſpeedily to deſert the buſineſs to which they were originally educated, and to betake themſelves to agriculture, which, from the independence it affords, is of all occupations the moſt grateful to the human mind. Thus, any great manufacture carried on in America, could only be ſupported by a ſucceſſion of emigrant workmen, receiving exorbitant wages, and having the proſpect of immediately deſerting it; a ſituation, in which it evidently could not proſper. Hence, to a very remote period, that is, till land ſhall become ſcarce and precious, in conſequence of an overflowing population, the United States of America muſt depend upon Europe for their moſt valuable manufactures. Neither is this a misfortune to America. Men there, as elſewhere, in following out their own private intents, contribute moſt effectually to advance the proſperity of their country. Agriculture is there purſued becauſe it is the moſt profitable of all employments to thoſe who engage in it, and leads them moſt rapidly to the poſſeſſion of property and independence; at the ſame time, by providing in abundance the means of ſubſiſtence, it facilitates to the community the acquiſition of what chiefly it wants, a numerous population, which, by the natural progreſs of things will ultimately bring in its train the cultivation of all the arts.

The Americans, however, are not deſtitute of a conſiderable variety of ſuch manufactures, as their peculiar ſituation has naturally led them to eſtabliſh. We have already mentioned, the manufacture of iron from the ore, which they practiſe in ſeveral ſituations to the eaſtward of the mountains, though not to ſuch extent as to ſupply the wants of their country. They alſo tan leather, which they are induced to do from the abundance of oak-bark that they poſſeſs; and they manufacture hats in conſiderable quantities. They have diſtilleries for the preparation of ſpirituous liquors, both from molaſſes imported from the Weſt India iſlands, and from grain. Tradeſmen in the towns, and private families in remote ſituations, prepare ſoap, candles, and malt liquors. In the remoter diſtricts, the women alſo prepare a conſiderable part of the clothing of their families. Upon the rivers, great numbers of ſaw mills are erected, for the purpoſe of converting to profit the timber, which they are under the neceſſity of cutting down, before the lands can be brought into cultivation. Connected with this operation, of clearing the land of timber, is the preparation of pot and pearl aſhes. As this forms a conſiderable branch of the trade of many American towns, the back country of which has been recently ſettled, we ſhall here ſtate the mode of preparing this ſalt, which has been generally adopted. America.

447
Potaſh works.

Large tubs with a double bottom are filled with the aſhes of wood: the uppermoſt bottom, which contains ſeveral holes, is covered with aſhes, about 10 or 11 inches deep, while the under part of the tub is filled with ſtraw or hay. Water being poured over the aſhes extracts the particles of ſalt, and diſcharges all the heterogeneous matter which it may yet contain on the layer of hay or ſtraw. The ley is drawn off by means of a cock, and if it ſhould not yet have attained a ſufficient degree of ſtrength, poured again over the ſame or over freſh aſhes. The ley is deemed ſufficiently ſtrong when an egg ſwims on it. This ley is afterwards boiled in large iron caldrons, which are conſtantly filled out of other caldrons, in which ley is likewiſe boiling. If the ley begins to thicken in the caldron, no freſh ley is added, but the fire is well fed with fuel until all the aqueous particles are ſeparated, and the whole is completely inſpiſſated and indurated. This ſalt is of a black colour, and called *black potaſh*. Some manufacturers leave the potaſh in this ſtate in the caldron, and increaſe the fire, by means of which the oil is diſengaged from the ſalt in a thick ſmoke, and the black potaſh aſſumes a gray colour, in which ſtate it is packed up in the barrels for ſale.

The proceſs of preparing the potaſh requires more or leſs time according to the quality of the aſhes and the ley, and to the degree of ſtrength of the latter: the medium time is 24 hours. The aſhes of green wood, and eſpecially of oak, are preferred. No potaſh can be prepared from the aſhes of reſinous trees, and aſhes which are five or ſix months old are better than thoſe that are new.

Some manufacturers uſe only one caldron for boiling, which they fill with cold ley as it comes from the tubs, and others put the ſalt, as ſoon as it begins to coagulate, into ſmaller caldrons to complete the proceſs.

In many parts of the ſtate of New York, eſpecially in the north, and the vicinity of Albany, the inhabitants who fell the wood prepare the potaſh. But there are alſo large manufactories, where from 30 to 40 tubs are uſed for preparing the ley, and from 10 to 12 caldrons for its evaporation. The manufacturers buy the aſhes from private families. The tubs and caldrons are of different ſizes, in proportion to the greater or leſs extent of the manufactory. By a general eſtimate, from five to ſix hundred buſhels of aſhes yield a ton of potaſh.

The barrels in which the potaſh is packed up, muſt be made of white oak, or if this cannot be had, of wood which is but little porous. The ſtaves ought to be far more durable than for caſks in which other dry goods are packed, the hoops alſo muſt be more numerous; for the leaſt fiſſure would expoſe the potaſh to humidity, to the air, and conſequently to deliqueſcence and diſſolution. Inſtances have occurred, when

America. when barrels badly made and hooped, and which had been filled with potaſh, were ſoon after found to be half empty.

448 Pearl-aſhes. Pearl-aſh is well known to be potaſh purified by calcination. To this end the potaſh is put into a kiln, conſtructed in an oval form, of plaſter of Paris; the inſide of which being made otherwiſe perfectly cloſe, is horizontally interſected by an iron grate, on which the potaſh is placed. Under this grate a fire is made, and the heat reverberated by the arched upper part of the kiln, completes the calcination, and converts the potaſh into pearl-aſh, which is taken out of the kiln, and, when completely cooled, packed in barrels. The proceſs of calcination laſts about an hour. Pearl-aſh is proportionally more heavy than potaſh, on account of its greater compactneſs, and the loſs of weight experienced by the latter, though the calcination is very trifling. Although pearl-aſh is leſs liable to deliqueſe by the air than potaſh, yet the barrels in which it is packed are of the ſame ſort and ſtructure of thoſe in which the latter ſalt is barrelled. They are of different ſizes, and contain from 200 to 300 pounds. Potaſh as well as pearl-aſh is ſold by tons in the courſe of trade; and it is not lawful to export either before it is duly inſpected by the public ſearchers, who are appointed for this purpoſe in all the ſtates where pearl or potaſh is manufactured.

449 Maple ſugar. The manufacture of ſugar from the maple tree, *acer ſaccharinum Linn.* called by the Indians *ozeketa*, is peculiar to the United States of America. The whole country to the northward of Pennſylvania, abounds with theſe trees, and alſo to the ſouthward upon approaching the mountains. In the weſtern territory they everywhere abound. Very conſiderable quantities of ſugar are made from them; ſo as to afford to the inhabitants an abundant ſupply of that valuable commodity. The medium produce of a tree ſtanding in the midſt of a wood, is three pounds of ſugar. The average produce of trees ſtanding on ground which has been cleared of all other woods, is from ſix to ſeven pounds per tree. A barrel of the firſt juice which comes from the maple tree will yield ſeven pounds of ſugar, and four if it ſtand in the midſt of other wood. The ordinary price of this ſugar is 1s. per pound. A barrel of the ſecond juice will yield three gallons and a half of treacle. Four or five barrels of the third juice will yield one barrel of a good and pleaſant vinegar. The vinegar is found to be better in proportion, as the juice is more concentrated by boiling. Hence ſome perſons brew but one barrel of vinegar from 10 barrels of the third juice. To clarify this vinegar it muſt be boiled with leaves. The third juice, when not uſed for vinegar, yields, if mixed with an equal quantity of water, a fermented liquor of an excellent flavour. The longer the firſt juice is boiled, the better and finer the ſugar becomes. In order that the trees may continue productive, they require to be tapped with extraordinary care, that is, the fiſſures or wounds made in them for extracting the juice, muſt neither be too deep nor too wide; ſo that no water may ſettle in them, and that the wood may cloſe again in the ſpace of a twelvemonth. During the time the juice is flowing out, which laſts about ſix weeks, and generally begins about the commencement of the month of February, all the days on which it freezes or rains are loſt; ſo that the number of days on America. which the buſineſs can be purſued to advantage, is frequently from theſe circumſtances much diminiſhed. Yet during the above time, two perſons can often make from 500 to 600 pounds of good ſugar, and this quantity is increaſed in proportion to the number of workmen employed. As the maple tree, wherever it is encouraged upon a moiſt ſoil, multiplies with aſtoniſhing rapidity, there is no other limit to the manufacture than the want of people to engage in it, or the limited demand for the commodity in a thinly peopled country. (For other particulars reſpecting this intereſting ſubject, ſee SUGAR.)

450 Ship-building. Ship-building is an art much practiſed in the northern ſtates upon the ſea coaſt. The Americans are underſtood to poſſeſs conſiderable ſkill in this branch of buſineſs, and to perform their work both in a ſubſtantial and frugal manner. In building veſſels in New England, they make the beams which ſupport the deck from the trunk of the ſpruce fir; taking care that theſe, and ſome other parts which are framed of this timber, have a ſufficient thickneſs of wood, and be ſufficiently rivetted together. The reſt of the veſſel is made of oak planks. It is only of late that the ſpruce fir has been uſed in building ſhips in this quarter. The ſhip-builders affirm, that it is an improvement to the veſſels, though in all probability, the ſcarcity of oak which now begins to be felt on the ſea coaſt of New England, has been the chief cauſe of the innovation. It is ſaid, however, that the ſpruce fir reſiſts, better than almoſt any other kind of wood, the action of the ſun and the weather, which in the American climate put all kinds of timber to a ſevere trial. The planks of the body of their ſhips, to the water's edge, are often made, not of oak but of beech wood, or of the wood of the black birch, which is reckoned equally hard and good. The keel is of the wood of the beech, of the ſugar maple, or of what is called the *rock maple*. By uſing theſe kinds of wood for ſo many purpoſes, there is often not above a fifth part of the ſhip made of oak. The ſhipbuilders maintain, that the beech, the black birch, and the maple, are very ſerviceable for the preſervation of iron, which the ſaline particles of the oak are apt to conſume. Inſtead of uſing tallow for thoſe purpoſes in ſhipbuilding, to which it has been uſually applied, all the ſhip-carpenters in America make uſe of train oil very plentifully laid on. By theſe devices, they have reduced the expence of ſhipbuilding to half of what it formerly was, to the great emolument of the perſons engaged in it.

451 Fiſheries of cod. The fiſheries are a branch of induſtry in which the Americans engage to a conſiderable extent. The whole coaſt of Maſſachuſets, and eſpecially of the diſtrict of Maine, is inhabited by fiſhermen engaged in the fiſhing of cod, upon the great bank of Newfoundland, or in the ſea in their own neighbourhood. They bring all the fiſh on ſhore, where they receive the laſt dreſſing. The fiſh are waſhed and laid in heaps, that the water may run off. Thereafter they are expoſed for two or three days to the air; after which they are placed on hurdles that are about four or five feet in breadth, three or four feet above the ground, and as long as the field on which they are erected. The fiſh are laid ſeparately, and frequently turned, that they may get thoroughly dry; which happens under a bright

America. bright American ſun in about ſix days. At laſt they are packed in caſes, preſſed down, and exported either to the Weſt Indies or to Europe. The beſt fiſh, that is, thoſe caught in the firſt fiſhing months, are ſuperior to the reſt, from being dried more ſlowly. They are ſent to Spain, excepting a few that are uſually beſpoke by the better ſort of people in the neighbourhood, and are ſold at double the price of thoſe which are caught later in the year, when the heat is more intenſe. The fiſh caught on the coaſts of Maſſachuſets and of Maine are neither ſo large nor ſo plentiful as thoſe taken at the Great Bank near Newfoundland; yet this fiſhery employs a conſiderable number of veſſels, which proceed only five or ſix miles from the coaſt, and return home every week.

452 Whale fiſhery. Beſides this, and the ſalmon and herring fiſheries, which are conſiderable, the Americans alſo engage extenſively in the whale fiſhing, on the coaſt of Brazil, and in the Pacific ocean in the ſame latitude, and in the Weſt Indian ſeas, as far eaſtward as to the Cape of Good Hope, from the 18th to the 25th degree of latitude. This buſineſs is ſometimes alſo proſecuted in Hudſon's bay and the ſeas adjacent to the coaſts of Greenland and Labrador, which abound more than the ſouthern ſeas in whales, and thoſe of a larger ſize, and ſuch as afford oil of a better quality. But as the vaſt maſſes of ice which infeſt the ſeas in theſe northern latitudes render the fiſhing dangerous, the Americans in general abandon the fiſhery in the north to the European fiſhermen. Of late years, the whales have altogether abandoned the coaſts of the United States, though they were formerly found in conſiderable numbers in that quarter. The ſpermaceti whales are chiefly found in the Indian ocean, on the coaſts of Africa and Madagaſcar, in the Pacific ocean, and on the coaſts of Peru and Chili. A voyage to this fiſhing occupies from ten to eighteen months. The crew receive no wages, but have a certain ſhare of the blubber; the captain has a fifth; the pilot a five-and-fortieth, or a fortieth, part of what is taken. The owners never make leſs than 20 *per cent.* upon the adventure; and the captain, from a ſucceſsful voyage, in common years, and at ordinary prices, uſually receives about eight or nine hundred dollars. A ſhip of 160 tons has a crew of 15 perſons and two boats. At their return, the blubber which has been barrelled at ſea is put into freſh barrels, and cleared from its ſediment before it is carried to market; for though the ſediment be as fit as the reſt for uſe in the ſoap-works, yet the oil in which it appears is regarded as of inferior quality in the European market. This ſediment, and a ſort of white fleſh which is found in the head and belly of the whale, are then ſqueezed in a preſs. A new quantity of oil

453 Spermaceti candles. of the beſt quality is thus obtained. The reſidue which remains after the firſt preſſing is put again into the preſs, and more forcibly ſqueezed than before. It affords a certain quantity of oil; and it is the produce of this laſt ſqueezing which, after undergoing a boiling, is poured into moulds, and forms ſpermaceti candles: Theſe are ſold for half a dollar a pound. Thoſe which are called ſpermaceti fiſhes yield this matter in great quantity. In their heads alone there are often five or ſix tons of this matter; though the other whales have the head differently compoſed, and do not afford above a quarter of a ton out of each head. Thus all whales yield more or leſs of this matter, which is ſo much valued as a material for candles. America.

Though the Americans have few manufactures, they engage extenſively in every kind of trade. In the interior of the country, almoſt every perſon who can command the requiſite capital is an innkeeper, or keeps a ſtore. The employment of innkeeper is there perfectly reſpectable, and is carried on by perſons of diſtinguiſhed character. What is called a ſtore in America is a ſhop or place where all kinds of commodities intended for conſumption are to be found and ſold by retail. Nothing is excluded from it. Train oil and candles, ſtationary wares, hardwares, and cloth, together with diſtilled ſpirits, ſugar, wines, and coffee, are all kept in it in the ſame manner as in the ſhops of ſome of the remote villages in Scotland. In ſome ſituations in America, theſe ſtores produce conſiderable profit, and are made ſubſervient to other ſpeculations. When a man engages in the clearing of land, and can at the ſame time afford to lay in the goods neceſſary for keeping a ſtore, he is enabled to get back from the workmen whom he employs the greateſt part of the wages he has paid them, in the form of profit upon the goods which they purchaſe at his ſtore. In this way, he contrives to have his work performed at a price which ultimately does not amount to more than a half of what is paid by others for the ſame labour. 454 American trade.

455 Foreign trade. With regard to foreign trade, the United States have of late years poſſeſſed a very great proportion of that which has been carried on among civilized nations. The vaſt extent of ſea coaſt, amounting to nearly 2000 miles, which ſpreads before the United States, the number of excellent harbours, the numerous creeks and immenſe bays which indent the coaſt, and the rivers and lakes which peninſulate the whole country, ſo habituate all young perſons in America to the idea of a maritime life, and to a fondneſs for navigation, that great numbers of them are at all times found ready to engage in it. The enterpriſing ſpirit of the people favours this tendency; and accordingly, every kind of commercial ſpeculation eaſily finds men ready to embark in it. For ſome time after the treaty of peace with Britain, by which their independence was acknowledged in 1783, while each ſtate continued to have its particular laws, prohibitions, and regulations; while the cuſtomhouſe rates changed every year, according to momentary conſiderations; and while an active jealouſy and rivalſhip ſubſiſted between the different ſtates, the commerce of the whole remained on a very precarious footing. It was only from the period of the eſtabliſhment of their new conſtitution that a conſiſtent ſyſtem of national commerce could be adopted. It ſo happened, that this period proved extremely favourable to their engaging extenſively in foreign trade. The violent ſhock, or rather the utter ruin, which the revolution brought along with it to the manufactures and commerce of France, forced her to open the ports of her colonies to the veſſels of neutral powers. From that moment, the Americans engroſſed all the commerce of the French colonies, which they were ſo well ſituated to carry on to advantage. The other powers of Europe, which had alſo colonies in the Weſt Indies, being all ſucceſſively engaged in the war, opened the ports of their colonies in like manner to the Americans, or at leaſt conſiderably diminiſh-

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America. ed their prohibitive regulations. Thus the commerce of the United States had the victualling of the Weſt India iſlands, as well as an excluſive trade with the French and Dutch colonies; not only in proviſions, but alſo in commodities of every kind. Their ſhips were freighted to carry Weſt India produce to Europe, and to bring back in return the articles neceſſary for the conſumption both of the United States and of thoſe ſame colonies. Add to this, that, in conſequence of the great ſcarcity of proviſions that during various years prevailed either in France or in Great Britain, the Americans found in theſe countries a ready and profitable market for all the productions of their country. By theſe means, aided by the eſtabliſhment of banks, and by an unexpenſive, though efficient, government, the commerce of the United States ſoon became extremely extenſive. It reached the Eaſt Indies, China, and every part of the known world. It is is true, that by the raſhneſs of their ſpeculations, many American merchants ſuffered; but the tide of commercial proſperity was very great upon the whole, and almoſt unexampled; ſo that great fortunes have been rapidly acquired in all the maritime towns of the United States.

Whether this commercial proſperity will be permanent, now that the European nations have returned to the enjoyment of peace, and conſequently have recovered the power of carrying on their own commerce without danger or interruption, with all the advantages of an abundant population, and of inferior wages of labour, is a queſtion about which many doubts have been entertained. It remains, however, with men of ſound reflection in America, a queſtion of ſome difficulty, whether, in the preſent ſtate of their affairs, the attempt that has been made to conduct an extenſive foreign commerce, is, upon the whole, favourable to the proſperity of their empire. Diſtant navigations are undoubtedly unfavourable to the progreſs of population, by the great number of men which they conſume, and by preventing the increaſe of families. This kind of commerce, alſo, by keeping up a taſte for foreign luxuries, induces a people that have no manufactures to laviſh away the neceſſaries of life on the purchaſe of ſuperfluities, and thus to introduce a coſtly ſtile of living, which is ſaid already to prevail too much in the United States, and which in every country has been found to be the greateſt enemy to the increaſe of the people.

One circumſtance in the mode of managing the American commerce ought not to paſs unnoticed. In Europe, we are accuſtomed to imagine that a man cannot be qualified to act as captain of a ſhip till he has made a number of voyages, and paſſed through a regular courſe of ſtudy; whereas, in New England the merchants do not heſitate to entruſt their ſhips to young perſons, who have frequently been only one year at ſea. As they have grown up in the buſineſs of the counting-houſe, they are perfectly acquainted with the price, the quality, and the ſale of each different commodity. The firſt year, they are aſſociated with a ſkilful ſteerſmate, and act at once in the capacity of captain and ſupercargo. Their veſſels do not ſuffer ſhipwreck more frequently than other ſhips which are more cautiouſly navigated. In the courſe of a few years, theſe young people become merchants themſelves, the captain's profits being always conſiderable. America. As they are generally appointed from the families of merchants, they receive aſſiſtance from their employers.

455 Traffic of land.

There is one kind of commerce which, in ſpeaking of the trade of the United States, ought not to be omitted, as it is altogether peculiar to North America; that is, the traffic of land. This trade is founded upon the conſiderable maſs of land in the territory of the United States, in compariſon with their preſent population, and upon the probability of the rapid augmentation of that population, either by the natural and ordinary means of reproduction, or by foreign emigrations. This, like all other branches of trade, and more than any other, is a traffic of ſpeculation. At the end of the revolution, the waſte lands, which amounted to more than four-fifths of the American empire, were found to belong to different ſtates, which, as ſovereigns, now inherited this property from the ſovereignty of the crown of Great Britain. The lands granted by the kings of Great Britain have, with ſome exceptions, remained in the poſſeſſion of the granters; but the amount of theſe was infinitely ſmall in proportion to the maſs of the uncultivated land. The ſmall ſtates near the ſea having been longer inhabited, poſſeſſed but a ſmall portion; and ſome had none at all; while the great ſtates, whoſe territory extended far into the interior, ſuch as Georgia, the Carolinas, Virginia, Pennſylvania, and New York, were in poſſeſſion of immenſe quantities of foreſt lands. It was neceſſary for theſe ſtates to ſell the waſte lands, to afford encouragement to their growing population, to preſent a bait to foreign emigration, and to liquidate the debts reſulting from the war without burdening the people with new taxes, which at that time they were little able to bear. Among the lands to be ſold were the confiſcated eſtates of the royaliſts, who had given aſſiſtance to the Britiſh during the war. To bring theſe lands to ſale, the ſtates opened land offices, where perſons who meant to purchaſe received warrants to have the lands they pointed out ſurveyed by the ſurveyor of the ſtate, poſſeſſion being delayed till payment of the price, or fulfilment of ſome part of the conditions of the transference. Great ſpeculations immediately began, land being purchaſeable of all the ſtates at a very low price. The ſtates were then inundated with paper money, peculiar to each, and all in a ſtate of depreciation. By buying up this paper at a trifling price throughout the country, and delivering it to the ſtates as the price of territory, many ſpeculators acquired land with a real value of two or three cents, or hundredth part of a dollar per acre, payable in ſix or eight years, with a diſcount from the treaſury of the ſtate for prompt payment, according to the value at which the land was rated by the law. Other ſpeculators, without adopting ſuch a mode of payment, made purchaſes merely upon the hope entertained by every American of an immediate increaſe of population, by emigration and otherwiſe, which would neceſſarily ſoon raiſe the price of lands. Conſiderable quantities of land were alſo beſtowed by the ſtates upon the officers and ſoldiers that had been employed in their armies during the war, as a remuneration for their ſervices. By theſe grants, and by purchaſes made by individuals from the land offices of the ſeveral ſtates, or from commiſſioners appointed

America. pointed to put up large portions to public ſale, a great extent of territory in all the ſtates ſoon came to be held, and continues to this day to be ſpeculated upon, by private perſons. The ſpeculators in land who hold great quantities of that commodity, endeavour to turn it to account chiefly in three ways: 1ſt, By ſelling the land in large parcels to men of fortune in Europe or America; 2dly, By ſelling it in ſmall parcels to families who mean to ſettle upon it; and, laſtly, By preſerving it till time and a diminution of the quantity of this ſort of merchandiſe have raiſed the value of it to a price anſwerable to their expectation.

457 Sales of land in large portions.

The firſt of theſe modes, is that which is moſt generally deſired. To accompliſh it, agents have at different times been ſent to Europe. Several great ſales were by their means effected in England upon advantageous terms, which raiſed the price of the remaining lands, increaſed the confidence of the ſpeculators, added to their numbers, and extended their ſchemes. The opinion of an immenſe emigration, to which the French revolution and the ſituation of Europe gave riſe, conſpired for ſome time to give confidence to theſe ſpeculators. The great ſales to Europeans were facilitated by the periods of the payments to be made to the ſtates, which were always diſtant, and by the delays of theſe payments which could not be obtained without much difficulty. In the ſtates of Pennſylvania and Maryland, every foreigner could buy and poſſeſs land as well as a citizen. In ſome others, although this privilege was not given by law to foreigners in general, yet it was readily permitted by the legiſlature when applied for. In all the ſtates, a foreigner may hold land in the name of an inhabitant; and the great intereſt the ſtates had in ſelling, and in buying foreign capitals into their territory, has always given entire ſecurity to this borrowed right of poſſeſſion. In making bargains of this kind, the conditions are various according to the views of the parties. The periods of payments are generally ſhort; at leaſt a large part of the purchaſe money is paid down when the bargain is concluded. The conditions impoſed by the ſtates in the contracts of ſale are binding by law upon the new purchaſers; but very often the old purchaſer remains reſponſible, in caſe of their not being fulfilled by the new one. The new purchaſers become ſpeculators themſelves, and in order to turn their new property to account, have recourſe to the ſame means that were employed by thoſe of whom they bought it.

458 Sales of land in ſmall parcels.

Land is ſold in ſmall parcels in ſeveral ways: either out and out for ready money, a mode of ſale which though not unfrequent, is not the moſt common; or out and out, but to be paid for by inſtalments; in which caſe the title deeds are not delivered till after the purchaſe money is entirely paid; and the ſeller retains a right of ejecting the new ſettler from his land, if the conditions of payment be not fulfilled. Sometimes the ſeller only requires a ſmall part of the price of the land in ready money; and the land remains ſubject to a perpetual rent, payable in money or in produce, which the purchaſer is not always left at liberty to redeem. Sometimes the ſeller endeavours to let his lands, for a certain number of years, for an annual rent, or under condition of clearing annually a certain number of acres, the whole improvements being to return to himſelf at the termination of the leaſe: But ſuch bargains are unuſual; ſettlers being unwilling to accept of a temporary right. Almoſt all the great landed proprietors, therefore, endeavour to get ſome perſons to accept, upon moderate terms, of ſmall lots, and to ſettle upon their eſtates; becauſe by clearing ſome portions of it, they enhance the value of the reſt. America.

459 Land withheld from ſale in the hope of a riſe of its price.

The third mode of deriving advantage from purchaſes of land, by waiting till time has raiſed its price, is the reſource of great proprietors who have not been able to employ the two others. Some perſons, however, with little capital, endeavour to wait upon the mere calculation of the riſe that will probably take place in a given time. In theſe calculations, men of a ſanguine temper are frequently deceived; and there are many examples of proprietors, who in the following year, would be extremely glad to ſell at the price that they had refuſed the year before. Theſe ſpeculations in land, however, have been the means of making great fortunes in America; but they have alſo, when engaged in without ſufficient capital, occaſioned more diſtreſs and greater and more diſaſtrous bankruptcies than any other kind of commercial adventures. The lands in America are alſo the branch of trade, which has given occaſion to the greateſt number of law ſuits, as well on account of the titles as of the boundaries of eſtates, and of the fulfilment of the conditions of ſale. The moſt certain, as well as the moſt advantageous means of deriving profit from a great extent of new land in America, is ſaid to be for the purchaſer to begin clearing it himſelf; to attract inhabitants as ſpeedily as poſſible by giving them, at a low rate, and even for nothing, if neceſſary, a number of acres ſufficient for the maintenance of their families; to erect mills, make bridges and roads, even to build a few houſes, and to encourage in every way the efforts of the new ſettlers. There is no example of theſe firſt ſacrifices, when made with intelligence and to a ſuitable extent, having failed rapidly to increaſe the value of the land reſerved by the proprietor, and ſpeedily to enrich him by attracting great numbers of emigrants from other countries. As the ſubduing of a vaſt wilderneſs, and filling it with men of a civilized race and character, is an event of much importance in the hiſtory of mankind, we ſhall here take notice of one of the inſtances of great ſucceſs in an undertaking of this kind, that occurred to an European ſpeculator.

460 Remarkable ſpeculation in the purchaſe of land.

The diſtrict called *Geneſſee* on the ſouthern ſhore of Lake Ontario, or rather that part of the diſtrict which was not then ſold, was in 1791 purchaſed, in London, from Mr Morris for 1s. per acre. He had bought it from Mr Phelps for 5d per acre. The contract was concluded on the ſuppoſition that this tract of land contained 1,000,000 of acres; and a condition was added that the price or ſum of 50,000l. ſterling which was to be paid immediately, ſhould be returned by Mr Morris, provided that Captain Williamſon, the oſtenſible purchaſer, who was to view the lands, ſhould not find them anſwerable to the deſcription given of them. The purchaſer was ſatisfied with the lands, and on ſurveying them a ſurplus was diſcovered of no leſs than 120,000 acres. But Mr Morris made no difficulty on transferring them, together with the reſt, to Captain Williamſon, without the leaſt remuneration, becauſe, as he obſerved, he had intended to ſell the whole with-

America. out any reſervation. Captain Williamſon is ſuſpected to have been only the agent of a very wealthy Britiſh baronet. But in every reſpect he has acted as proprietor. The diſtrict bought by him, bounded on one ſide by Lake Ontario, and on the other by the river Geneſſee, extends 80 miles in length by 30 or 40 in breadth. To preſerve the continuity of his lands, he made ſeveral additional purchaſes, ſo that his eſtate ſoon amounted to 1,500,000 acres. After ſurveying the whole, he fixed on ſpots for building towns, as central points to a ſyſtem of ſettlements. Theſe towns, were, Bath, on the creek of Conhoctoon, Williamſburg, on the river Geneſſee, and Great Sodus, on Lake Ontario. He immediately eſtabliſhed a mode of communication between Philadelphia and this new tract, by forming roads in a direct line, ſo as to ſhorten the journey at leaſt 300 miles. Theſe new roads were made merely by felling the trees to the breadth of an ordinary road, in as ſtraight a line as poſſible through the foreſt, and by removing them to one ſide of the path; their ſtumps to the height of ſeveral feet being ſtill left ſtanding. He alſo erected ſeven ſaw mills, and three corn mills. He built a great number of ſuch houſes as the firſt ſettlers upon lands uſually require; and he began in ſeveral places to clear the woodlands. His firſt labourers were Germans, brought from Hamburgh; but they ſpent their time in idleneſs and drunkenneſs, and ſoon left him. They were replaced by Iriſhmen, by whoſe aſſiſtance his roads were ſoon put into what the Americans account good condition in ſuch a ſituation; that is, he made lanes through the woods in the way already mentioned. The reſult was, that his lands, which at firſt ſold at one dollar per acre, in two years time, ſold for 3 dollars. The produce of about 800,000 acres diſpoſed of in this way, not only refunded the purchaſe money, and the whole amount of the other expences incurred, but is alſo underſtood to have yielded a nett profit of 50,000l. ſterling. To obtain this ſucceſs, however, Captain Williamſon found it neceſſary to reſide in the woods in the midſt of his poſſeſſions. When he ſold ſmall ſhares of 500 or 1000 acres, he always ſtipulated that one family ſhould come to ſettle upon each ſhare within 18 months, under the penalty of a forfeiture of the bargain. When larger portions were ſold, he ſtipulated, that a proportional number of acres ſhould be cleared of wood. His terms of payment were, to diſcharge half the purchaſe money in 3 years, and the remainder at the expiration of ſix years; the payment of intereſt to commence within 18 months after the bargain. Thus, a purchaſer who inſtantly ſet about clearing the ground, could eaſily obtain its produce before the intereſt became due; and his crops frequently aſſiſted him towards the payment of the firſt inſtalment. He alſo eſtabliſhed ſtores of proviſions in different places; but theſe he never opened for ſale unleſs the ſettlers could not otherwiſe ſupply themſelves, that the ſale of the produce of their lands might not be injured. He likewiſe built a ſchool at Bath, and endowed it with ſome hundred acres of land. He gradually built inns, and even a ſeſſions houſe and a priſon, for the public uſe. By all theſe efforts, added to great care in preventing litigation among the ſettlers; by fixing in a preciſe manner the boundaries of the ſeveral pieces of property ſold, theſe extenſive foreſts were in a few years reduced under the dominion of man, and put into a train of ſpeedily becoming populous and valuable. America.

461 State of agriculture.

From what has been already ſaid concerning the ſtate of manufactures in America, and the general ſituation of the country, it will eaſily be conceived, that the greater number of the people muſt be ſtill engaged in agriculture. Indeed, it is underſtood, that nine-tenths of the inhabitants of the United States follow this employment. Concerning the ſtate of it, when conſidered as an art, it is difficult to ſpeak with preciſion, on account of the variety of forms in which it is practiſed in different diſtricts of that great country. It may juſtly be ſaid, that the art of agriculture exiſts in America in all its known degrees and varieties, both of perfection and of imperfection. The ancient ſtate of Maſſachuſets is as much cultivated as France or England. The houſes ſtand near to each other, in the midſt of the fields and farms to which they belong: ſome of the roads ſeem to be one continued village; and to ſupport this population much induſtry is exerted upon the ſoil. Moſt of the fences are made of ſtone. The harveſt is always completely ſecured in houſes, and a great part of the ground is always periodically laid down in graſs. Numbers of horſes employed in country labour are ſeen in the fields; but they are not remarkable for beauty. The cattle are of a fine breed, and all the paſture grounds are covered with them. But the agriculture of Maſſachuſets, and of ſome other parts of the New England ſtates, affords no proper criterion by which to judge of the ſtate of this important art in the greater part of America. The general rule with regard to huſbandry in that country is, that it is extremely defective and ſlovenly. This does not ariſe ſo much from the want of ſkill on the part of the Americans, as from the nature of their ſituation. In that country, land is plentiful and cheap; but men are few, and labour is conſequently dear. An American huſbandman, therefore, is more ſtudious to make the moſt of the labour that he can command, than to raiſe great crops from a ſmall portion of ſoil. Having abundance of fertile land to waſte, he finds it more profitable to turn over negligently, with as little toil as poſſible, a large portion of it, than to labour any part of it perfectly. In this way he derives the greateſt benefit from his own perſonal induſtry, or from the labour of thoſe perſons whom it is in his power to engage for hire. This negligent mode of cultivation, however, is laid aſide in the neighbourhood of the great towns, where land is valuable and dear; and it prevails in proportion to the remoteneſs of the ſituation, and the facility with which land is obtained.

462 They flood the land.

In ſome places, in conſequence of the multitude of ſtreams that are to be found in America, the valuable practice of flooding land is adopted; and the American huſbandmen are ſaid to practice this branch of the art of agriculture with conſiderable ingenuity and induſtry. Inſtead of attempting to level their ground, however, they manage to convey conſiderable ſtreams of water through the valleys to the ſummits of the eminences, or high grounds, by means of tubes or pipes, formed of the trunks of trees bored or hollowed out. In other reſpects, however, the practice of American huſbandry is undoubtedly very imperfect. Even in thoſe parts of the country in which timber has become dear, the

America. the Americans ſtill continue from habits to uſe wooden fences. No ſuch thing as a hedge is to be ſeen in any
463 No hedges. of the ſtates. The farmers ſay, that the thorn does not thrive in their climate. This point has not perhaps been well aſcertained by experiments; but there can be no doubt, that out of the endleſs variety of native plants and ſhrubs, ſome might eaſily have been found that are capable of being uſed as a living fence. All the cultivated fields at the firſt clearing of the ground are incloſed with fences, which conſiſt of poles of wood once ſplit and laid zig-zag upon another without any ſtakes. Theſe fences are afterwards exchanged for regular palings of different kinds of wood, which are neceſſarily attended with all the defects of that mode of attempting to ſecure either corn or ſtock; running rapidly into decay, and requiring conſtant repairs.

464 No ſtacks of grain. The Americans have an expenſive mode of ſecuring their grain. Inſtead of building it up in ſtacks, they are at the trouble of bringing it all into houſes or barns. They ſay, that it would not be ſecure in ſtacks againſt the ſudden and violent torrents of rain that occur in their climate; an error into which they have undoubtedly been led by building and covering their ſtacks in an unſkilful and improper manner. They do not reap their grain with the ſickle, but cut it down with the ſcythe, which muſt undoubtedly produce conſiderable waſte. But this is perhaps done from neceſſity, in conſequence of the high price of labour, or rather the difficulty of obtaining a ſufficient number of labourers to perform this work in another manner. Inſtead of thraſhing, they uſe in many places, and particularly in Virginia, the ancient cuſtom of treading out the corn by means of cattle, by whoſe feet it muſt, no doubt, be conſiderably bruiſed and damaged.

465 New ſettlements, how formed. The ſimpleſt and leaſt artful kind of American huſbandry is that practiſed in the formation of new ſettlements. When a family have come to a reſolution to ſettle in a particular diſtrict, they uſually proceed in the following manner: The huſband in the latter end of ſummer repairs to the ſpot where the ſettlement is to be made. The firſt thing he does is to cut down the ſmall trees on one or two acres. He next barks the larger trees. This laſt operation conſiſts of cutting off a circle of bark from the tree all round with a hatchet, penetrating at the ſame time a ſhort way into the wood; the effect of which operation is, that on the following year, the tree produces few or no leaves to prevent the ſun from reaching the ſoil. In that climate, trees thus barked or girdled ſpeedily decay, and in a few years are overturned by any ſtorm; after which they can be burnt with little trouble on the ground. Among the trees thus barked, and upon the ground that has been cleared, the new ſettler breaks up the ſoil, by dragging along it a common harrow with iron teeth. Without farther preparation, and without the uſe of a plough, he ſows wheat or rye. Wheat thus ſown produces from 20 to 25 buſhels an acre, of an excellent quality; and, in conſequence of the great fertility of the ſoil, and its natural ſoftneſs, being wholly formed of rotten leaves and graſs, good crops of wheat are obtained with no greater degree of induſtry during ſeveral years in ſucceſſion. Having ſown his grain in this way, the ſettler, with the wood which he has felled, conſtructs a ſmall log-houſe, and makes ſuitable fences around it; a labour which may be performed in about a month's time; after which, the new plantation is left to itſelf for the winter. It is to be obſerved that a log-houſe is built by laying trees upon each other at right-angles in ſuch a way as to encloſe a ſquare ſpace; the interſtices being filled up with ſtone and clay, or only with loam, and the roof covered with trees and turf. A chimney is uſually built, in one corner, of ſtones and clay. In the beginning of ſpring, this adventurer brings his family and the beſt of his cattle to his new ſettlement. His cows are turned into the woods to graze. He plants potatoes, and ſows Indian corn, and thus is enabled to provide for the firſt year's maintenance. While thus employed, he is at the ſame time clearing more ground, burning the trees he has already felled, and, as far as may be, even thoſe which he has barked. The aſhes afford a very uſeful manure; and in the opinion of the beſt judges, are employed in this way to much greater advantage than when converted into potaſh, the making of which is with the new ſettlers merely the reſult of neceſſity. For if a ſaw-mill be at hand, the large trees are conveyed thither by oxen. Thus, within the ſpace of twelve months, a man may clear 15 acres; and few families cultivate more than 30. The barked trees are left ſtanding for a longer or ſhorter time, according to circumſtances, viz. the ſpecies of the tree, the nature of the ſoil, and the degree of the wetneſs of the ſeaſon. The hemlock fir will ſtand eight or nine years, the oak four or five, the maple three or four; and trees, all the branches of which have been burnt off, ſeldom fall before this time. The ſtumps of the felled trees, generally two or three feet high above the ground, hardly rot ſooner than the barked trees which have been left ſtanding on the lands. Salt pork and beef are the uſual food of the new ſettlers. Their drink is water and whiſky; but there are few families unprovided with coffee and chocolate. The axe which the Americans uſe in felling trees has a ſhorter handle and a ſmaller head than that of European wood-cutters; and they aſſert, that they can do more work with this ſhort-handled light axe than with the European.

America.

The Americans appear to entertain fewer local attachments than the peaſants of Europe; and accordingly, emigration with them is extremely common. Some families make a buſineſs of forming new ſettlements in the way now mentioned. After building a houſe, forming encloſures, cutting down a part of the wood, and putting every thing into a decent train of cultivation, they ſell the ſettlement which they have formed with ſo much labour, and proceed farther into the woods, to commence anew the ſame career of hardſhip and of induſtry. By theſe operations, they never fail to earn a very conſiderable profit, on account of the additional value which the land acquires by their efforts in the eyes of perſons of greater property. The ſame kind of undertakings, however, are alſo engaged in by men of a vagrant and reſtleſs character, who delight in an idle life, the greateſt part of which is ſpent in hunting. Theſe men keep upon the frontiers of every new colony, and as ſoon as their amuſements begin to be reſtrained by ſettlers occupying the country round them, they immediately ſell their plantations, and proceed to more remote ſituations; thus becoming a kind of voluntary outcaſts

America. from civilized ſociety. In theſe undertakings, there is uſually little perſonal hazard, as the wild animals are leſs fierce in America than in other parts of the globe. Wolves, bears, nay even panthers, uſually fly before man; and the inſtances of their doing miſchief are ſo rare, that the very reality of it might be doubted. The ſevereſt misfortune to which the inhabitants of the American foreſts are liable is the loſs of their children in the woods. Theſe unfortunate infants, over whom it is almoſt impoſſible to keep conſtantly a watchful eye, are apt to run out of the houſe, which is ſeldom fenced the firſt year, and, ſtraying from their houſes, are unable to find them again. In ſuch caſes, however, all the neighbours join in the ſearch, and ſometimes the children are found. But there are alſo inſtances of their being totally loſt, or diſcovered only when dead of hunger or fear.

466 Children apt to be loſt in the woods.

467 Cattle uſed in agriculture.

Both horſes and oxen are uſed in agriculture in America. In ſome places, however, they have at times found it neceſſary to confine themſelves excluſively to the uſe of the latter, becauſe they are ſubject to no diſeaſe in that country. Whereas in Pennſylvania, New York, and elſewhere, almoſt the whole horſes are ſometimes carried off by a weakneſs which deſtroys them in the courſe of two months. The liver is blown up by a ſwelling, which extends into the legs and the whole maſs of blood, and is called the yellow water. Is is ſaid, that in the ſtate of Virginia the Arabian horſe, with a very moderate degree of attention, thrives as in his native climate, and without degenerating. Southwardly, the heat of the ſun occaſions a deficiency of paſture; and northwardly the winters are too cold for the ſhort and fine hair, and the particular ſenſibility of conſtitution of that race. Their patience of heat fits them, in that and the ſouthern climates, even for the drudgeries of the plough; and numbers of them are exported from thence to the Weſt India iſlands, as articles of luxury to the wealthy planters there.

468 Sheep.

Very few ſheep are reared by the American farmers. The wool is of a good enough quality; but there is little or no demand for it, unleſs for the ſupply of ſome manufactories of hats. The mutton is in general not good; the carcaſes being very large, and the fleſh coarſe from being fed on the high rank graſs of the American paſtures. Accordingly few farmers keep more than 18 or 20 to ſupply wool to be manufactured in their own families. Great numbers of

469 Swine.

ſwine are kept by the Americans. This is ſaid to have ſoon become a very favourite kind of ſtock among the earlieſt ſettlers in the country; from the delight which they found the ſwine took in hunting out and devouring all kinds of ſerpents, with which the country abounded, and which were objects of great terror to perſons newly arrived from the cultivated countries of Europe, in which theſe reptiles are more rare.

470 Grain.

The kinds of grain cultivated in America are nearly the ſame with thoſe reared in Europe, with ſome additions. A regular ſucceſſion of crops is deſcribed by an American writer, as uſed in recruiting worn-out lands. In Maryland and Virginia, they have long been in the practice of ſowing a pint of the beans of the *caſſia chamæcriſta* with every buſhel of oats on poor lands. The oats ripen, and are cut in July, when the beans are young, and eſcape the injury of the ſcythe. They flower in Auguſt and September. In October the leaves fall off; the ſeeds ripen, and the pod opens with ſuch elaſticity as to ſcatter the beans to ſome diſtance around. The year following the field is cultivated with Indian corn, which is ſown in drills. The beans which ſprout early are all deſtroyed by the plough and the hoe; but the more numerous part not making their appearance above ground, till the culture of the corn is ended, ſpring up unhurt by the inſtruments of agriculture, and furniſh ſeed for the enſuing year, when the field is again ſown with oats. By this alternate cultivation of Indian corn and oats with beans, the land is ſo far improved by the rotting of leaves and ſtalks of the beans, that the product is 15 buſhels to the acre, on ſuch as prior to this management would not have produced more than five. The American huſbandmen are alſo of opinion, that the common field pea is preferable to every thing elſe for improving lands, if the vines or ſtraw be left to rot on the ground, inſtead of being given to cattle for fodder. America.

471 Indian corn.

Indian corn or maize everywhere forms a conſiderable article of the produce of American huſbandry. The mode of rearing it is ſimple. Holes are made in the field, four feet aſunder every way, and ſo as to form ſtraight lines, for the conveniency of hoeing, or ploughing. In every hole are put five or ſix grains previouſly ſteeped in water, to make them ſpring up the quicker. By day people are placed for a ſhort time, to guard them againſt birds, and by night, fires are kept up till the corn has ſprung, to frighten away the fox, who would otherwiſe turn up the ground, and eat the corn of all the rows one after another. As ſoon as the corn has ſhot out of the earth, when it mounts up, the earth is drawn towards its root, to ſtrengthen it againſt the wind. Five or ſix ears are commonly found on each ſtalk. The grains are nearly of the ſize of a pea, and 700 grains are commonly found upon one ear. A light black ſoil agrees better with it than a ſtrong and rich one. The grain is uſed in various ways, but chiefly in the form of a kind of porridge or gruel. Bread is alſo made from it, and it is ſometimes uſed in diſtillation.

472 Wheat.

As in Europe, wheat is regarded as the moſt valuable kind of grain. In Virginia, however, near the ſea coaſt, the cultivation of it is not a little diſcouraged by an inſect called the *weavel*. This is a worm whoſe eggs are almoſt conſtantly depoſited in the ear of the grain. A ſlight degree of heat greater than that of the common atmoſphere in ſummer kills it, and is endeavoured to be obtained in the following way: The grain is thraſhed as ſoon as it is cut, and laid up in its chaff in large heaps. The heat which is ſpeedily produced deſtroys the vital principle of the egg, and protects the corn from the inconveniences of its being hatched, while at the ſame time the chaff ſufficiently reſtrains the heat from riſing into putrefaction. If the grain continued in the ears without being ſpeedily thraſhed, it would be deſtroyed by the worm which would be excluded from the eggs. This ſcourge, however, ſpreads no farther northwards than the Potowmack, and is bounded to the weſt by the ridge called the Blue Mountains. A few weeks after the wheat has been beaten or trodden out by horſes, it is free from all danger, is winnowed, and ſent to market.

473 Tobacco.

Tobacco continues to be cultivated to a conſiderable extent

America. extent in Virginia, and the ſtates to the ſouthward. It is yearly, however, giving place to wheat, which is of infinitely more value to the country, as having a leſs tendency to impoveriſh the ſoil, and contributing in a more direct manner to the encouragement of population. The culture of tobacco, on account of the conſtant attention and labour which it requires under a burning ſun, is chiefly performed by negroes. It is difficult, troubleſome, and uncertain. It is ſown in the month of March, in a fat and rather moiſt ſoil. Before the time of ſowing, the land is covered with ſmall branches of trees, which are burnt for the purpoſe of deſtroying the herbs and roots that might injure the growth of the plant, and alſo in order to increaſe the fertility of the ſoil by their aſhes. The tobacco is thickly ſown on a bed in the moſt ſheltered corner of the field. This bed is covered with branches, leſt the froſt ſhould hinder the unfolding of the ſeed, and prevent the ſprouting of the plants. When they are three or four inches high, they are tranſplanted into a field, which has been well manured and prepared for their reception. A negro heaps earth around the plants, which are ſet four feet diſtant from each other on all ſides. The ground is conſtantly kept clear of weeds, and all the leaves are taken from the plant, which it is thought might injure its perfect growth, beginning always with thoſe that are next the ground, and which might be affected by the wet. More earth is heaped around the ſtalk, and its head bruiſed with the nail to prevent its running up too high. All the ſprouts which ſhoot forth below the leaves are cut away, and all the leaves ſucceſſively torn off, except eight or nine, which alone are left on the ſtalk. At laſt, when the plant is ſuppoſed to be ripe, which happens in the month of Auguſt, it is cut, left ſeveral days in the field to dry in the ſun, and then carried into the barns, where every plant is ſuſpended by its undermoſt part. In this poſition the leaves attain by deſiccation the laſt degree of maturity, but not all of them at the ſame time; for this deſiccation, which, in regard to ſome, is completed within two days, takes, with reſpect to others, ſeveral weeks. When the leaves are prefectly dry, they are taken from the ſtalk, and laid one upon another in ſmall parcels. The moſt perfect leaves muſt be put together, and thoſe of an inferior quality ſeparated into different claſſes: this is at leaſt the method followed by ſuch planters as pay moſt attention to the fabrication of their tobacco. Theſe ſmall parcels of leaves, tied together by their tails, are then brought under the preſs, and afterwards preſſed down into hogſheads. This proceſs varies more or leſs in the different plantations, but the variations are not by any means conſiderable. The ſeed for the next year is obtained from 40 or 50 ſtalks per acre, which are ſuffered to run up as high as they will grow without their heads being bruiſed.

The ſorts of tobacco cultivated in Virginia, are the *ſweet-ſcented*, the moſt eſteemed of all; the *big* and *little*, which follow next; then the *Frederick*; and, laſtly, the *one-and-all*, the largeſt of all, and which yields moſt in point of quantity. A negro can cultivate two acres and a half; and, as each acre yields, upon an average, 1000 pounds of tobacco, each negro can conſequently produce 2500 pounds. But the culture of this plant is, as already has been ſtated, extremely troubleſome. It is expoſed to a great variety of acci- America. dents, which cannot always be avoided, and which deſtroy many ſtalks, or ſpoil at leaſt many leaves. After the plant has been tranſplanted, the root is frequently attacked by a ſmall worm, which cauſes the leaf to turn yellow, and which muſt be taken out of the ground with the fingers, to ſave the plant. Humidity communicates *the rot* to the plant, that is, covers it with red ſpots, which cauſe it to moulder away, and the ſtalk is loſt. Violent winds are apt to break the ſtalk. When the leaves are at the point of attaining their maturity, horn-worms neſtle in them, attack them, and completely deſtroy the plant, unleſs they can be torn off. Laſtly, When the tobacco is cut and ſpread on the ground to dry, the wet impairs its quality.

474 Indigo and cotton.

Indigo and cotton are alſo cultivated in ſome of the ſouthern ſtates. Cotton in particular is exported from Charleſtown in conſiderable quantities; and of late it has been brought down the river Miſſiſſippi, from Kentucky and other ſettlements to New Orleans, in ſuch abundance as to form an important article of commerce.

475 Rice.

In South Carolina, rice is cultivated to a great extent. That country is divided by nature into Upper and Lower. The latter, which is the eaſtern part, adjoining to the Atlantic ocean, extends inward almoſt 100 miles. The land in this low diſtrict conſiſts of marſhes and ſwamps, interſperſed with a little high land. The marſhes are a ſecond-rate land, which produces a coarſe kind of graſs in very great abundance. Little attention is paid to them, though they could in general be drained and cultivated. The high land is alſo neglected for the ſake of the ſwamps, which are the moſt valuable kind of ſoil, conſiſting of a rich blue clay, or fine black earth, to the greateſt depth. The rice which is cultivated upon them is ſown in April and May. The ground is turned up eight or nine inches deep in furrows, into which the rice is thrown by a woman; and the negroes, who alone are employed in this cultivation, fill up the furrows. The ſeed ſhoots up in 10 or 12 days, according as the ground is more or leſs wet. When the blade is from ſix to ſeven inches high, and after the negroes have cleared away the weeds, the water is made to flow over the field, ſo that no more than the tops of the blades can be ſeen. In three or four weeks the water is let off, and the negroes take away the remaining weeds. The field is covered again with water, which is drawn off when the yellow colour of the ear and the hardneſs of the ſtalk denote the ripeneſs of the rice. It is then cut and kept in ſtacks till winter. It is afterwards thraſhed, and put into a ſmall wooden houſe, which is ſome feet high, and reſts upon four pillars; and in the ceiling of which is faſtened a large ſieve, which ſeparates it from the other parts, and the wind clears it perfectly before it falls to the ground. The rice, after being thus cleared, muſt be freed from the firſt ſhell that ſurrounds it. For this purpoſe, it is carried to a mill, the grinders of which are made of fir, and are about four inches thick, and two and a half in diameter. One is moveable, the other fixed. They are both ſcooped out in an oblique but concentric form. Againſt the edges thus formed, the rice is preſſed; and by that means ſeparated from the huſks. Theſe mills are turned by a negro. On account of the rapid motion

America. tion and the ſoft wood of which they are made, they do not laſt longer than one year. The rice is winnowed as ſoon as it comes from the mill, but ſtill it has a ſecond ſhell which muſt be taken off, and this is done by the negroes pounding it with clubs. Theſe clubs, however, are ſometimes put in motion by machinery turned by oxen. After the rice is pounded, it is winnowed again to cleanſe it from the ſecond ſhell; and it is put into another ſieve for the purpoſe of ſeparating the ſmall from the larger grains. The laſt only are ſaleable. Whether the ſeparation is carefully made or not, muſt depend on the honeſty of the planter; and during the late dearth of proviſions in Europe, when the rice bore a high price, it is ſaid that they were not very ſcrupulous in this reſpect. The rice deſtined for ſale is packed up in barrels, offered for the inſpection of the officer appointed for that purpoſe, and then exported. During its growth, the rice is expoſed to ſeveral dangers, which render the crop uncertain. Before the blade grows up, it is attacked by ſmall worms, which gnaw the root. It is alſo frequently injured by little fiſhes that live in the water which covers the ſwamps. Againſt them the rice is only defended by the heron (*ardea alba minor*) which feeds on theſe little fiſhes and worms; and on this account is ſpared by the planters, as the turkey-buzzard is by the town's people. When the rice is ripe, it is aſſailed by innumerable quantities of ſmall birds, which are known in Carolina by the name of *rice birds*. The young negroes are continually kept beſide the fields to frighten them away; but theſe voracious birds cannot be entirely kept off. The rice ſwamps yield between 50 and 80 buſhels of rice an acre, according to the quality of the ſoil. Sometimes 120 buſhels have been produced from an acre; but inſtances of this kind have been rare. Twenty buſhels of rice, with the ſhells, weigh about 500 pounds. Without the ſhells, theſe 20 make but eight buſhels; without, however, loſing much in weight. The ſtraw is given to oxen and horſes.

It will eaſily be believed, that the cultivation of rice has a tendency to render a hot climate, in which alone it can be practiſed, extremely unhealthful. The inhabitants accordingly, in the warm and damp climate of South Carolina, ſuffer ſeverely every autumn from malignant bilious fevers, which cut them off in great numbers. When originally introduced, this conſequence was not foreſeen; but it now maintains its ground, from the difficulty of altering an eſtabliſhed ſyſtem of induſtry. It will probably, however, be ſuppreſſed in the courſe of time, as white men will not engage in the operative part of the cultivation; and the unſkilful labour of negroes is always expenſive, which prevents the cultivation of it from being attended with any great degree of profit. The American rivers alſo being ſubject to violent inundations, which they call *freſhes*, often ſweep away the whole harveſt, together with the woods and fences which ſurround the rice fields.

476 The country irregularly ſettled.

The lands that have been brought under cultivation in America do by no means extend in a regular progreſs at equal diſtances from the ſea coaſt or from the older ſettlements. In conſequence of the ſuperior goodneſs of the ſoil, of the ſuppoſed ſalubrity of particular parts of the country, or of ſpeculations by purchaſers of land, who have held out unuſual encouragements to new ſettlers; very remote diſtricts are in many places inhabited, while others at a leſs diſtance from the ſeat of the original colonies, ſtill remain in a ſtate of nature. In general, however, the progreſs of emigration neceſſarily muſt be towards the weſt, and from choice, it uſually is from the north to the ſouth. The ſhortneſs of the winter in the ſouthern territories of the union, affords a great temptation to this courſe of things, on account of the heavy tax which is impoſed upon human induſtry, by the neceſſity of ſtoring up great quantities of fuel for man, and food for cattle, in the more northern regions. In general, the great tract of the Alleghany mountains is left unſettled, and emigrants from the eaſtern parts of the union uſually proceed altogether beyond them before they think of ſettling. It has been computed that, in ſome years lately, no leſs than 30,000 perſons have croſſed theſe mountains in ſearch of new habitations. The ſtate of Kentucky, adjoining to the Ohio, has been the chief point towards which theſe emigrants have directed their courſe. They uſually proceed by land, acroſs the mountains, to Fort Pitt, which is 320 miles from Philadelphia. Families are conveyed thither in waggons, by perſons who engage in this employment, and take whole families of men, women, and children, and their goods, at ſo much *per cwt.* Near Fort Pitt, where many of the emigrants remain, boats are obtained at a trifling price, in which travellers commit themſelves to the ſtream of the Ohio, which conveys them downwards to theſe remote regions. Other emigrants travel towards the ſame place by land, through the high country of Virginia, ſome of whom advance into the new ſtate of Teneſſee, that has been formed in the back parts of Carolina. Of the immenſe territory beyond the Ohio, very little is yet occupied, though the ſuperior mildneſs of the climate and the fertility of the ſoil begin to draw emigrants thither from the eaſtern ſtates.

477 Houſes.

Of the principal cities and towns of the American union, we ſhall take notice in ſeparate articles. In the mean time, it may be obſerved, that the kinds of houſes uſed in America are no leſs various than the ſituations of men in that country, from remote and ſolitary families in the woods, to wealthy citizens who inhabit elegant dwellings in the ſtreets and ſquares of populous towns. In general, however, houſes of all kinds throughout the country of America are formed of timber. We have mentioned the log-houſes which the firſt ſettlers erect. Theſe are ſubſtantial habitations, though uſually very clumſy. They are generally replaced by handſome houſes, finiſhed by carpenters, with chimneys and ovens formed of brick. The towns in the ſouthern ſtates, being built in this way, have repeatedly ſuffered great calamities by fire. The fear of this evil, together with the increaſing price of timber, has introduced in the northern ſtates very extenſively the uſe of brick for building. Accordingly the city of Philadelphia, containing nearly 80,000 inhabitants, and which is ſaid to be one of the moſt regular and beautiful in the world, has now a very great proportion of its houſes built with brick. They are ſtill, however, not a little expoſed to accidental fires, as their roofs are formed of ſhingles or boards, ſo placed as that the lower edge of each overlaps the upper part of the board immediately below it, in the way that ſlates or tiles

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America. are laid upon each other to cover the roofs of houſes in Europe. Theſe roofs, and alſo the whole outſide of the wooden houſes, are uſually very neatly painted. One convenience that attends the uſe of wooden houſes is, that, as they are not loſty, and their ſtructure is very ſlight, if a man who has only a ſmall houſe diſlikes the place of the town in which he lives, he can remove his dwelling to a more agreeable neighbourhood. The furniture is taken out, the brick chimneys are taken down, and the houſe is mounted upon very low but very ſtrong carriages, formed for the purpoſe, and is wheeled away to its new ſituation in any other ſtreet, where ground for the purpoſe has been procured. When the chimneys are erected, the transference is complete.

478 Religion. In the United States, religion does not form, as elſewhere, a part of the political eſtabliſhment of the country, but is rather to be regarded as connected with the ſtate of manners, ſcience, and character of the people. In conſequence of the entire freedom of religious opinion and worſhip which has for many years been enjoyed in America, all the varieties of ſects have eſtabliſhed themſelves there, though nobody has departed from the public profeſſion of Chriſtianity. In general, however, religion is conſidered as an object of more importance in the northern than in the ſouthern ſtates. Accordingly, the emigrants from the New England colonies, who are the moſt numerous of all, never fail very ſpeedily to eſtabliſh religious meetings or churches in their new ſettlements. Throughout the ſtates, the prevailing forms of religious worſhip are thoſe of the Church of England, and of the Preſbyterians. The Independents are alſo numerous. In Pennſylvania, the greateſt variety of religious denominations prevail; but the Quakers are the moſt numerous. They were the firſt ſettlers in that ſtate in 1682, under William Penn; and maintain in that country the reputation which they have acquired in England of ſoberneſs, induſtry, humanity, punctuality in their dealings, and ſtrictneſs in the obſervance of all the peculiarities of dreſs, ſpeech, and manners, that their religious opinions enjoin.

479 Moravians. The Moravians (ſee *Unitas Fratrum*), have made ſeveral eſtabliſhments in Pennſylvania and elſewhere. That at *Bethlehem*, 53 miles north of Philadelphia, is the oldeſt and the moſt conſiderable. In 1740, Count Zinzendorff purchaſed the diſtrict, and ſoon brought to it 140 Moravian brethren and ſiſters from Germany. They held every thing in common: but ſuch was their zeal, that the men ſoon cleared the woods, made roads, and reduced the lands into cultivation, while the women prepared their clothes and victuals. The ſyſtem of common property was afterwards done away, excepting as to certain objects, ſuch as corn mills, a tannery, a tavern and buildings, which belong to the whole community. The town of *Bethlehem* is inhabited by 500 or 600 perſons, all of the brother or ſiſterhood. They are divided into five departments, each under the direction of an inſpector or inſpectreſs; and the temporal adminiſtration of the ſociety is in ſome degree mixed with its diſcipline. The unmarried brethren live together in a ſeparate houſe; that is, they eat and ſleep there, but they do not work there if they can work elſewhere. The money they earn is their own, but they muſt pay for their board and their proportion of the public taxes. The inſpectors ſupply them with work if they cannot find it elſewhere. Thus theſe brethren coſt nothing to the ſociety at large. The ſame is the caſe with regard to the unmarried ſiſters, ſome of whom are employed as ſervants and cookmaids in the houſes of the town, where they receive board and lodgings. They pay a certain ſum to the ſociety, which preſerves their right of entering to the unmarried ſiſters houſe when they pleaſe. In this houſe moſt of the ſiſters are employed in ſewing and embroidery, and are paid for their work by the inſpectreſs, who ſells it for the benefit of the houſe. The widows houſe is ſupported by the brethren, and the widows themſelves contribute their whole labour, which is not ſufficient for its ſupport. They have a ſchool or academy which enjoys ſome reputation. The married people live in their own houſes. No communication is allowed between the young men and the young women. When a young man wiſhes to marry, he mentions to the inſpector the girl of whom he has made choice, but to whom he has never ſpoken. The inſpector applies to the inſpectreſs of the girls, and if ſhe judge the young woman's character not incompatible with that given of the young man by the inſpector, the girl is applied to, who may refuſe, but is not allowed to ſay whom ſhe would prefer. If an unmarried brother and ſiſter are detected in a correſpondence without marriage, the matter is kept ſecret by the rulers of the ſociety, but the parties are never allowed to marry each other. They are all of German extraction, and ſpeak that language; but their numbers are not increaſing, notwithſtanding the fecundity of the American women, of which the Moravian married ſiſters have their ſhare. They have other ſettlements in the ſame ſtate, particularly one at Nazareth, 10 miles north from Bethlehem, and another at Litiz, in Lancaſter county. They are alſo ſettled in New Jerſey and North Carolina. There is a general directory of the whole ſociety for America, which correſponds with the general college of the ſociety in Europe, that meets at Hernutt in Upper Luſatia.

480 Shakers. At Lebanon, in the ſtate of New York, a religious ſociety is eſtabliſhed, of a ſingular nature, called the *Shakers*. This ſociety is a republic governed in a deſpotic manner. All the members work for the benefit of the ſociety, which ſupplies them with clothes and victuals, under the direction of the chief elder, whom they elect, and whoſe power is unlimited. Subordinate to him are inſpectors of all claſſes, inveſted with different degrees of authority. The accounts reach him in a certain regular gradation, and his commands are conveyed in the ſame manner. It would be an unpardonable breach of order to addreſs the chief elder himſelf, unleſs the addreſſer belongs to a claſs which enjoys this privilege. Marriage is prohibited in this ſociety, which has been recruited merely by proſelytes for 80 years. Married men and women are admitted into the ſociety, on condition that they renounce each other; and they frequently bring their children with them, who in this caſe are conſidered as belonging to the ſociety. They make cloth, gauze, ſhoes, ſaddles, nails, cabinet work, and in ſhort every article that finds a ready market. They ſell their commodities in the neighbouring towns, and the women perform ſuch buſineſs as is generally allotted to their ſex. The ſociety poſſeſſes conſiderable

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America. property, the amount of which, however, is known to none but the chief elder. They are an honeſt, good-natured people, are faithful workmen, and very moderate in their prices. Of any peculiar doctrines entertained by them little is known, excepting, that the ſect was founded by a woman, called *Anna Leeſe*, whom they ſtyled the *Elect Lady*. They aſſert, that ſhe was the woman ſpoken of in the 12th chapter of the Revelations, that ſhe ſpoke 72 tongues, and could converſe with the dead. Their worſhip conſiſts of little more than a ſet of whimſical geſticulations performed upon a ſignal given by the chief elder, along with the chanting of ſome hymns known only to themſelves. This ſociety has nothing in common with the Quakers.

481 Tunkers. At Ephrata, 60 miles weſtward of Philadephia, is the ſettlement of what are called the *Tunkers* or *Dunkers*, (ſee TUNKERS, or DUMPLERS.) They are a kind of Baptiſts, but profeſs a ſtrange medley of tenets. They were inſtituted in this place by one *Conrad Peyſel*, a German. He collected them into a ſociety, and conducted them to Pitſburg, which at that time was a wild uninhabited place. The chief of the community who ſucceeded Peyſel, having made ſome alterations in their diſcipline, diſſenſions took place; they diſperſed, but afterwards united again in the ſame place where they were firſt eſtabliſhed. A community of property is obſerved among them, and they make a vow of poverty and chaſtity. This vow is not always kept; as ſome of them quit the ſociety and marry, which it cannot prevent their doing, as the law regards ſuch vows as not obligatory. They lament the fall of our firſt parent, who would rather have for his wife, a carnal being, Eve, than let the celeſtial Sophia, a being thoroughly divine, bear a child. She would have communicated only with the ſpiritual nature of Adam, and thus a race would have been engendered all pure and without the leaſt corporeal ingredient. They lament the indulgence which God ſhowed in regard to this deſire of Adam; however, God, according to their doctrine, has merely deferred the period of this ſtate of perfection. It is certainly to arrive, and the Tunkers foreſee the time, when, after the general reſurrection, the divine Sophia will deſcend into every one of us.

Three diſtinct races of men continue to inhabit the territory of the United States. Theſe are the Indians; the Negroes, who were introduced as ſlaves from the coaſt of Africa; and the Whites, of European extraction.

482 Indians. The Indians, who were the original inhabitants of the country, have now been expelled from a very large portion of it, and their numbers are rapidly declining. "It is a melancholy reflexion, (ſays the American ſecretary at war, in a memorial addreſſed to the preſident in 1794), that our modes of population have been more deſtructive to the Indian natives than the conduct of the conquerors of Mexico and Peru. The evidence of this is the utter extirpation of nearly all the Indians in the moſt populous parts of the union. A future hiſtorian may mark the cauſes of this deſtruction of the human race in ſable colours." The government of the United States has made ſome humane attempts to regulate the intercourſe of their people with the unfortunate original inhabitants of the country. In 1796, a law was paſſed, with this view, which contains many ſalutary proviſions. It ordains, America. that the boundaries of the Indian territory ſhall be aſcertained and marked as clearly as poſſible. All perſons are prohibited to hunt upon the territory acknowledged by treaty to belong to the Indians, or to carry off cattle from it, on pain of a fine of 100 dollars, and ſix months impriſonment. None are allowed to enter the Indian territory without a paſſport. Any fraud, robbery, or other crime, committed againſt an Indian, is to be puniſhed by a fine and reſtitution, and the United States bind themſelves to ſee the reſtitution made, providing the Indian do not himſelf take vengeance for the injury; in which caſe he loſes his claim. To kill an Indian of any tribe, in amity with the United States, is declared a capital crime. None are allowed to trade with the Indians without a licenſe, and thoſe to whom this privilege is granted are prohibited to purchaſe any implements of hunting, agriculture, or houſehold economy; and the troops of the United States are authorized to apprehend white men, who treſpaſs againſt theſe laws, even upon the Indian territory; and they may alſo be apprehended in any part of the United States where they are found. An Indian guilty of any crime may be apprehended within the territory of the United States. If he eſcape, the perſon injured by him may ſtate his complaint to the agent of the United States on the frontier of the Indian territory, who is to demand reparation from the tribe to which the offending Indian belongs, and to acquaint the preſident with the reſult of his demand. If reparation be not made, the injured party is indemnified from the treaſury of the United States, and the ſum thus applied is deducted from the ſubſidies granted by the United States to that tribe. The courts of the United States, and alſo, when the cauſe is not capital, the courts of the individual ſtates, take cognizance of offences againſt this law, even when they have been committed within the territories belonging to the Indians.

Another law enacted in the ſame year 1796, with a view to ſecure to the Indians fair treatment in their commercial dealings with the white people, eſtabliſhes a trade with them to be carried on under the authority of the preſident. One hundred and fifty thouſand dollars are appropriated to the trade, of which the objects are, to furniſh the Indians with ſuch ſupplies and implements as their wants require, and to purchaſe from them ſkins and furs. The law directs, that the prices of the articles ſold to the Indians be ſo regulated as barely to prevent the United States from loſing any part of their capital. It reſtrains the agents employed in their trade from trafficking directly or indirectly on their own account. It forbids them to cheat the Indians, and ſubjects them to fines of different magnitudes, in proportion to the nature of the offences by which they tranſgreſs theſe regulations. The diſtrict courts of the ſtate, where the ſtorehouſes are eſtabliſhed for the commerce with the Indians, take cognizance of theſe offences.

It is underſtood, that the juſt and liberal proviſions of theſe laws, have never been punctually reduced to practice. The extremity of the United States, bordering on the territory of the Indians, is inhabited by a ſet of men who are in conſtant hoſtility with them. This claſs of inhabitants is univerſally admitted to conſiſt of the very worſt men in all America. The kind

483 The frontier ſettlers are always hoſtile to the Indian.

America. kind of perſons who in Europe became robbers, thieves, poachers, and ſmugglers; in ſhort, the reſtleſs ſpirits, of whom ſome exiſt in every community, who can never be confined to regular habits of induſtry, emigrate in America to the frontiers, and become voluntary exiles from ſociety and civilization. They live, like the ſavages, by hunting and fiſhing, or by other trifling exertions of induſtry, but more frequently, when they find it practicable, they engage in plundering the neighbouring Indians. Accordingly, where theſe are concerned, the ſentiments and even the idea of honeſty and humanity are unknown to thoſe remote ſettlers. With very ſlight ſhades of diſcrimination between them, they are uniformly a plundering and ferocious banditti, who conſider an Indian as a being not belonging to the human ſpecies, and whom they may juſtly plunder or deſtroy. Hence it moſt commonly happens, in thoſe quarters, that neither accuſers, witneſſes, nor juries, can be found to convict a white man guilty of a treſpaſs or crime againſt an Indian. The oppreſſions, the uſurpations, and the crimes committed by the whites againſt the Indians are therefore never puniſhed, or at leaſt the inſtances of puniſhment are ſo rare, that it would be difficult to find an example of its having occurred.

The Indian, on the other hand, haraſſed and plundered by a ſet of men, the meaneſt of whom poſſeſſes more art and more powerful means of doing miſchief than himſelf, contracts the habit of robbery and pillage, of which he ſees the example, and is the conſtant victim. As he extends, according to the practice of ſavages, his vengeance to every individual of the ſame colour with the perſon who has injured him, the whites, even of the beſt character, are compelled, as a meaſure of ſafety, to hold themſelves in a ſtate of hoſtility againſt the Indians, and thus acquire a ſpirit of enmity towards them. This hoſtility uniformly ends to the diſadvantage of the original inhabitants of this great country, not only becauſe they are leſs ſkilful in war, but becauſe the loſſes of men which they ſuſtain are not rapidly repaired by reproduction, as happens to a civilized people, who know how to rear upon a fertile ſoil all the means of ſubſiſtence in abundance. It is not a little remarkable, that the Indians ſay, it is the worſt claſs of their whole tribes that habitually continue near the frontiers, engaged in a conſtant ſtate of fraud and violence.

The government of the United States does not poſſeſs upon its remote frontier ſufficient ſtrength to repreſs the irregularities now mentioned. The governments of the individual ſtates do not attend to them. Every perſon admits, that the evil ariſes principally and originally from the lawleſs aggreſſions of the whites; but as the evil is become habitual, and ſo inveterate that it is not eaſy to diſcover a remedy, it is uſually ſpoken of by the white Americans without horror. In the mean time, the Indians as a people are the only ſufferers by it. They are the weaker party. Every conteſt ends in their diſcomfiture, and every tranſaction tends to their diſadvantage; whereas the wandering and reſtleſs claſs of white men that conſtantly keep upon the frontier of the ſettled country are of eſſential ſervice to their country. They act as a kind of pioneers in preparing the way for the eſtabliſhment of perſons of better character, who gradually ſucceed them.

It is an eſtabliſhed opinion in America, among the moſt exempt from prejudices, that the Indians never can be civilized; that the ſtricteſt education, the moſt aſſiduous and perſevering cares, cannot deſtroy their ſavage habits, to which they recur with the moſt ardent paſſion, from the tranquillity and from the manners of the white people; and an infinite number of examples are cited, of Indians brought up at Philadelphia and New York, and even in Europe, who never ceaſed to ſigh after their tribe. The opinion that has been reared upon theſe facts has, no doubt, had a conſiderable effect in diminiſhing the exertions of benevolent perſons towards their civilization. It has been juſtly remarked, however, that we have no reaſon to be ſurpriſed by the conduct of thoſe educated Indians who reſumed their original habits. "The Indians," ſays the duke de la Rochefoucault Liancourt, "whoſe education has been attempted, or ſaid to be, had already paſſed ſome years of their life in the tribe to which they belonged. Tranſported alone from their ſpecies into the midſt of white people, different in language, habits, and in colour, and often even in clothing, they became as it were inſulated; they were regarded by the whites as a different ſpecies of men; they did not attempt even to make them forget that they were from a nation ſtill exiſting, whoſe manners and habits had rivetted their firſt attention, and made the deepeſt impreſſion upon them. If, when arrived at the age of manhood, they ſhould have imbibed for a white woman that affection which naturally created the deſire of an union with her, the difference of colour became almoſt an inſurmountable obſtacle. Is it to be wondered, then, that theſe Indians ſhould wiſh to return to their tribe, of which they had ſtill the moſt lively memory, and where alone they were able to find companions of ſimilar manners to their own, and thoſe pleaſures which cauſe in man an attachment to life?" There are, however, in Connecticut, and in the ſtate of New York, a conſiderable number of Indians, both men and women, who ſerve as domeſtics in white American families, and who perform their duty as well and as faithfully as thoſe of any other race. One tribe only of Indians, the *Oneidas*, in the back parts of the ſtate of New York, on the ſhore of Lake Ontario, appears to have acquired what can be ſaid to reſemble civilization. They cultivate the ground with ſucceſs, and have a conſiderable number of villages. They are mild and peaceful, and kindly officious in performing little ſervices to the whites. On the whole, they are accounted excellent neighbours. America.

In the mean time it is evident, from the ordinary progreſs of things, that, unleſs the other tribes of Indians ſhall reſolve, which ſeems extremely unlikely, to ſubſiſt by agriculture, they muſt ſpeedily yield to the encroachments of American population and induſtry. In the territory of the United States, beyond the Ohio, which, with ſome trifling exceptions, is ſtill occupied by the Indians, it is believed there exiſts a population of about 50,000 ſouls. Between the head of the Ohio at Fort Pitt and the northern lakes, a few thouſands more are to be found. In the ſtates of Carolina and of Georgia, and Florida, belonging to Spain, about ten or twelve thouſand are ſtill to be found; ſo that, in the territory of the United States there is probably, in all, between ſixty and ſeventy thouſand Indians. The ter-

America. ritories occupied by the Indians are acknowledged to be their own, and that they cannot be taken away by force. But this affords no protection to theſe people. A little whiſky will bribe their chieftans to give their conſent to the largeſt transferences. It is perfectly common for great tracts of the fineſt territory in the world to be bartered away, with the conſent of all parties, for a few rings, a few handkerchiefs, ſome barrels of rum, and perhaps ſome money, which the unfortunate natives know not how to convert to any valuable uſe. The European nations and their deſcendants have long been accuſtomed to regard all the world as their property, and the reſt of mankind as a kind of intruders, or an inferior race, whom they have a right to diſpoſſeſs when it ſuits their conveniency. We are apt to treat as abſurd the right which the pope, as high prieſt of the European ſtates, once claimed, to give away at his pleaſure whole empires, and immenſe tracts of unknown territory which never belonged to him; but the conduct of the parties to the treaty of Paris in 1783 was probably neither leſs unjuſt nor leſs abſurd, when the king of Great Britain gave up, and the American ſtates were underſtood to acquire, a right of undiſputed ſovereignty over an immenſe territory inhabited by independent nations. The ſtates of America, accordingly, conſider themſelves as poſſeſſing the ſupreme right to the property of the territory belonging to the Indians; and though they do not ſeize that territory by force, or transfer it by ſale, they readily do what is nearly equivalent; they ſell to private perſons the right to purchaſe certain portions of it from the Indians. Thus the ſtate of Maſſachuſets ſold to Meſſrs Phelps and Gorham the excluſive privilege of purchaſing from the Indians a large territory upon the river Geneſſee, whenever they ſhould conſent to part with it. Meſſrs Phelps and Gorham ſold this privilege of purchaſe to Mr Morris, who again ſold it to the Dutch Company; binding himſelf at the ſame time to prevail with the Indians to relinquiſh their right to a certain part at leaſt of the lands. Thus four different ſets of purchaſers ſucceeded each other in regard to an object concerning the ſale of which the conſent of the true original owners had not yet been obtained; and four different contracts were entered into, founded on the ſuppoſition, that it would be an eaſy matter to remove the Indians from thoſe diſtant corners to which they had retired; a point about which their more poliſhed neighbours were well aſſured.

484 Smallpox and intemperance fatal to the Indians.

The ſmallpox has at different periods proved extremely fatal to the Indians, and has greatly diminiſhed their numbers. But the moſt dangerous enemy which they have to encounter is their attachment to ſpirituous liquors, which the whites cannot be prevented from ſelling to them, and which they cannot reſtrain themſelves from purchaſing. Theſe liquors are peculiarly fatal to their ſtrength and health, and daily render their marriages leſs prolific.—So that, from a complication of evils, the hoſtility and oppreſſion of the neighbouring white people, the imprudent ſales which they make of their territory, and the diſeaſes to which they are expoſed, the Indian tribes are gradually expatriated and decreaſing in number. Every nation is now divided into different branches; the families are diſperſed abroad; and whiſky is rapidly diminiſhing the number of thoſe which yet remain. A few years more, and theſe nations will diſappear from the ſurface of the earth, as civilized people approach. America.

485 Negroes.

Negroes originally imported from the coaſt of Africa, and held in ſlavery or emancipated, form another part of the population of the United States. The Britiſh nation, which refuſed to pollute its population at home by the exiſtence of domeſtic ſlavery, had nevertheleſs tolerated the practice in its diſtant colonies, where the character of the people was accounted of leſs importance to the empire, and where the intereſts of commerce were regarded as the primary object of attention. In the convention which formed the conſtitution of the American union, the ſouthern ſtates were ſucceſsful in obtaining an enactment in favour of the ſlave trade, which was couched in the following ambiguous terms: "The migration or importation of ſuch perſons as any of the ſtates now exiſting ſhall think proper to admit, ſhall not be prohibited by the congreſs, prior to the year 1808; but a tax or duty may be impoſed on ſuch importation, not exceeding 10 dollars for each perſon." There are no ſlaves in the commonwealth of Maſſachuſets; and this is the only ſtate in the union that is entirely exempt from the diſgrace of perſonal ſlavery. It was aboliſhed in the following manner. No law in New England had poſitively authorized ſlavery; but it prevailed under the ſanction of cuſtom and of public opinion. Several laws indeed preſuppoſed it; as they authorized the reclaiming of negroes who quitted their maſters, enjoined the neceſſity of reſtoring them, and prohibited the intermarriage of blacks with free people. The new conſtitution of Maſſachuſets, like thoſe of the other ſtates, declared an equality of rights for all men. In 1781, ſome negroes, prompted by private ſuggeſtion, maintained that they were not ſlaves, and they found advocates who brought their cauſe before the ſupreme court. Their counſel pleaded, 1ſt That no law eſtabliſhed ſlavery, and that the laws ſuppoſing it were the reſult of error in the legiſlators who had an authority to enact them; 2dly, They contended, that all ſuch laws were annulled by the new conſtitution. They gained the cauſe upon both theſe principles; and, as there were only few ſlaves in Maſſachuſets, all further idea of ſlavery was baniſhed. But in the other New England ſtates, under ſimilar laws, and in ſimilar circumſtances, a contrary deciſion was given.

It is to be obſerved, that in 1778, the general cenſus or enumeration of the population of Maſſachuſets, included 18,000 ſlaves; whereas, the ſubſequent cenſus of 1790, exhibits only 6000 blacks. It appears that a great proportion of the emancipated negroes went to the towns, where making an indiſcreet uſe of their newly acquired freedom, many of them addicted themſelves to the intemperate uſe of ſpirituous liquors, and died in conſequence; others engaged as ſailors even on board foreign ſhips. The generality of thoſe who did not diſappear became ſervants, ſome are tradeſmen, or even farmers; and a tolerable number, conſidering their education and the habits which ſlavery produces, have attained to independence. They have not fallen under the laſh of public juſtice more frequently than the whites, in proportion to the numbers of each claſs.

In the eaſtern part of Virginia, one-fifth of the population is ſtill ſaid to conſiſt of Negroe ſlaves, and farther

America. farther ſouth where rice is cultivated, the proportion of negroes is ſtill greater. In Pennſylvania, and the other middle or northern ſtates, meaſures have been adopted for their gradual emancipation. Such meaſures have become popular, not only from the general temper of the age, but from the conviction now generally diffuſed of the tendency of domeſtic ſlavery to degrade the character of the free white men.

486 Whites. With regard to the whites, who form the third and laſt claſs of the people of this great country; it may be obſerved, that when the American conſtitution ordained the enumeration of the inhabitants of the United States, within three years after its acceptance, it enacted alſo, that the ſame enumeration ſhould be renewed every 10 years, and left it to the congreſs to make a law for regulating the manner of performing it. A law was accordingly paſſed for this purpoſe in 1790. The marſhal of every diſtrict, who is a kind of ſheriff, is ordered to ſuperintend the enumeration. In this work he may call in what aid he thinks proper. He muſt make a return to the preſident of the United States, diſtinguiſhing in the table of population, the number of free males under and over the age of 16 years; and alſo the free women and girls; and the ſlaves. The Indians are not included in the liſt of population. The liſts are exhibited upon public places, for the correction of the inhabitants, and the heads of families are required, under a pecuniary penalty, to ſtate correctly the number of their families. The whole enumeration is required to be performed in nine months. The total expence of it is eſtimated at 40,000 dollars every time it is made.

The enumeration of the people taken in 1791, by virtue of this law, announced a population of 3,929,326 inhabitants, of whom 3,231,629 were free. Among the free perſons were 57,707 negroes, or mulattoes. The ſlaves amounted to 697,691. By the lateſt enumeration, the population of the United States amounted to about 5,000,000.

487 National character. The character of the inhabitants of the United States of America is neceſſarily various, according to the climate which they inhabit, and the laws and hiſtory of the different ſtates. The uſe of ſlaves, in particular, has of itſelf produced a conſiderable effect upon the character and habits of the free men of thoſe parts of the empire in which they abound. Certain features of character, however, are in ſome meaſure common to the whole inhabitants of the ſtates; and it may be obſerved in general, that the Britiſh nation, which was the founder and the parent of theſe people, has no reaſon to be aſhamed of them. Indeed, in a country which belonged to Great Britain for a long time, which was peopled from it, of which the moſt numerous and neareſt connexions are yet with Great Britain, and which carries on with us almoſt all its commerce, the manners of the people muſt neceſſarily in a great degree reſemble our own. Accordingly, the American manners particularly thoſe relative to living, are the ſame as in England, or the ſouth of Scotland; and New York and Philadelphia are faithful copies, in this reſpect, of Liverpool and of Glaſgow. As to the dreſs, the Engliſh faſhions are as faithfully copied, as the tranſmiſſion of merchandiſe from England, and the correſpondence of taylors and mantua-makers, will admit of. The diſtribution of the apartments in their houſes is like that of Great Britain. The furniture is Britiſh; the town carriages are either Britiſh or in the Britiſh taſte, and it is no ſmall merit in the faſhionable world, to have a coach newly arrived from London, of the neweſt faſhion there. The cookery is Britiſh; and as in Britain, after dinner, the ladies withdraw, and give place to drinking wine, a cuſtom which the Americans carry at leaſt to as great a length, as the natives of the parent ſtate. Indeed, frequent and ſumptuous dinners are ſaid to be held in as high conſideration in the new, as in the old world. America.

In the United States, the Britiſh character is modified by the ſituation in which the inhabitants of this new empire find themſelves. The moſt general qualities common to all Americans, are underſtood to be, intrepidity, an ardour for enterpriſe, a high opinion of themſelves, humanity, and a boundleſs love of gain. Theſe qualities, ſome of which are ſo apparently diſcordant, are nevertheleſs found to unite in the American character. They who conſider candidly the hiſtory of the war of the revolution, the inſtances of individual courage which they exhibited in it, and the perſeverance which the whole people diſplayed under repeated diſcomfiture, will be fully ſatisfied concerning their firmneſs and courage. Habituated to fatigue from their infancy, having for the moſt part made their fortunes by their labour and their induſtry, fatigue and labour are not yet become repugnant, even to thoſe in eaſy circumſtances. While they wiſh to enjoy the luxuries of life, they do not regard them as abſolute wants. They know how to diſpenſe with them, and to quit them and to travel in the woods whenever their intereſt requires it. They can forget them whenever a reverſe in the current of their affairs takes them away. They are not depreſſed by diſappointment, but inſtantly reſume the purſuit of fortune when ſhe has moſt cruelly deceived them.

Great pride of ſpirit, and a high notion of their own worth, are alſo ſtriking parts of the American character. A committee of the houſe of repreſentatives of the United States, appointed to prepare an anſwer to the addreſs of the preſident, in December 1796, gave a notable inſtance of this. Theſe gentlemen very modeſtly thought fit, to call their countrymen *the moſt enlightened nation of the whole world;* and very great labour and long diſcuſſions, were neceſſary before the majority of the houſe could be prevailed upon to ſacrifice this ſuperlative, which it is ſaid would not have embarraſſed the modeſty of their conſtituents. No white American will ſo far degrade himſelf, as to conſent to accept of the ſituation of a domeſtic menial ſervant or footman. Hence it is ſaid, that throughout the whole extent of the United States, 20 native Americans are not to be found in the ſtate of domeſtic ſervants. This claſs of domeſtics in America, is compoſed of emigrant prieſts, Germans, and negroes or mulattoes. As ſoon as the former of theſe have acquired a little money, they quit a ſtation which they find to be regarded with ſuch contempt, and eſtabliſh themſelves in a ſmall trade, or upon land which they clear and cultivate. Hence it may eaſily be inferred, that a good domeſtic man ſervant is not readily to be found in America.

The prejudice which cauſes the men in America to have ſo great a repugnance to the ſtate of domeſtic

America. servitude, does not influence the women in the ſame degree. And accordingly, nothing is more common than to ſee young women of good families, in the ſituation of ſervants during the firſt years of their youth.

At the ſame time, it muſt not be imagined, that pure republican manners prevail in America. Though there are no diſtinctions of rank, formally acknowledged by law in the United States, yet fortune and the nature of profeſſions form different claſſes; the firſt claſs is occupied by the great merchants, the lawyers, the phyſicians, the clergy, and the land-owners who do not cultivate their land themſelves; the number of whom is ſmall from the ſtate of Delaware to the north, but is great in the ſtates of the ſouth, where ſlavery prevails. The ſecond claſs conſiſts of the inferior merchants, the farmers, and the artiſans. And the third claſs is compoſed of workmen, who let themſelves to labour by the day, the month, &c. In balls, concerts, and public amuſements, theſe claſſes do not mix; though, except ordinary labourers, and common ſailors, every one calls himſelf, and is called by others, a gentleman. A ſmall income is ſufficient for the aſſumption of this title, as it eaſily carries men from one claſs to another. It is ſaid, indeed, that the ſtruggle for rank between different claſſes produces, in the great towns, a very ruinous degree of oſtentation. In New York and Philadelphia, luxury is very high, and makes a dangerous progreſs every year, by increaſing the expence of living, and altering the public opinion with regard to what conſtitutes eaſy circumſtances and a competent fortune. Still, however, the inferior claſſes of workmen entertain a higher opinion of themſelves than elſewhere. They find the road to independence more practicable, and as the price of their labour is high, their circumſtances are eaſy, and they endeavour to throw aſide, as far as poſſible every appearance of ruſticity. They ſee all ranks of men engaged in buſineſs; they do not therefore account themſelves degraded by being compelled to labour, eſpecially as they find their ſkill and induſtry ſought after by others, while it is productive of affluence to themſelves; for in the United States there is not a family, even in the moſt miſerable hut, who do not eat butchers meat twice a-day at leaſt, and drink tea and coffee; nor is there a man who drinks pure water. Having heard much of the modes of living uſual among perſons of their rank in other nations, they are led to entertain an unbounded value for themſelves and their country.

Did not the practice of ſlavery ſtill ſtand in the way, the Americans would not be ſurpaſſed in the reputation of generoſity and humanity. When a brother or a ſiſter dies, leaving orphan children, they are readily adopted into the families of their uncles and other kindred, who treat them entirely as their own. This conduct is ſo common in America, that it meets with no praiſe, and is conſidered merely as the performance of the moſt ordinary duty, and as requiring no effort. Hoſpitality to ſtrangers is alſo exerted to a great extent, and in a way that even perplexes for ſome time the modeſty of an European. In caſes of unuſual calamity alſo, great liberality is diſplayed by them. The unfortunate ſufferers by the fires of Charleſtown and Savannah, and by the dreadful diſeaſe which raged at Philadelphia, New York, and other cities, were relieved by the abundant ſubſcriptions of the citizens of all the American towns where theſe diſaſters did not occur. The inhabitants of the French Weſt India iſlands who fled to the ſhores of America, in conſequence of the events of the late terrible revolution, were relieved by voluntary contributions, to the amount of more than 200,000 dollars. Whole families of them were ſupported for one or two years, according to their neceſſities, by individual Americans, in their houſes, merely becauſe they were unfortunate. There alſo exiſts a very conſiderable number of charitable ſocieties for various purpoſes, in the United States. Some of theſe are marine ſocieties, whoſe purpoſe is in ſome towns to provide a ſubſiſtence for the wives and children of thoſe who die at ſea, or to provide aſſiſtance to all veſſels wrecked upon their coaſts. There are alſo ſocieties for the aſſiſtance of emigrants, that is to ſay, for aſſiſting with advice and ſuccours thoſe ſtrangers who arrive from Europe, with an intention of eſtabliſhing themſelves in America. Others ſubſcribe for the ſupport of hoſpitals and ſchools, and for the diſtribution of proper medicines. There are ſocieties for the civilization of the Indians, and others for the purpoſes of ameliorating the ſituation of priſoners. Indeed, it is with regard to this laſt ſubject that the Americans are entitled to boaſt that the triumph of humanity has been more complete in ſome parts at leaſt of their country than anywhere elſe in the world. At Philadelphia, the adminiſtration of the priſons has been eſtabliſhed upon the moſt enlightened and beneficent principles, and is conducted with a degree of advantage to the public, and to impriſoned criminals, that has hitherto been unknown in the hiſtory of mankind. The jailors receive ample ſalaries; a conſtant inſpection is exerted over them, by the moſt reſpectable characters in the ſtate; the convicts are treated with the utmoſt mildneſs; yet licentiouſneſs is baniſhed, they are enabled to ſupport themſelves, and ſometimes to carry out with them a ſum of money, or to ſupport their families during their confinement; and in almoſt all caſes, the much wiſhed-for, but hitherto unattainable end, is ſaid to be gained, of rendering puniſhment the means of accompliſhing the reformation of the criminal. Such is ſaid to be the admirable effect of the humane and ſkilful management which has been here adopted, chiefly, it is underſtood, by means of the members of the ſect of Quakers; that, inſtead of the priſons containing what are called old offenders, it uſually happens, that of 100 convicts diſcharged, either in conſequence of pardons, or at the expiration of the term of their ſentence, there are never above two committed for new crimes, although impriſonment for a longer or a ſhorter period is the only puniſhment adopted for all great crimes; no crime being capital excepting only wilful murder.

But the moſt remarkable feature in the American character, and indeed their ruling paſſion, is a boundleſs thirſt after gain. This paſſion, however, is in them altogether different from that timid and hoarding appetite which with us is ſometimes ſeen to quench all the energies of the human mind, and to extinguiſh every generous and liberal ſentiment. In truth, the avarice of an American is nothing more than the paſſion of ambition directed to the acquiſition of wealth

as

America. as the only means of attaining diſtinction in the ſtate of ſociety in which he is placed. Accordingly, he endeavours to gratify his love of riches, not ſo much by the ſlow and ſure mode of ſaving what he already poſſeſſes, and of ſuffering it to accumulate, as by entering into bold and hazardous ſpeculations, with a view to the ſudden acquiſition of fortune. If his ſpeculation is unſucceſsful, he thinks not the worſe of himſelf on that account, nor is diſcouraged from repeatedly encountering ſimilar hazards. If he is at laſt ſucceſsful, his wealth is uſed in ſuch a manner as evidently demonſtrates, that the love of riches has not fully engroſſed his mind. He is luxurious, oſtentatious, generous to the unfortunate, and ready to contribute to every ſcheme of public beneficence or utility. Still, this ardent paſſion for the acquiſition of money which occupies ſo much of the thoughts of every American, never fails to appear diſguſting to men of letters, or to men of rank who have at any time gone from Europe to America. They are aſtoniſhed to find phyſicians, lawyers, and prieſts, deeply engaged in ſtockjobbing and commercial ſpeculations, and that every part of ſociety is compoſed of men whoſe ruling paſſion and great ſubject of meditation is, the ſudden acquiſition in ſome way or other of great pecuniary gain.

The Americans marry very young, eſpecially in the country. Young men, who generally eſtabliſh themſelves very early either in ſome new lands or in ſome trade, have occaſion for a wife to aſſiſt them in their labours; and this conduces to their early marriages as much as the general purity of manners. If a wife die, ſhe is, for the ſame reaſon, very ſpeedily replaced by another. Both in town and country, ſhe is an indiſpenſable reſource for domeſtic affairs, when her huſband is engaged in his own affairs, as every one is in America. She is alſo neceſſary as a companion in a country where the children ſoon quit their parents, and where the men, conſtantly engaged in ſome kind of buſineſs, find it inconvenient to leave their own families in ſearch of ſocicty. The manners of the Americans in their conduct towards the other ſex are repreſented as very pure. Young women of uncommon beauty travel alone from 15 to 25 miles to Philadelphia to market with eggs, fowls, butter, and other commodities, beginning their journies at the commencement of the night, without finding that their youth and beauty expoſe them to any hazard or inconvenience.

All travellers agree in repreſenting the American women as highly virtuous and reſpectable; as faithful and induſtrious wives, and affectionate mothers. The young women enjoy entire freedom, and the commerce of the ſexes is free from gallantry and from jealouſy. The crime of adultery, which attacks ſociety in its firſt elements, is ſaid to be unknown. One quality aſcribed in a remarkable degree to the American women ought not to paſs unnoticed, which is, a remarkable attention to cleanneſs, both in their perſons and their houſes. The French who took refuge in the United States during the revolution, though attentive enough in this reſpect to the appearance of their perſons, were regarded as ſo ſlovenly and dirty in the management of their houſes and furniture, that they ſoon rendered themſelves altogether odious to the Americans.

The ſtate of education and of literature is ſtill defective in moſt parts of America. The phyſical or natural America. part of the education of the Americans is ſaid to be leſs excellent. Left to themſelves from their tendereſt age, they are expoſed without precaution to the rigour of heat and cold, with their feet and legs bare, and with few clothes. The children of the rich are not brought up much more tenderly than thoſe in leſs eaſy circumſtances. In the country, they often go alone twice a-day to ſchools, two or three miles diſtant from home. There are few American children who cannot ſwim boldly, and at ten years of age, manage a gun and hunt without danger: and not one who does not ride with great courage, or who fears fatigue. This liberty given to children teaches them to take care of themſelves, and, bold as they are, they avoid dangers better than children brought up with much greater care. They become ſtrong and enterpriſing men, whom no difficulties diſhearten; and produce a growing generation, which will be as invincible in its territory, as that which preceded it was found to be.

The inſtructive part of education has not attained the ſame perfection. Maſſachuſets is the only ſtate in which a ſyſtem of education has hitherto been eſtabliſhed by law. It was enacted in 1789, that each town or townſhip containing 50 families or houſes ſhall have a ſchoolmaſter of good character, to inſtruct the children in the Engliſh language, reading, writing, and arithmetic. The ſchool to be open ſix months in the year. The towns or townſhips of 100 families, are to have ſchools of the ſame kind, which are to be open during the whole year. Thoſe of 150 families are bound to have two ſchools, one for 12 months and one for ſix. Thoſe of 200 families, or more, are bound to have two ſchools, one for 12 and one for ſix months, and in addition to theſe, a grammar ſchool, in which the Greek, Latin, and Engliſh languages are to be taught grammatically. The expence of ſupporting the ſchoolmaſters, together with the ſchool houſes, the fuel, and ink that may be neceſſary, are defrayed by a general tax or aſſeſſment upon the whole people. The parents pay their ſhare of this aſſeſſment, in proportion only to their wealth, and not to the number of their children. They ſupply their children with the neceſſary books, and with pens and paper. Colleges are alſo eſtabliſhed; but in theſe the profeſſors receive fees from the ſtudents. The books read at the ſchools are regulated by law; and we are informed, that the Latin grammar which the ſtate of Maſſachuſets has preferred is that of Dr Alexander Adam, rector of the High School of Edinburgh, author alſo of the celebrated treatiſe upon Roman Antiquities, and other works illuſtrative of claſſical literature.

Though the ſtate of Maſſachuſets is the only one that has eſtabliſhed a ſyſtem of education by law, the manners of the people in the whole New England ſtates have produced ſuch a degree of attention to literature, that there are few or no white perſons there who cannot read the Engliſh language, and the people at large poſſeſs a conſiderable degree of literature. In proportion, however, to the diſtance from New England ſouthward, education becomes gradually defective, and in the Carolinas and Georgia, a ſchool is ſcarcely to be found. In different ſtates, however, there are colleges and univerſities, in which the ſciences are taught, and degrees conferred.

The

America. The education of youth in America is conducted as in Scotland, with a view rather to introduce young perſons quickly into life, than to render them men of profound learning. A young man in America hardly arrives at the age of 16 years before his parents are deſirous of placing him in the counting-houſe of a merchant, or in the office of a lawyer: Hence he is never likely to reſign himſelf to the ſciences and to letters. He ſoon loſes all other ideas than thoſe which can hurry him on to the acquiſition of a fortune. He ſees no other views in thoſe around him, or in ſociety; and that his whole conſideration is attached to this kind of ſucceſs. Hence it will not appear ſurpriſing, that there ſhould be few learned men in the United States. Indeed, the number of learned, ingenious, and well-informed individuals, which is very conſiderable, that have appeared there, muſt be aſcribed rather to their own native energy of character than to their education, or the ſtate of ſociety in which they were placed.

In the American ſchools, the inſtruction in Latin is ſeldom extended farther than the firſt claſſic authors, including Cornelius Nepos, Ovid, and ſome orations of Cicero. A little of Virgil and Horace are read in the colleges. The New Teſtament in Greek, and a little of Homer in ſome colleges, is the limit of claſſical inſtruction in that language. Mathematical inſtruction is uſually confined to the Elements of Euclid, and the firſt principles of conic ſections. Practical geometry, however, for the purpoſes of land-ſurveying and navigation, is much valued, on account of its connexion with thoſe branches of buſineſs which lead to riches. Mechanics, hydroſtatics, and hydraulics, are taught after the works of Nicolſon, Ferguſon, or Enfield. Medicine, however, and the branches of ſcience connected with it, are ſaid to be well taught in ſome American univerſities; and that profeſſion has produced many reſpectable and well-informed men. Still it is probable, that however enlightened the Americans may account themſelves, the nature of their purſuits is ſuch, that a conſiderable time will elapſe before they can exhibit any great number of men of profound and extenſive learning. Such accompliſhments, however, as their ſituation acquires they poſſeſs in much perfection. In the debates of congreſs, ſpeeches full of correct reaſoning, drawn from a knowledge of mankind and of hiſtory, and expreſſed with purity and eloquence, are often heard; and almoſt all perſons engaged in buſineſs aſpire in their correſpondence to diſplay much elegance of expreſſion, though their ſtyle is apt to ſwell out into verboſity. America.

The moſt common vices of the American people are, an oſtentatious luxury, on the part of the rich in great towns; and of the inferior claſs, a too free uſe of ſpirituous liquors. This they are led to by their eaſy circumſtances, and by a great fondneſs for ſociety. Theſe vices are greater and more remarkable in the ſouthern ſtates than in the northern. In the ſouth, alſo, men are more fond of gaming than in the north, and the energetic qualities of the American character are leſs conſpicuous; a circumſtance which is ſuppoſed to ariſe from the exiſtence of ſlavery, which in theſe ſtates renders labour and perſonal induſtry leſs reſpectable. But, in general, the character of the Americans is rendered pure by the train of conſtant induſtry in which all perſons are engaged. One of the moſt troubleſome of their faults, however, ought not to paſs unnoticed: They are, upon the whole, a very litigious people, and lawyers abound and flouriſh among them to a great degree. But, in common with all the countries that have derived any part of their conſtitution or their laws from England, they poſſeſs a very pure adminiſtration of juſtice. This has always been the ſingular privilege and the glory of the Engliſh nation. No people that attains to it can fail to poſſeſs ſound morals, nor conſequently to enjoy all the proſperity of which a nation is capable. To the habits of integrity, and a reſpect for the laws and the magiſtrates, which it produces, we muſt aſcribe the internal tranquillity of America. Politics forms the only ſcience which all men ſtudy there; and political zeal hurries the different parties into the moſt uncharitable miſrepreſentations of each others views and conduct. But no man has preferred his own perſonal aggrandiſement to the authority of the law or the welfare of his country; no uſurpation has defaced the fair page of the American hiſtory; and if rebellion has occurred, it has been bloodleſs, and has only afforded to all ranks of men an opportunity of diſplaying their attachment to public order.

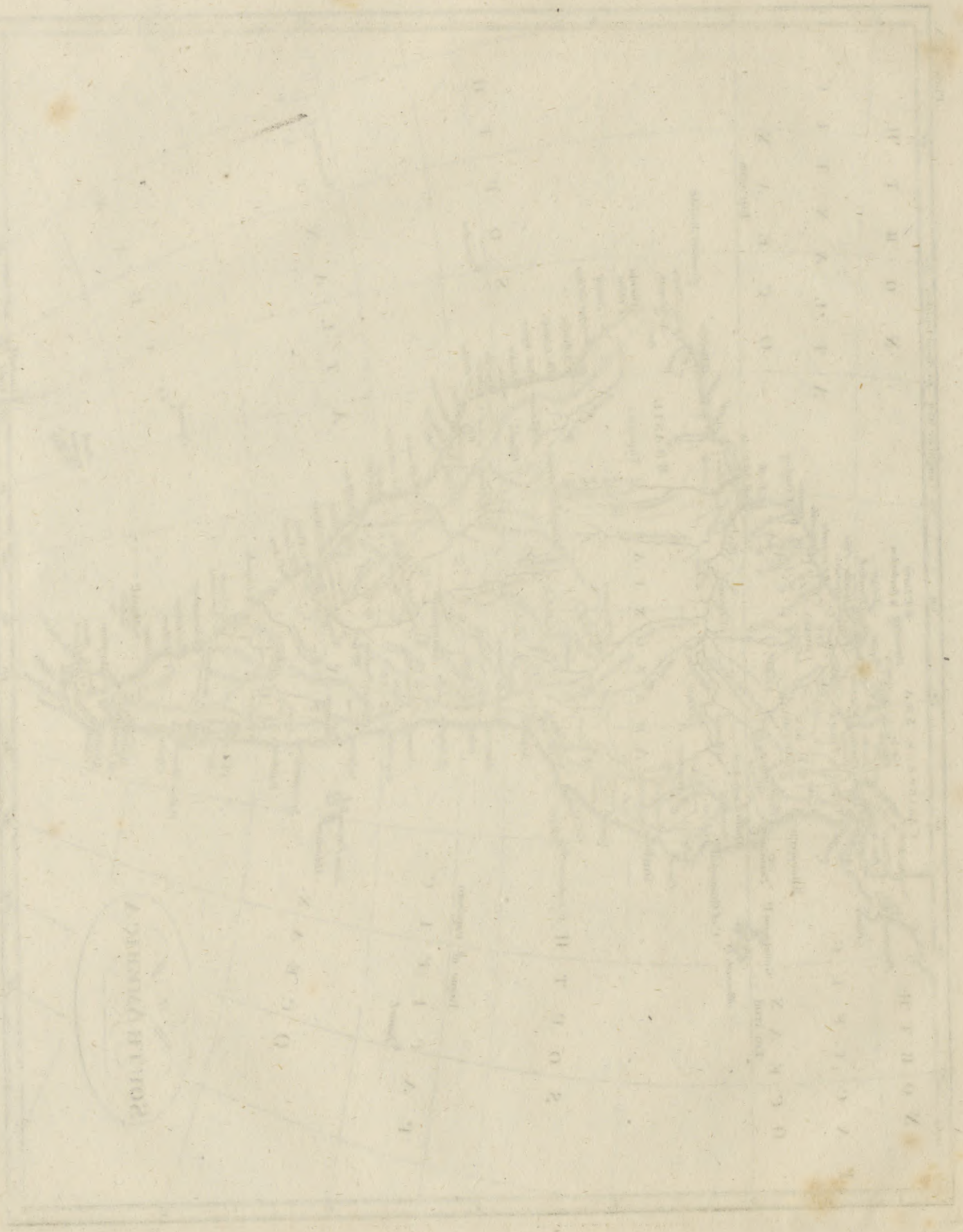
Upon the whole, though men excluſively attached to the purſuits of literature, and to the enjoyment of idle but poliſhed ſociety, would find themſelves ill ſituated in America, yet we muſt undoubtedly regard the United States as forming at this moment the moſt proſperous empire upon the globe. It contains an active people, eaſy in their circumſtances and happy; and every day gives an acceſſion of population and of ſtrength to this new country.

INDEX.

Burgoyne,

Abbell Prin. Wal. Sculptor. fecit.


SOUTH AMERICA
Longitude West from London
NORTH PACIFIC OCEAN
NORTH ATLANTIC OCEAN
SOUTH PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
CARIBBEAN SEA
EQUATOR
Tropic of Capricorn
TERRA FIRMA
NEW GRENADA
GUIANA
AMAZONIA
BRASIL
PERU
PARAGUAY
CHILI
PATAGONIA
R. Amazon
Rio de la Plata
Quito
Lima
Truxillo
Arica
Potosi
Atacama
Coquimbo
Valparaiso
Santiago
Baldivia
Chiloe
Castro
Buenos Ayres
Assumption
Rio Janeiro
St. Salvador
Olinda
Tapayos
Caracas
Panama
Bluefields
Nicaragua
Gallapagos Is.
Albemarle I.
Easter I.
Juan Fernandez I.
Masafuero
Falkland Is.
South Georgia
Sandwich Land
Trinidad
Fernandez Noronha
Magellan
Madre de Dios
Straits of Magellan
Staten Land
C. Horn
Christmas Sound



American Night-ſhade ‖ Amethyſt.

AMERICAN NIGHT-SHADE. See PHYTOLACCA, BOTANY *Index*.

AMERICAN GROUND-NUT. See ARACHIS, BOTANY *Index*.

AMERICUS VESPUCIUS. See VESPUCCI.

AMERSFORT, a city in the Netherlands, in the province of Utrecht, ſeated on the river Ems, E. Long. 5. 20. N. Lat. 52. 14. The moſt remarkable objects are, the townhouſe; the grand palace, which is triangular; the public walk, planted with trees; and the great church, dedicated to St George. The land to the eaſt and ſouth of this city is very fruitful; on the north there is nothing but paſture ground, and on the weſt it is woody. Not far from hence is a mountain called *Amersfort-berg*, on which is planted a viſta of trees, which reaches to Utrecht.

AMERSHAM, or AGMONDESHAM, a market town in Buckinghamſhire, conſiſting of about 200 houſes, with a free-ſchool, and four alms-houſes. It ſends two members to parliament, and has a market on Tueſday. It is a rectory rated at 48l. 16s. 8d. in the king's books. The market-houſe is a very handſome ſtructure. W. Long. 0. 15. N. Lat. 51. 47.

AMES, WILLIAM, D. D. a learned independent divine, celebrated for his controverſial writings, was born in 1576, and educated at Chriſt's college, in Cambridge. In the reign of King James I. he left the univerſity, and ſoon after the kingdom, on account of his being unwilling to conform to the rules of the church; and retired to the Hague, where he had not been long before he was invited to accept of the divinity chair in the univerſity of Franeker, in Frieſland, which he filled with admirable abilities for above twelve years; during which his fame was ſo great, that many came from remote nations to be educated under him. He from thence removed to Rotterdam for a change of air, which his health required; and here he continued during the remainder of his life. His controverſial writings, which compoſe the greateſt part of his works, are chiefly againſt Bellarmine and the Arminians. He alſo wrote, 1. A freſh Suit againſt the ceremonies. 2. *Lectiones in Pſalmos Davidis.* 3. *Medulla Theologiæ;* and ſeveral pieces relative to the ſciences. He died of an aſthma at Rotterdam, in November 1633.

AMESTRATUS, a town of Sicily (Cicero); *Ameſtratos* (Stephanus); *Amaſtra* (Silius Italicus); *Multiſtratos* (Polybius): Now *Miſtretta*, in the Val di Demona, on the river Haleſus. It was a very ſtrong fort of the Carthaginians, beſieged in vain by the Romans for ſeven months with conſiderable loſs; at length, after another ſiege, taken and razed (Diodorus Siculus.)

AMETHYST, a tranſparent gem of a purple colour, which ſeems compoſed of a ſtrong blue and a deep red; and, according as either of theſe prevails, affording different tinges of purple, ſometimes approaching to violet, and ſometimes even fading to a pale roſe colour. Though the amethyſt is generally of a purple colour, it is nevertheleſs ſometimes found naturally colourleſs, and may at any time be eaſily made ſo by putting it into the fire; in which pellucid or colourleſs ſtate, it ſo reſembles the diamond, that its want of hardneſs ſeems the only way of diſtinguiſhing it. Some derive the name *amethyſt* from its colour, which reſembles wine mixed with water; whilſt others, with more probability, think it got its name from its ſuppoſed virtue of preventing drunkenneſs; an opinion which, however imaginary, prevailed to that degree among the ancients, that it was uſual for great drinkers to wear it about their necks. Be this as it will, the amethyſt is ſcarcely inferior to any of the gems in the beauty of its colour; and in its pureſt ſtate is of the ſame hardneſs, and at leaſt of equal value, with the ruby and ſapphire. It is found of various ſizes, from the bigneſs of a ſmall vetch to an inch and a half in diameter, and often to much more than that in length. Its ſhape is extremely various, ſometimes roundiſh, ſometimes oblong, and at others flatted, at leaſt on one ſide; but its moſt common appearance is in a cryſtalliform figure, conſiſting of a thick column, compoſed of four planes, and terminated by a flat and ſhort pyramid, of the ſame number of ſides; or elſe, of a thinner and longer hexangular column; and ſometimes of a long pyramid, without any column. It makes the gayeſt figure in the laſt of theſe ſtates, but is hardeſt and moſt valuable in the roundiſh and pebble-like form. The amethyſt is found in the Eaſt and Weſt Indies, and in ſeveral parts of Europe; the oriental ones, at leaſt ſome of the finer ſpecimens, being ſo hard and bright as to equal any of the coloured gems in value. However, by far the greater number of amethyſts fall infinitely ſhort of theſe; as all the European ones, and not a few of thoſe brought from the Eaſt and Weſt Indies, are very little harder than common cryſtal.

Amethyſt ‖ Amhar.

Counterfeit or Factitious AMETHYST. Spars and cryſtals tinged red and yellow, &c. are ſold for amethyſts. The falſe ones come from Germany, are tinged by vapours in the mines, and contain ſome lead.

Amethyſts may be counterfeited by glaſs, to which the proper colour or ſtain is given. There were fine ones made in France about the year 1690, which may even impoſe on connoiſſeurs, unleſs the ſtone be taken out of the collet.—The method of giving this colour to glaſs is directed as follows: Take cryſtal frit, made with the moſt perfect and fine tarſo: Then prepare a mixture of manganeſe in powder, one pound; and zaffre prepared, one ounce and a half: Mix theſe powders well together; and add to every pound of the frit an ounce of this powder. Let it be put into the pots with the frit, not into the prepared metal. When the whole has ſtood long enough in fuſion to be perfectly pure, work it into veſſels, and they will reſemble the colour of the amethyſt.

AMETHYST, in *Heraldry*, a term for the purple colour in the coat of a nobleman, in uſe with thoſe who blazon with precious ſtones, inſtead of metals and colours. This, in a gentleman's eſcutcheon, is called *Purpure;* and in thoſe of ſovereign princes, *Mercury*.

AMETHYSTEA, AMETHYST. See BOTANY *Index*.

AMETHYSTINE is applied, in *Antiquity*, to a kind of purple garment dyed of the hue of amethyſt. In this ſenſe amethyſtine differed from *Tyrian* as well as from *hyacinthine* purple, being a kind of medium between both.

AMHAR, or AMHARA, a province of Abyſſinia, ſaid to extend 40 leagues from eaſt to weſt. It is conſidered as the moſt noble in the whole empire, both on account of its being the uſual reſidence of the A-

Amhurſt ‖ Amicable Numbers.

byſſinian monarchs, and having a particular dialect different from all the reſt, which, by reaſon of the emperors being brought up in this province, is become the language of the court and of the politer people. Here is the famed rock Amba-geſhen, where the young monarchs were formerly confined. See AMBA and ABYSSINIA.

AMHURST, NICHOLAS, an Engliſh poet and political writer of the 18th century, was born at Marden in Kent, and entered of St John's college, Oxford; from whence he was expelled for irregularity of conduct and libertine principles. Retaining great reſentment againſt the univerſity on this account, he abuſed its learning and diſcipline, and ſome of the moſt reſpectable characters in it, in a poem publiſhed in 1724 called *Oculus Britanniæ*, and in a book entitled *Terræ Filius*. He publiſhed, A Miſcellany of Poems, ſacred and profane; and, The Convocation, a poem in five cantos, which was a ſatire on the Biſhop of Bangor's antagoniſts. But he is beſt known for the ſhare he had in the political paper called *The Craftſman*: though, after having been the drudge of his party for near 20 years, he was as much forgotten in the famous compromiſe of 1742 as if he had never been born; and, when he died in that year of a broken heart, was indebted to the charity of his bookſeller for a grave.

AMIANTHUS, or EARTH-FLAX, in *Mineralogy*, a fibrous, flexile, elaſtic, mineral ſubſtance, conſiſting of ſhort, abrupt, and interwoven filaments. It is found in Germany, in the ſtrata of iron ore, ſometimes forming veins of an inch in diameter. Its fibres are ſo flexible that cloth has been made of them, and the ſhorter filaments that ſeparate in the waſhing of the ſtone may be made into paper in the common manner. For the method of its preparation for manufacture into cloth, ſee ASBESTOS.

Amianthus is claſſed by Mr Kirkwan in the muriatic genus of earths, becauſe it contains about a fifth part of magneſia. Its other conſtituents are, flint, mild calcareous earth, barytes, clay, and a very ſmall proportion of iron. It is fuſible *per ſe* in a ſtrong heat, and alſo with the common fluxes. See MINERALOGY *Index*.

AMICABLE, in a general ſenſe, denotes any thing done in a friendly manner, or to promote peace.

AMICABLE Benches, in *Roman Antiquity*, were, according to Pitiſcus, lower and leſs honourable ſeats allotted for the *judices pedanei*, or inferior judges, who, upon being admitted of the emperor's council, were dignified by him with the title *amici*.

AMICABLE Numbers, denote pairs of numbers, of which each of them is mutually equal to the ſum of all the aliquot parts of the other. So the firſt or leaſt pair of amicable numbers are 220 and 284; all the aliquot parts of which, with their ſums, are as follows, viz.

of 220, they are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110, their ſum - - - - 284;
of 284, they are 1, 2, 4, 71, 142, and their ſum is 220.

The 2d pair of amicable numbers are 17296 and 18416, which have alſo the ſame property as above.

And the third pair of amicable numbers are 9363584 and 9437056.

Theſe three pairs of amicable numbers were found out by F. Schooten, ſect. 9. of his *Exercitationes Mathematicæ*, who, it is ſaid, firſt gave the name of *amicable* to ſuch numbers, though ſuch properties of numbers, it ſeems, had before been treated of by Rudolphus, Deſcartes, and others. Amicable Numbers. ‖ Amida.

To find the firſt pair, Schooten puts $4x$ and $4yz$, or a^2x and a^2yz for the two numbers where $a=2$; then making each of theſe equal to the ſum of the aliquot parts of the other, gives two equations, from which are found the values of x and z, and conſequently aſſuming a proper value for y, the two amicable numbers themſelves $4x$ and $4yz$.

In like manner for the other pairs of ſuch numbers; in which he finds it neceſſary to aſſume $16x$ and $16yz$ or a^4x and a^4yz for the 2d pair, and $128x$ and $128yz$ or a^7x and a^7yz for the 3d pair.

Schooten then gives this practical rule, from Deſcartes, for finding amicable numbers, viz. aſſume the number 2, or ſome power of the number 2, ſuch that if unity or 1 be ſubtracted from each of theſe three following quantities, viz;

from three times the aſſumed number,
alſo from 6 times the aſſumed number,
and from 18 times the ſquare of the aſſumed number,

the three remainders may be all prime numbers; then the laſt prime number being multiplied by double the aſſumed number, the product will be one of the amicable numbers ſought, and the ſum of its aliquot parts will be the other.

That is, if a be put $=$ the number 2, and n ſome integer number, ſuch that $3a^n-1$, and $6a^n-1$, and $18a^{2n}-1$ be all three prime numbers; then is $\overline{18a^{2n}-1} \times 2a^n$ one of the amicable numbers; and the ſum of its aliquot parts is the other.

AMICTUS, in *Roman Antiquity*, was any upper garment worn over the tunica.

AMICTUS, among *Eccleſiaſtical Writers*, the uppermoſt garment anciently worn by the clergy; the other five being the alba, ſingulum, ſtola, manipulus, and planeta. The amictus was a linen garment, of a ſquare figure, covering the head, neck, and ſhoulders, and buckled or claſped before the breaſt. It is ſtill worn by the religious abroad.

AMICULUM, in *Roman Antiquity*, a woman's upper garment, which differed from the pala. It was worn both by matrons and courtezans.

AMICUS CURIÆ, a law term, to denote a byſtander who informs the court of a matter in law that is doubtful or miſtaken.

AMID-AMID, in *Geography*, a lofty ridge of mountains in Abyſſinia. See ABYSSINIA.

AMIDA, a god worſhipped by the Japaneſe; who has many temples erected to him in the iſland of Japan, of which the principal is at Jeddo. The Japaneſe have ſuch a confidence in their idol Amida, that they hope to attain eternal felicity by the frequent invocation of his name. One of the figures of this idol is repreſented at Rome.

AMIDA, in *Ancient Geography*, a principal city of Meſopotamia, otherwiſe called *Ammæa*; ſituated on a high mountain, on the borders of Aſſyria, on the Tigris, where it receives the Nymphius. It was taken from the Romans, in the time of the emperor Conſtans, by Sapores king of Perſia. The ſiege is ſaid to have coſt him 30,000 men; however, he reduced

Amiens. ced it to ſuch ruin, that the emperor afterwards wept over it. According to Ammianus Marcellinus, the city was razed; the chief officers were crucified; and the reſt, with the ſoldiers and inhabitants, either put to the ſword or carried into captivity, except our hiſtorian himſelf, and two or three more, who, in the dead of the night, eſcaped through a poſtern unperceived by the enemy. The inhabitants of Niſibis, however, being obliged to leave their own city by Jovian's treaty with the Perſians, ſoon reſtored Amida to its former ſtrength; but it was again taken by Cavades in 501, but was reſtored to the Romans in 503. On the declenſion of the Roman power, it fell again into the hands of the Perſians; but was taken from them by the Saracens in 899. It is now in the poſſeſſion of Turks. Here are above 20,000 Chriſtians, who are better treated by the Turks than in other places. A great trade is carried on in this city of red Turkey leather, and cotton cloth of the ſame colour. The Arabian name of Amida is *Diarbekir*, and the Turkiſh one *Kara-Amed*. E. Long. 39. 0. N. Lat. 36. 58.

AMIENS, a large handſome city of France, the capital of Picardy. It is agreeably ſituated on the river Somme, and ſaid to have received its Latin name *Ambianum* from being everywhere encompaſſed with water. It is a place of great antiquity; being mentioned by Cæſar as a town that had made a vigorous reſiſtance againſt the Romans, and where he convened a general aſſembly of the Gauls after having made himſelf maſter of it. The emperors Antoninus and Marcus Aurelius enlarged it; and Conſtantine, Conſtans, Julian, and ſeveral others, reſided here a conſiderable time. The town is encompaſſed with a wall and other fortifications; and the ramparts are planted with trees, which form a delightful walk. The river Somme enters Amiens by three different channels, under as many bridges; and theſe channels, after waſhing the town in ſeveral places, where they are of uſe in its different manufactures, unite at the other end by the bridge of St Michael. Here is a quay for the boats that come from Abbeville with goods brought by ſea. At the gate of Noyon there is a ſuburb remarkable for the abbey of St Achen. Next to this gate you come to that of Paris, where they have a long mall between two rows of trees. The houſes are well built; the ſtreets ſpacious, embelliſhed with handſome ſquares and good buildings; and the number of inhabitants is between 40,000 and 50,000. The cathedral, dedicated to our Lady, is one of the largeſt and moſt magnificent churches in France; adorned with handſome paintings, fine pillars, chapels, and tombs; particularly the nave is greatly admired. The other places worth ſeeing are the palace of the bailiwick, the townhouſe, the ſquare *des Fleurs*, and the great market place.

Amiens was taken by the Spaniards, in 1597, by the following ſtratagem: Soldiers, diſguiſed like peaſants, conducted a cart laden with nuts, and let a bag of them fall juſt as the gate was opened. While the guard was buſy in gathering up the nuts, the Spaniards entered and became maſters of the town. It was retaken by Henry IV. who built a citadel here. The definitive treaty of peace, entered into by the different European powers in 1802, was negotiated here.

This town is the ſeat of a biſhop, ſuffragan of Rheims, as alſo of a preſidial, bailiwick, vidam, a chamber of accounts, and a generality. The biſhop's revenue is 30,000 livres. They have ſome linen and woollen manufactures, and they alſo make a great quantity of black and green ſoap. It lies in E. Long. 2. 18. N. Lat. 49. 53. Amilcar ‖ Amman.

AMILCAR, the name of ſeveral Carthaginian captains. The moſt celebrated of them is Amilcar Barcas, the father of Hannibal, who, during five years, infeſted the coaſt of Italy; when the Romans ſending out their whole naval ſtrength, defeated him near Trapani, 242 years before Chriſt; and this put an end to the firſt Punic war. Amilcar began the ſecond, and landed in Spain, where he ſubdued the moſt warlike nations; but as he was preparing for an expedition againſt Italy, he was killed in battle, 228 years before the Chriſtian era. He left three ſons, whom he had educated, as he ſaid, like three lions, to tear Rome in pieces; and made Hannibal, his eldeſt ſon, ſwear an eternal enmity againſt the Romans.

AMILICTI, in the *Chaldaic Theology*, denote a kind of intellectual powers, or perſons in the divine hierarchy. The amilicti are repreſented as three in number; and conſtitute one of the triads, in the third order of the hierarchy.

AMIRANTE, in the *Spaniſh Polity*, a great officer of ſtate, anſwering to our lord high admiral.

AMISUS, in *Ancient Geography*, the chief city of the ancient kingdom of Pontus. It was built by the Mileſians, and peopled partly by them and partly by a colony from Athens. It was at firſt a free city, like the other Greek cities in Aſia; but afterwards ſubdued by Pharnaces king of Pontus, who made it his metropolis. It was taken by Lucullus in the Mithridatic war, who reſtored it to its ancient liberty. Cloſe by Amiſus ſtood another city called *Eupatoria*, from Mithridates Eupator its founder. This city was likewiſe taken by Lucullus, who levelled it with the ground; but it was afterwards rebuilt by Pompey, who united it with Amiſus, giving them the name of *Pompeiopolis*. It was taken during the war between Cæſar and Pompey, by Pharnaces king of Pontus, who put moſt of its inhabitants to the ſword; but Cæſar, having conquered Pharnaces, made it again a free city.

AMITERNUM, a town of the Sabines, in Italy, (Livy, Pliny); now extinct. The ruins are to be ſeen on the level ridge of a mountain, near St Vittorino, and the ſprings of the Aternus; not far from Aquila, which roſe out of the ruins of Amiternum.

AMITTERE LEGEM TERRÆ, among *Lawyers*, a phraſe importing the loſs of liberty of ſwearing in any court: The puniſhment of a champion overcome or yielding in battle, of jurors found guilty in a writ of attaint, and of a perſon outlawed.

AM-KAS, in *Hiſtory*, a name given to a ſpacious ſaloon in the palace of the Great Mogul, where he gives audience to his ſubjects, and where he appears on ſolemn feſtivals with extraordinary magnificence. His throne is ſupported by ſix large ſteps of maſſy gold, ſet with rubies, emeralds, and diamonds, eſtimated at 60,000,000l.

AMMA, among *Eccleſiaſtical Writers*, a term uſed to denote an abbeſs or ſpiritual mother.

AMMAN, or AMMANT, in the *German* and *Belgic Polity*, a judge who has the cognizance of civil cauſes.

—It

Ammania, Ammianus.

—It is alſo uſed among the French for a public notary, or officer, who draws up inſtruments and deeds.

AMMANIA. See BOTANY *Index*.

AMMI, BISHOP'S WEED. See BOTANY *Index*.

AMMIANUS MARCELLINUS, a Roman hiſtorian of the fourth century, was a native of Greece, born in the city of Antioch. Having ſerved ſeveral years in the early part of his life in the army, he was afterwards promoted to the honourable ſtation of *protector domeſticus*. In the year 350 he entered the ſervice of Conſtantius, the emperor of the eaſt, and, under the command of Urſicinus, a general of the horſe, he ſerved during ſeveral expeditions. According to his own modeſt relation, it appears that he acquired conſiderable military fame, and that he deſerved well of his ſovereign. He attended the emperor Julian in his expedition into Perſia, but hiſtory is ſilent whether or not he roſe to any higher military rank than that which has already been mentioned. He was either in the city or the vicinity of Antioch when the conſpiracy of Theodorus was diſcovered, under the reign of Valens, and was an eye witneſs of the ſevere torments to which many perſons were expoſed by the emperor on that account.

But his laſting reputation was not to be acquired from military exertions. He left the army, and retired to Rome, where he employed his time and talents in writing the hiſtory of that empire during the period of three centuries. Though a native of Greece, he wrote in the Latin language; but, according to the remark of Voſſius, his Latin ſhows that he was a Greek, and alſo a ſoldier. His hiſtory begins with the reign of Nerva, and continues to the death of Valens; and the work was originally divided into 31 books. Of theſe the firſt 13 have periſhed, and the 18 which remain commence with the 17th year of the reign of Conſtantius, and terminate at the year 375. But there are ſeveral facts mentioned in the hiſtory which prove that the author was alive in the year 390. Of this number are the acceſſion of Theodoſius to the eaſtern empire, the character of Gratian, and the conſulate of Neothorius. Similar to the manner in which Herodotus, the father of Grecian hiſtory, read his hiſtory, Marcellinus read his books in public with general approbation. Some have reckoned the ſtyle harſh and redundant, but this may eaſily be excuſed, from his education and military life; and the valuable information communicated abundantly compenſates for that defect. Candour and impartiality are leading features in his hiſtory. The character given him by Mr Gibbon appears to be accurate, when he ſays that he is "an accurate and faithful guide, who compoſed the hiſtory of his own times without indulging the prejudices and paſſions which uſually affect the mind of a contemporary."

A difference of opinion has obtained, whether or not our hiſtorian was a Chriſtian or a Pagan. But the reſpectful manner in which he ſpeaks of Pagan deities, and of the advantage of heathen auguries to foretel future events, render it abundantly evident that he was a heathen. The favourable account which he gives of the religion, manners, and fortitude of Chriſtians, are the reſult of his candour and impartiality as an hiſtorian. The work of Marcellinus has paſſed through ſeveral editions; but that printed at Leyden in 1693, with explanatory notes, is eſteemed the beſt. (*Gen. Biog.*)

Ammirato || Ammon.

AMMIRATO, SCIPIO, an eminent Italian hiſtorian, born at Lecca in Naples in 1531. After travelling over great part of Italy, without ſettling to his ſatisfaction, he was engaged by the great duke of Tuſcany to write *The Hiſtory of Florence*; for which he was preſented to a canonry in the cathedral there. He wrote other works while in this ſtation; and died in 1600.

AMMOCHRYSOS, from αμμος *ſand*, and χρυσος *gold*, a name given by authors to a ſtone very common in Germany, and ſeeming to be compoſed of a golden ſand. It is of a yellow gold-like colour, and its particles are very gloſſy, being all fragments of a coloured talc. It is uſually ſo ſoft as to be eaſily rubbed to a powder in the hand; ſometimes it requires grinding to powder in a mortar, or otherwiſe. It is uſed only as ſand to ſtrew over writing. The Germans call it *katzengold*. There is another kind of it leſs common, but much more beautiful, conſiſting of the ſame ſort of gloſſy ſpangles, but thoſe not of a gold colour, but of a bright red, like vermilion.

AMMODYTES, or SAND-EEL. See ICHTHYOLOGY *Index*.

AMMON, anciently a city of Marmarica (Ptolemy). Arrian calls it a *place*, not a city, in which ſtood the temple of Jupiter Ammon, round which there was nothing but ſandy waſtes. Pliny ſays, that the oracle of Ammon was 12 days journey from Memphis, and among the *Nomi* of Egypt he reckons the *Nomos Ammoniacus*: Diodorus Siculus, That the diſtrict where the temple ſtood, though ſurrounded with deſerts, was watered by dews which fell nowhere elſe in all that country. It was agreeably adorned with fruitful trees and ſprings, and full of villages. In the middle ſtood the Acropolis or citadel, encompaſſed with a triple wall; the firſt and inmoſt of which contained the palace; the others the apartments of the women, the relations and children, as alſo the temple of the god, and the ſacred fountain for luſtrations. Without the Acropolis ſtood, at no great diſtance, another temple of Ammon, ſhaded by a number of tall trees: near which there was a fountain, called that of the ſun, or *Solis Fons*, becauſe ſubject to extraordinary changes according to the time of the day; morning and evening warm, at noon cold, at midnight extremely hot. A kind of foſſil ſalt was ſaid to be naturally produced here. It was dug out of the earth in large oblong pieces, ſometimes three fingers in length, and tranſparent as cryſtal. It was thought to be a preſent worthy of kings, and uſed by the Egyptians in their ſacrifices.—From this our ſal ammoniac has taken its name.

AMMON, or HAMMON, in *Heathen Mythology*, the name of the Egyptian Jupiter, worſhipped under the figure of a ram.

Bacchus having ſubdued Aſia, and paſſing with his army through the deſerts of Africa, was in great want of water: but Jupiter, his father, aſſuming the ſhape of a ram, led him to a fountain, where he refreſhed himſelf and his army; in gratitude for which favour, Bacchus built there a temple to Jupiter, under the title of *Ammon*, from the Greek αμμος, which ſignifies *ſand*, alluding to the ſandy deſert where it was built. In this

Ammon || Ammoniac

this temple was an oracle of great note, which Alexander the Great conſulted, and which laſted till the time of Theodoſius.

Hammon, the god of the Egyptians, was the ſame with the Jupiter of the Greeks; for which reaſon theſe latter denominate the city which the Egyptians call No-Hammon, or the habitation of Ammon, *Dioſpolis* or the city of Jupiter. He is thought to be the ſame with Ham, who peopled Africa, and was the father of Mizraim, the founder of the Egyptians.

AMMON, or BEN-AMMI, the ſon of Lot, was the father of the Ammonites, and dwelt to the eaſt of the Dead ſea, in the mountains of Gilead. See AMMONITIS and AMMONITES.

AMMON, or AMMONIUS, *Andreas*, an excellent Latin poet, born at Lucca in Italy, was ſent by Pope Leo X. to England, in the characters of prothonotary of the Apoſtolic See, and collector-general of that kingdom. He was a man of ſingular genius and learning, and ſoon became acquainted with the principal literati of thoſe times; particularly with Eraſmus, Colet, Grocin, and others, for the ſake of whoſe company he reſided ſome time at Oxford. The advice which Eraſmus gives him, in regard to puſhing his fortune, has a good deal of humour in it, and was certainly intended as a ſatire on the artful methods generally practiſed by the ſelfiſh and ambitious part of mankind: "In the firſt place (ſays he), throw off all ſenſe of ſhame; thruſt yourſelf into every one's buſineſs, and elbow out whomſoever you can; neither love nor hate any one; meaſure every thing by your own advantage; let this be the ſcope and drift of all your actions. Give nothing but what is to be returned with uſury, and be complaiſant to every body. Have always two ſtrings to your bow. Feign that you are ſolicited by many from abroad, and get every thing ready for your departure. Show letters inviting you elſewhere, with great promiſes." Ammon was Latin ſecretary to Henry VIII. but at what time he was appointed does not appear. In 1512 he was made canon and prebendary of the collegiate chapel of St Stephen, in the palace of Weſtminſter. He was likewiſe prebendary of Wells; and in 1514 was preſented to the rectory of Dychial in that dioceſe. About the ſame time, by the king's ſpecial recommendation, he was alſo made prebendary of Saliſbury. He died in the year 1517, and was buried in St Stephen's chapel in the palace of Weſtminſter. He was eſteemed an elegant Latin writer, and an admirable poet. The epiſtles of Eraſmus to Ammon abound with encomiums on his genius and learning. His works are, 1. *Epiſtolæ ad Eraſmum*, lib. i. 2. *Scotici conflictus hiſtoria*, lib. i. 3. *Bucolicæ vel eclogæ*, lib. i. Baſil 1546, 8vo. 4. *De rebus nihil*, lib. i. 5. *Panegyricus quidam*, lib. i. 6. *Varii generis epigrammata*, lib. i. 7. *Poemata diverſa*, lib. i.

AMMONIA, or VOLATILE ALKALI. See CHEMISTRY *Index*.

AMMONIAC, a concrete gummy reſinous juice, brought from the Eaſt Indies, uſually in large maſſes, compoſed of little lumps or tears, of a milky colour, but ſoon changing, upon being expoſed to the air, of a yellowiſh hue. We have no certain account of the plant which affords this juice: the ſeeds uſually found among the tears reſemble thoſe of the umbelliferous claſs. It has been, however, alleged, and not without ſome degree of probability, that it is an exudation from a ſpecies of the FERULA, another ſpecies of which produces the aſafœtida. The plant producing it is ſaid to grow in Nubia, Abyſſinia, and the interior parts of Egypt. It is brought to the weſtern parts of Europe from Egypt, and to England from the Red ſea, by ſome of the ſhips belonging to the Eaſt India Company trading to thoſe parts. Such tears as are large, dry, free from little ſtones, ſeeds, or other impurities, ſhould be picked out, and preferred for internal uſe: the coarſer kind is purified by ſolution and colature, and then carefully inſpiſſating it; unleſs this be artfully managed, the gum will loſe a conſiderable deal of its more volatile parts. There is often vended in the ſhops, under the name of ſtrained gum ammoniacum, a compoſition of ingredients much inferior in virtue.

Ammoniac, Sal Ammoniac

Ammoniac has a naſeous ſweet taſte, followed by a bitter one; and a peculiar ſmell, ſomewhat like that of galbanum, but more grateful: it ſoftens in the mouth, and grows of a whiter colour upon being chewed. Thrown upon live coals, it burns away in flame: it is in ſome meaſure ſoluble in water and in vinegar, with which it aſſumes the appearance of milk; but the reſinous part, amounting to about one half, ſubſides on ſtanding.

Ammoniac is an uſeful deobſtruent, and frequently preſcribed for opening obſtructions of the abdominal viſcera, and in hyſterical diſorders occaſioned by a deficiency of the menſtrual evacuations. It is likewiſe ſuppoſed to deterge the pulmonary veſſels; and proves of conſiderable ſervice in ſome kinds of aſthmas, where the lungs are oppreſſed by viſcid phlegm; in this intention, a ſolution of gum ammoniac in vinegar of ſquills proves a medicine of great efficacy, though not a little unpleaſant. In long and obſtinate colics proceeding from viſcid matter lodged in the inteſtines, this gummy reſin has produced happy effects, after the purges and the common carminatives had been uſed in vain. Ammoniac is moſt commodiouſly taken in the form of pills; about a ſcruple may be given every night, or oftener. Externally, it ſoftens and ripens hard tumours: a ſolution of it in vinegar ſtands recommended by ſome for reſolving even ſchirrous ſwellings. A plaſter made of it and ſquill-vinegar is recommended by ſome in white ſwellings. A dilute mixture of the ſame is likewiſe rubbed on the parts, which are alſo fumigated with the ſmoke of juniper berries. In the ſhops is prepared a ſolution of it in pennyroyal water, called from its milky colour *lac ammoniaci*. It is an ingredient alſo in the ſquill pills.

SAL AMMONIAC, the old name of *muriate of ammonia*, a native ſalt, compoſed of ammonia, or volatile alkali, and muriatic acid, was generated in thoſe large inns or caravanſeras where the crowd of pilgrims coming from the temple of Jupiter Ammon uſed to lodge; who, in thoſe parts, travelling upon camels, and thoſe creatures when in Cyrene, a province of Egypt, where that celebrated temple ſtood, urining in the ſtables, or (ſay ſome) in the parched ſands, out of this urine, which is remarkably ſtrong, aroſe a kind of ſalt, denominated ſometimes (from the temple) *Ammoniac*, and ſometimes (from the country) *Cyreniac*. Since the ceſſation of theſe pilgrimages, no more of this ſalt is produced there; and, from this deficiency

Ammonian ‖ Ammonites.

ficiency, ſome ſuſpect there never was any ſuch thing: But this ſuſpicion is removed, by the large quantities of a ſalt, nearly of the ſame nature, thrown out by Mount Ætna.

The modern ſal ammoniac is entirely factitious. See CHEMISTRY *Index*.

AMMONIAN PHILOSOPHY. See AMMONIUS.

AMMONITÆ, in *Natural Hiſtory*. See *CORNU Ammonis*.

AMMONITES, a people deſcended from Ammon the ſon of Lot. The Ammonites deſtroyed thoſe giants which they called Zamzummims (Deut. ii. 19—21), and ſeized upon their country. God forbade Moſes, and by him the children of Iſrael (*id.* 19.), to attack the Ammonites; becauſe he did not intend to give their lands unto the Hebrews. Before the Iſraelites entered the land of Canaan, the Amorites had by conqueſt got great part of the countries belonging to the Ammonites and Moabites. This Moſes retook from the Amorites, and divided between the tribes of Gad and Reuben. In the time of Jephtha, the Ammonites declared war againſt the Iſraelites (Judg. xi.), under pretence that they detained a great part of the country which had formerly been theirs before the Amorites poſſeſſed it. Jephtha declared, that as this was an acquiſition which the Iſraelites had made in a juſt war, and what they had taken from the Amorites, who had long enjoyed it by right of conqueſt, he was under no obligation to reſtore it. The Ammonites were not ſatisfied with this reaſon; wherefore Jephtha gave them battle and defeated them. The Ammonites and Moabites generally united whenever there was any deſign ſet afoot of attacking the Iſraelites. After the death of Othniel (*id.* iii.), the Ammonites and Amalekites joined with Eglon king of Moab to oppreſs the Hebrews; whom they ſubdued, and governed for the ſpace of 18 years, till they were delivered by Ehud the ſon of Gera, who ſlew Eglon king of Moab. Some time after this, the Ammonites made war againſt the Iſraelites, and greatly diſtreſſed them. But theſe were at laſt delivered by the hands of Jephtha; who having attacked the Ammonites, made a very great ſlaughter among them (chap. xi.) In the beginning of Saul's reign (1 Sam. xi.), Nahaſh king of the Ammonites having ſat down before Jabeſh-gilead, reduced the inhabitants to the extremity of demanding a capitulation. Nahaſh anſwered, that he would capitulate with them upon no other conditions than their ſubmitting to have every one his right eye plucked out, that ſo they might be made a reproach to Iſrael: but Saul coming ſeaſonably to the relief of Jabeſh, delivered the city and people from the barbarity of the king of the Ammonites. David had been the king of Ammon's friend; and after the death of this prince, he ſent ambaſſadors to make his compliments of condolence to Hanun his ſon and ſucceſſor; who, imagining that David's ambaſſadors were come as ſpies to obſerve his ſtrength, and the condition of his kingdom, treated them in a very injurious manner (2 Sam. x. 4.) David revenged this indignity thrown upon his ambaſſadors, by ſubduing the Ammonites, the Moabites, and the Syrians their allies. Ammon and Moab continued under the obedience of the kings David and Solomon; and, after the ſeparation of the ten tribes, were ſubject to the kings of Iſrael till the death of Ahab in the year of the world 3107. Two years after the death of Ahab, Jehoram his ſon, and ſucceſſor of Ahaziah, defeated the Moabites (2 Kings iii.): but it does not appear that this victory was ſo complete as to reduce them to his obedience. At the ſame time, the Ammonites, Moabites, and other people, made an irruption into the lands belonging to Judah; but were forced back and routed by Jehoſhaphat (2 Ch. xx. 1, 2.) After the tribes of Reuben, Gad, and the half tribe of Manaſſeh, were carried into captivity by Tiglath-pilneſer in the year 3264, the Ammonites and Moabites took poſſeſſion of the cities belonging to theſe tribes. Jeremiah (xlix. 1.) reproaches them for it. The ambaſſadors of the Ammonites were ſome of thoſe to whom this prophet (chap. xxvii. 2—4.) preſented the cup of the Lord's fury, and directed to make bonds and yokes for themſelves; exhorting them to ſubmit themſelves to Nebuchadnezzar, and threatening them, if they did not, with captivity and ſlavery. Ezekiel (xxv. 4—10.) denounces their entire deſtruction; and tells them that God would give them up to the people of the eaſt, who ſhould ſet their palaces in their country, ſo that there ſhould be no more mention of the Ammonites among the nations. It is believed that theſe misfortunes happened to the Ammonites in the fifth year after the taking of Jeruſalem, when Nebuchadnezzar made war againſt all the people that dwelt upon the confines of Judea, in the year of the world 3420.

Ammonites ‖ Ammonius.

It is alſo thought probable, that Cyrus gave the Ammonites and Moabites the liberty of returning into their own country, from whence they had been removed by Nebuchadnezzar: for we ſee them in the place of their former ſettlement, expoſed to thoſe revolutions which were common to the people of Syria and Paleſtine; ſubject ſometimes to the kings of Egypt, and at other times to the kings of Syria. We are told by Polybius, that Antiochus the Great took Rabboth, or Philadelphia, their capital, demoliſhed the walls, and put a garriſon in it in 3806. During the perſecutions of Antiochus Epiphanes, Joſephus informs, that the Ammonites ſhowed their hatred to the Jews, and exerciſed great cruelties againſt ſuch of them as lived about their country. Juſtin Martyr ſays, That in his time there were ſtill many Ammonites remaining; but Origen aſſures us, that when he was living they were known only under the general name of Arabians. Thus was the prediction of Ezekiel (xxv. 10.) accompliſhed; who ſaid that the Ammonites ſhould be deſtroyed in ſuch a manner as not to be remembered among the nations.

AMMONITIS, in *Ancient Geography*, a country of Arabia Petræa, occupied by the children of Ammon, whence the appellation. Its limits partly to the weſt and partly to the north were the river Jabbok, whoſe courſe is nowhere determined; though Joſephus ſays, that it runs between Rabbath-Ammon, or Philadelphia, and Geraſa, and falls into the Jordan.

AMMONIUS, ſurnamed SACCAS, was born in Alexandria, and flouriſhed about the beginning of the third century. He was one of the moſt celebrated philoſophers of his age; and, adopting with alterations the Eclectic philoſophy, laid the foundations of that ſect which was diſtinguiſhed by the name of the *New Platonics*. See ECCLECTICS and PLATONISM.

This

Ammonius. This learned man was born of Chriſtian parents, and educated in their religion; the outward profeſſion of which, it is ſaid, he never entirely deſerted. As his genius was vaſt and comprehenſive, ſo were his projects bold and ſingular: For he attempted a general coalition of all ſects, whether philoſophical or religious, by framing a ſyſtem of doctrines which he imagined calculated to unite them all, the Chriſtians not excepted, in the moſt perfect harmony. In purſuance of this deſign, he maintained, that the great principles of all philoſophical and religious truth were to be found equally in all ſects; that they differed from each other only in their method of expreſſing them, and in ſome opinions of little or no importance; and that, by a proper interpretation of their reſpective ſentiments, they might eaſily be united into one body. Accordingly, all the Gentile religions, and even the Chriſtian, were to be illuſtrated and explained by the principles of this univerſal philoſophy; and the fables of the prieſts were to be removed from Paganiſm, and the comments and interpretations of the diſciples of Jeſus from Chriſtianity. In conformity to this plan, he inſiſted, that all the religious ſyſtems of all nations ſhould be reſtored to their original purity, and reduced to their primitive ſtandard, viz. the ancient philoſophy of the eaſt, preſerved uncorrupted by Plato: and he affirmed, that this project was agreeable to the intentions of Jeſus Chriſt; whoſe ſole view in deſcending upon earth was to ſet bounds to the reigning ſuperſtition, to remove the errors that had blended themſelves with the religions of all nations, but not to aboliſh the ancient theology from which they were derived. He therefore adopted the doctrines which were received in Egypt concerning the univerſe and the Deity, conſidered as conſtituting one great whole; concerning the eternity of the world, the nature of ſouls, the empire of Providence, and the government of the world by demons. He alſo eſtabliſhed a ſyſtem of moral diſcipline; which allowed the people in general to live according to the laws of their country and the dictates of nature; but required the wiſe to exalt their minds by contemplation, and to mortify the body, ſo that they might be capable of enjoying the preſence and aſſiſtance of the demons, and of aſcending after death to the preſence of the Supreme Parent. In order to reconcile the popular religions, and particularly the Chriſtian, with this new ſyſtem, he made the whole hiſtory of the Heathen gods an allegory; maintaining that they were only celeſtial miniſters, entitled to an inferior kind of worſhip. And he acknowledged that Jeſus Chriſt was an excellent man, and the friend of God; but alleged that it was not his deſign entirely to aboliſh the worſhip of demons, and that his only intention was to purify the ancient religion. This ſyſtem, ſo plauſible in its firſt riſe, but ſo comprehenſive and complying in its progreſs, has been the ſource of innumerable errors and corruptions in the Chriſtian church. At its firſt eſtabliſhment it is ſaid to have had the approbation of Athenagoras Pantænus, and Clemens the Alexandrian, and of all who had the care of the public ſchool belonging to the Chriſtians at Alexandria. It was afterwards adopted by Longinus the celebrated author of the treatiſe on the Sublime, Plotinus, Herennius, Origen, Porphyry, Jamblichus the diſciple of Porphyry, Sopater, Ediſius, Euſtathius, Maximus of Epheſus, Priſcus, Chryſanthius the maſter of Julian, Julian the Apoſtate, Hieroclis, Proclus, and many others both Pagans and Chriſtians.

The above opinions of Ammonius are collected from the writings and diſputations of his diſciples the modern Platonics: for he himſelf left nothing in writing behind him; nay, he impoſed a law upon his diſciples not to divulge his doctrines among the multitude; which injunction, however, they made no ſcruple to neglect and violate.

Ammunition || Amontons.

AMMUNITION, a general name for all warlike proviſions; but more particularly powder, ball, &c.

Ammunition, arms, utenſils of war, gunpowder, imported without licenſe from his majeſty, are, by the laws of England, forfeited, and triple the value. And again, ſuch licenſe obtained, except for furniſhing his majeſty's public ſtores, is to be void, and the offender to incur a premunire, and to be diſabled to hold any office from the crown.

Ammunition Bread, Shoes, &c. ſuch as are ſerved out to the ſoldiers of an army or garriſon.

AMNESTY, in matters of policy, denotes a pardon granted by a prince to his rebellious ſubjects, uſually with ſome exceptions: ſuch was that granted by Charles II. at his reſtoration.—The word is formed from the Greek αμνηστια, the name of an edict of this kind publiſhed by Thraſybulus, on his expulſion of the tyrants out of Athens.

AMNIOS, in *Anatomy*, a thin pellucid membrane which ſurrounds the fœtus in the womb. See Fœtus.

AMOEBÆUM, in *Ancient Poetry*, a kind of poem repreſenting a diſpute between two perſons, who are made to anſwer each other alternately; ſuch are the third and ſeventh of Virgil's eclogues.

AMOL, a town of Aſia, in the country of the Uſbecks, ſeated on the river Gihon. E. Long. 64. 30. N. Lat. 39. 20.

AMOMUM, Ginger. See Botany *Index*.

Amomum Vulgare. See Sium, Botany *Index*.

AMONTONS, William, an ingenious experimental philoſopher, the ſon of a lawyer of Normandy, was born at Paris in the year 1663. From his childhood he laboured under the infirmity of extreme deafneſs, which led him to amuſe himſelf in the want of ſociety, by ſtudying geometry and mechanics. He learned deſigning and ſurveying, and was employed in many public works. He preſented to the Academy of Sciences, in the year 1687, an hygrometer upon a new conſtruction, which was highly approved. In 1695, he publiſhed, in French, a treatiſe, entitled "Obſervations on a new Hour-Glaſs, and Barometers, Thermometers, and Hygrometers." This work was dedicated to the Academy of Sciences, of which he became a member in the year 1699. Upon his admiſſion, he read a paper on friction, in which a new theory upon that ſubject is propoſed: the paper will be found in the memoirs of the academy. He diſcovered a method of conveying intelligence ſpeedily to a great diſtance by means of ſignals, from one perſon to another, placed at as great a diſtance as they could be ſeen by means of teleſcopes: he may therefore be eſteemed the inventor of the telegraph. This ingenious man, who was diſtinguiſhed for his ingenuity in inventing, and his accuracy in executing experiments, died in the year 1705. His pieces which are numerous,

Amoræans || Amortization.

and on various ſubjects, as air, fire, barometers, pumps, &c. may be found in the volumes of the Memoirs of the Academy of Sciences. *(Gen. Biog.)*

AMORÆANS, a ſect or order of Gemaric doctors, or commentators on the Jeruſalem Talmud. The Amoræans ſucceeded the Miſchnic doctors. They ſubſiſted 250 years; and were ſucceeded by the Seburæans.

AMORGOS, or AMURGUS, in *Ancient Geography*, now *Morgo*, not far from Naxus to the eaſt, one of the European Sporades; the country of Simonides the iambic poet. To this iſland criminals were baniſhed. It was famous for a fine flax called *Emorgis*.

AMORITES, a people deſcended from Amorrhæus, according to the Septuagint and Vulgate; Emoræus, according to other expoſitors; Hæmori, according to the Hebrew; or Emorite, according to our verſion of the Bible; who was the fourth ſon of Canaan, Gen. x. 16.

The Amorites firſt of all peopled the mountains lying to the weſt of the Dead ſea. They had likewiſe eſtabliſhments to the eaſt of the ſame ſea, between the brooks of Jabbok and Arnon, from whence they forced the Ammonites and Moabites, Numb. xiii. 30. xvi. 29. Joſh. v. 1. and Judges xi. 19. 20. Moſes made a conqueſt of this country from their kings Sihon and Og, in the year of the world 2553.

The prophet Amos (ii. 9.), ſpeaking of the gigantic ſtature and valour of the Amorites, compares their height with that of cedars, and their ſtrength with that of an oak. The name *Amorite* is often taken in Scripture for all Canaanites in general. The lands which the Amorites poſſeſſed on this ſide Jordan were given to the tribe of Judah, and thoſe which they had enjoyed beyond this river were diſtributed between the tribes of Reuben and Gad.

AMORIUM, a town of Phrygia Major, near the river Sangarius, on the borders of Galatia.—It was taken from the Romans by the Saracens in 668; but ſoon after retaken by the Romans. A war breaking out again between theſe two nations in 837, the Roman emperor Theophilus deſtroyed Sozopetra the birthplace of the caliph Al' Motaſem, notwithſtanding his earneſt entreaties to him to ſpare it. This ſo enraged the caliph, that he ordered every one to engrave upon his ſhield the word *Amorium*, the birthplace of Theophilus, which he reſolved at all events to deſtroy. Accordingly he laid ſiege to the place, but met with a vigorous reſiſtance. At length, after a ſiege of 55 days, it was betrayed by one of the inhabitants who had abjured the Chriſtian religion. The caliph, exaſperated at the loſs he had ſuſtained during the ſiege, put moſt of the men to the ſword, carried the women and children into captivity, and levelled the city with the ground. His forces being diſtreſſed for want of water on their return home, the Chriſtian priſoners roſe upon ſome of them, and murdered them; upon which the caliph put 6000 of the priſoners to death. According to the eaſtern hiſtorians, 30,000 of the inhabitants of Amorium were ſlain, and as many carried into captivity.

AMORPHA, FALSE INDIGO. See BOTANY *Index*.

AMORTIZATION, in *Law*, the alienation of lands or tenements to a corporation or fraternity and their ſucceſſors. See MORTMAIN.

Amos.

AMOS, the fourth of the ſmall prophets, who in his youth had been a herdſman in Tekoa, a ſmall town about four leagues ſouthward of Jeruſalem, was ſent to the king of Baſhan, that is, to the people of Samaria, or the kingdom of Iſrael, to bring them back to repentance and an amendment of their lives; whence it is thought probable that he was born within the territories of Iſrael, and only retired to Tekoa on his being driven from Bethel, by Amaziah the prieſt of the golden calves at Bethel.

The prophet being thus retired to Tekoa, in the kingdom of Judah, continued to propheſy. He complains in many places of the violence offered him, by endeavouring to oblige him to ſilence. He boldly remonſtrates againſt the crying ſins that prevailed among the Iſraelites, as idolatry, oppreſſion, wantonneſs, and obſtinacy. He likewiſe reproves thoſe of Judah, ſuch as their carnal ſecurity, ſenſuality, and injuſtice. He terrifies them both with frequent threatenings, and pronounces that their ſins will at laſt end in the ruin of Judah and Iſrael, which he illuſtrates by the viſions of a plumb-line and a baſket of ſummer-fruit. It is obſervable in this prophecy, that as it begins with denunciation of judgment and deſtruction againſt the Syrians, Philiſtines, Tyrians, and other enemies of the Jews, ſo it concludes with comfortable promiſes of reſtoring the tabernacle of David, and erecting the kingdom of Chriſt. Amos was choſen to the prophetic office in the time of Uzziah king of Judah, and Jeroboam the ſon of Joaſh king of Iſrael, two years before the earthquake (Amos i. 1.), which happened in the 24th or 25th year of Uzziah, according to the rabbins and moſt of the modern commentators; or the year of the world 3219, when this prince uſurped the prieſt's office, and attempted to offer incenſe to the Lord: but it is obſerved, that this cannot be the caſe, becauſe Jotham the ſon of Uzziah, who was born in 3221, was of age to govern, and conſequently was between 15 and 20 years of age, when his father undertook to offer incenſe, and was ſtruck with a leproſy. The firſt of the prophecies of Amos, in order of time, are thoſe of 7th chapter: the reſt he pronounced in the town of Tekoa, whither he retired. He foretold the misfortunes which the kingdom of Iſrael ſhould fall into after the death of Jeroboam II. who was then living; he foretold the death of Zechariah, the invaſion of the lands belonging to Iſrael by Pul and Tiglath Pilneſer kings of Aſſyria; and he ſpeaks of the captivity of the ten tribes, and their return.

The time and manner of this prophet's death are not known. Some old authors relate that Amaziah, prieſt of Bethel, provoked by the diſcourſes of the prophet, had his teeth broke, in order to ſilence him. Others ſay, that Hoſea or Uzziah, the ſon of Amaziah, ſtruck him with a ſtake upon the temples, knocked him down, and wounded him much; in which condition he was carried to Tekoa, where he died, and was buried with his fathers; but it is generally thought that he propheſied a long time at Tekoa, after the adventure which he had with Amaziah; and the prophet himſelf taking no notice of the ill treatment

Amoy ‖ Amphiaraus.

ment which he is ſaid to have received, is an argument that he did not ſuffer in the manner they relate.

St Jerome obſerves, that there is nothing great or ſublime in the ſtyle of Amos. He applies the words of St Paul (2 Cor. vi. 6.) to him, 'rude in ſpeech though not in knowledge.' And he farther obſerves, that he borrows his compariſons from the ſtate and profeſſion to which he belonged.

AMOY, an iſland in the province of Fokien, in China, where the Engliſh had a factory: but they have abandoned it on account of the impoſitions of the inhabitants. E. Long. 118. 0. N. Lat. 24. 30. It has a fine port, that will contain many thouſand veſſels. The emperor has a garriſon here of 7000 men.

AMPELIS, the vine. See VITIS, BOTANY *Index*.

AMPELIS, the *Chatterer*. See ORNITHOLOGY *Index*.

AMPELITES, CANNEL-COAL, or CANDLE-COAL, a hard, opaque, foſſil, inflammable ſubſtance, of a black colour. It does not effervesce with acids. The ampelites, though much inferior to jet in many reſpects, is yet a very beautiful foſſil; and, for a body of ſo compact a ſtructure, remarkably light. Examined by the microſcope, it appears compoſed of innumerable very ſmall and thin plates, laid cloſely and firmly on one another; and full of very ſmall ſpecks of a blacker and more ſhining matter than the reſt, which is evidently a purer bitumen than the general maſs. Theſe ſpecks are equally diffuſed over the different parts of the maſſes. There is a large quarry of it near Alençon in France. It is dug in many parts of England, but the fineſt is in Lancaſhire and Cheſhire; it lies uſually at conſiderable depths. It makes a very briſk fire, flaming violently for a ſhort time, and after that continuing red and glowing hot a long while; and finally is reduced into a ſmall proportion of gray aſhes, the greater part of its ſubſtance having flown off in the burning.—It is capable of a very high and elegant poliſh; and in the countries where it is produced, is turned into a vaſt number of toys, as ſnuff-boxes and the like, which bear all the nicety of turning, and are made to paſs for jet. Huſbandmen ſmear their vines with it, as it kills the vermine which infeſts them. It is likewiſe uſed for the dying of hair black. In medicine, it is reputed good in colics, againſt worms, and of being in general an emollient and diſcutient; but the preſent practice takes no notice of it.

AMPELUSIA, in *Ancient Geography*, a promontory of Mauritania Tingitana, called *Cottes* by the natives, which is of the ſame ſignification with a town of the ſame name not far from the river Lixus, near the ſtraits of Gibraltar; now *Cape Spartel*. W. Long. 6. 30. Lat. 36. 0.

AMPHERES, in *Antiquity*, a kind of veſſels wherein the rowers plied two oars at the ſame time, one with the right hand and another with the left.

AMPHIARAUS, in *Pagan Mythology*, a celebrated prophet, who poſſeſſed part of the kingdom of Argos. He was believed to excel in divining by dreams, and is ſaid to be the firſt who divined by fire. Amphiaraus knowing, by the ſpirit of prophecy, that he ſhould loſe his life in the war againſt Thebes, hid himſelf in order to avoid engaging in that expedition: but his wife Eriphyle, being prevailed upon by a preſent, diſcovered the place in which he had concealed himſelf; ſo that he was obliged to accompany the other princes who marched againſt Thebes. This proved fatal to him; for the earth being ſplit aſunder by a thunderbolt, both he and his chariot were ſwallowed up in the opening. Amphiaraus, after his death, was ranked among the gods; temples were dedicated to him; and his oracle, as well as the ſports inſtituted to his honour, were very famous.

Amphiarthroſis, Amphibia.

AMPHIARTHROSIS, in *Anatomy*, a term for ſuch junctures of bones as have an evident motion, but different from the diarthroſis, &c. See DIARTHROSIS.

AMPHIBIA, in *Zoology*, the name of Linnæus's third claſs of animals; including all thoſe which live partly in water and partly on land. This claſs he ſubdivides into four orders, viz. the amphibia reptiles; the amphibia ſerpentes; the amphibia nantes; and the amphibia meantes.

It has been a queſtion whether the animals commonly called *amphibious*, live moſt in the water or on land. If we conſider the words αμφι (*utrinque*, both ways), and βιος (*vita*, life), from which the term *amphibious* is derived; we ſhould underſtand, that animals, having this title, ſhould be capable of living as well by land, or in the air, as by water; or of dwelling in either conſtantly at will: but it will be difficult to find any animal that can fulfil this definition, as being equally qualified for either. An ingenious naturaliſt *, therefore, from conſidering their economy reſpectively, divides them into two orders, viz. 1. Such as enjoy their chief functions by land, but occaſionally go into the water. 2. Such as chiefly inhabit the water, but occaſionally go aſhore. What he advances on this ſubject is curious, and well illuſtrates the nature of this claſs.

* Dr *Parſons*; in a paper read before the Royal Society.

1. Of the firſt order, he particularly conſiders the phocæ; and endeavours to ſhow, that none of them can live chiefly in the water, but that their chief enjoyment of the functions of life is on ſhore.

Theſe animals (he obſerves) are really quadrupeds; but, as their chief food is fiſh, they are under a neceſſity of going out to ſea to hunt their prey, and to great diſtances from ſhore; taking care that, however great the diſtance, rocks or ſmall iſlands are at hand, as reſting places when they are tired, or when their bodies become too much macerated in the water; and they return to the places of their uſual reſort to ſleep, copulate, and bring forth their young, for the following reaſons, viz. It is well known, that the only eſſential difference (as to the general ſtructure of the heart) between amphibious and mere land animals, or ſuch as never go into the water, is, that in the former the oval hole remains always open. Now, in ſuch as are without this hole, if they were to be immerſed in water for but a little time, reſpiration would ceaſe, and the animal muſt die; becauſe a great part of the maſs of blood paſſes from the heart by the pulmonary artery through the lungs, and by the pulmonary veins returns to the heart, while the aorta is carrying the greater part of the maſs to the head and extremities, &c.

Now, the blood paſſes through the lungs in a continual uninterrupted ſtream, while reſpiration is gentle and moderate: but when it is violent, then the circulation is interrupted, for inſpiration and exſpiration are now carried to their extent; and in this ſtate the blood cannot paſs through the lungs either during the total

Amphibia. inſpiration or total exſpiration of the air in breathing: for, in the former caſe, the inflation compreſſes the returning veins; and in the latter, by the collapſion of the lungs, theſe veins are interrupted alſo; ſo that it is only between theſe two violent actions that the blood can paſs: and hence it is, that the lives of animals are ſhortened, and their health impaired, when they are ſubjected to frequent violent reſpiration; and thus it is, that when animals have once breathed, they muſt continue to reſpire ever after, for life is at an end when that ceaſes.

There are three neceſſary and principal uſes of reſpiration in all land animals, and in thoſe kinds that are counted amphibious. The firſt is that of promoting the circulation of the blood through the whole body and extremities. In real fiſhes, the force of the heart is alone capable of ſending the blood to every part, as they are not furniſhed with limbs or extremities; but in the others mentioned, being all furniſhed with extremities, reſpiration is an aſſiſtant force to the arteries in ſending blood to the extremities; which, being ſo remote from the heart, have need of ſuch aſſiſtance, otherwiſe the circulation would be very languid in theſe parts: thus we ſee, that in perſons ſubject to aſthmatic complaints, the circulation grows languid, the legs grow cold and œdematous, and other parts ſuffer by the defect in reſpiration.—A ſecond uſe of breathing is, that in reſpiration, the variety of particles, of different qualities, which float always in the air, might be drawn into the lungs, to be inſinuated into the maſs of blood, being highly neceſſary to contemperate and cool the agitated maſs, and to contribute refined pabulum to the finer parts of it, which, meeting with the daily ſupply of chyle, ſerves to aſſimilate and more intimately mix the maſs, and render its conſtitution the fitter for ſupporting the life of the animal. Therefore it is, that valetudinarians, by changing foul or unwholeſome air for a free, good, open air, often recover from lingering diſeaſes.—A third principal uſe of reſpiration is, to promote the exhibition of voice in animals: which all thoſe that live on the land do according to their ſpecific natures.

From theſe conſiderations it appears, that the phocæ of every kind are under an abſolute neceſſity of making the land their principal reſidence. But there is another very convincing argument why they reſide on ſhore the greateſt part of their time: namely, that the fleſh of theſe creatures is analogous to that of other land animals; and therefore, by over long maceration, added to the fatigue of their chaſing their prey, they would ſuffer ſuch a relaxation as would deſtroy them. It is well known, that animals which have lain long under water are reduced to a very lax and even putrid ſtate; and the phoca muſt baſk in the air on ſhore: for while the ſolids are at reſt, they acquire their former degree of tenſion, and the vigour of the animal is reſtored: and while he has an uninterrupted placid reſpiration, his blood is refreſhed by the new ſupply of air, as explained above, and he is rendered fit for his next cruiſe: for action waſtes the moſt exalted fluids of the body, more or leſs, according to its duration and violence; and the reſtorative reſt muſt continue a longer or ſhorter time, according to the quantity of the previous fatigue.

Let us now examine by what power theſe animals are capable of remaining longer under water than land animals. Amphibia.

All theſe have the oval hole open between the right and left auricles of the heart; and, in many, the canalis arterioſus alſo: and while the phoca remains under water, which he may continue an hour or two more or leſs, his reſpiration is ſtopped; and the blood, not finding the paſſage through the pulmonary artery free, ruſhes through the hole from the right to the left auricle, and partly through the arterial canal, being a ſhort paſſage to the aorta, and thence to every part of the body, maintaining the circulation: but, upon riſing to come aſhore, the blood finds its paſſage again through the lungs the moment he reſpires.

Thus the fœtus in utero, during its confinement, having the lungs compreſſed, and conſequently the pulmonary arteries and veins impervious, has the circulation of the blood carried on through the oval hole and the arterial canal. Now, ſo far the phoca in the water, and the fœtus in utero, are analogous; but they differ in other material circumſtances. One is, that the fœtus having never reſpired, remains ſufficiently nouriſhed by the maternal blood circulating through him, and continues to grow till the time of his birth, without any want of reſpiration during nine months confinement: the phoca, having reſpired the moment of his birth, cannot live very long without it, for the reaſons given before; and this hole and canal would be cloſed in them, as it is in land animals, if the dam did not, ſoon after the birth of the cub, carry him ſo very frequently into the water to teach him; by which practice theſe paſſages are kept open during life, otherwiſe they would not be capable of attaining the food deſigned for them by Providence.

Another difference is, that the phoca, as was ſaid before, would be relaxed by maceration in remaining too long in the water; whereas the fœtus in utero ſuffers no injury from continuing its full number of months in the fluid it ſwims in: the reaſon is, that water is a powerful ſolvent, and penetrates the pores of the ſkins of land animals, and in time can diſſolve them; whereas the *liquor amnii* is an inſipid ſoft fluid, impregnated with particles more or leſs mucilaginous, and utterly incapable of making the leaſt alteration in the cutis of the fœtus.

Otters, beavers, and ſome kinds of rats, go occaſionally into the water for their prey, but cannot remain very long under water. "I have often gone to ſhoot otters (ſays our author), and watched all their motions; I have ſeen one of them go ſoftly from a bank into the river, and dive down; and in about two minutes riſe at 10 or 15 yards from the place he went in, with a middling ſalmon in his mouth, which he brought on ſhore: I ſhot him, and ſaved the fiſh whole." Now as all fœtuſes have theſe paſſages open, if a whelp of a true water ſpaniel was, immediately after its birth, ſerved as the phoca does her cubs, and immerſed in water, to ſtop reſpiration for a little time every day, it is probable that the hole and canal would be kept open, and the dog be made capable of remaining as long under water as the phoca.

Frogs, how capable ſoever of remaining in the water, yet cannot avoid living on land, for they reſpire; and if a frog be thrown into a river, he makes to the ſhore as faſt as he can.

The

Amphibia. The lizard kind, ſuch as may be called water-lizards (ſee LACERTA), are all obliged to come to land, in order to depoſite their eggs, to reſt, and to ſleep. Even the crocodiles, who dwell much in rivers, ſleep and lay their eggs on ſhore; and, while in the water are compelled to riſe to the ſurface to breathe; yet, from the texture of his ſcaly covering, he is capable of remaining in the water longer by far than any ſpecies of the phoca, whoſe ſkin is analogous to that of a horſe or cow.

The hippopotamus, who wades into the lakes or rivers, is a quadruped, and remains under the water a conſiderable time; yet his chief reſidence is upon land, and he muſt come on ſhore for reſpiration.

The teſtudo, or ſea-tortoiſe, though he goes out to ſea and is often found far from land; yet being a reſpiring animal, cannot remain long under water. He has indeed a power of rendering himſelf ſpecifically heavier or lighter than the water, and therefore can let himſelf down to avoid an enemy or a ſtorm: yet he is under a neceſſity of riſing frequently to breathe, for reaſons given before; and his moſt uſual ſituation, while at ſea, is upon the ſurface of the water, feeding upon the various ſubſtances that float in great abundance everywhere about him; theſe animals ſleep ſecurely upon the ſurface, but not under water; and can remain longer at ſea than any other of this claſs, except the crocodile, becauſe as it is with the latter, his covering is not in danger of being too much macerated; yet they muſt go on ſhore to copulate and lay their eggs.

2. The conſideration of theſe is ſufficient to inform us of the nature of the firſt order of the claſs of amphibious animals; let us now ſee what is to be ſaid of the ſecond in our diviſion of them, which are ſuch as chiefly inhabit the waters, but occaſionally go on ſhore;

Theſe are but of two kinds: the eels, and water ſerpents or ſnakes of every kind. It is their form that qualifies them for loco-motion on land, and they know their way back to the water at will; for by their ſtructure they have a ſtrong periſtaltic motion, by which they can go forward at a pretty good rate: whereas all other kinds of fiſh, whether vertical or horizontal, are incapable of a voluntary loco-motion on ſhore; and therefore, as ſoon as ſuch fiſh are brought out of the water, after having flounced a while, they lie motionleſs and ſoon die.

Let us now examine into the reaſon why theſe vermicular fiſh, the eel and ſerpent kinds, can live a conſiderable time on land, and the vertical and horizontal kinds die almoſt immediately when taken out of the water: and, in this reſearch, we ſhall come to know what analogy there is between land animals and thoſe of the waters. All land animals have lungs, and can live no longer than while theſe are inflated by the ambient air, and alternately compreſſed for its expulſion; that is, while reſpiration is duly carried on, by a regular inſpiration and exſpiration of air.

In like manner, the fiſh in general have, inſtead of lungs, gills or branchiæ: and as in land animals the lungs have a large portion of the maſs of blood circulating through them, which muſt be ſtopped if the air has not a free ingreſs and egreſs into and from them; ſo, in fiſh, there is a great number of blood veſſels that paſs through the branchiæ, and a great portion of their blood circulates through them, which muſt in like manner be totally ſtopped, if the branchiæ are not perpetually wet with water. So that, as the air is to the lungs in land animals a conſtant aſſiſtant to the circulation; ſo is the water to the branchiæ of thoſe of the rivers and ſeas: for when theſe are out of the water, the branchiæ very ſoon grow criſp and dry, the blood veſſels are ſhrunk, and the blood is obſtructed in its paſſage; ſo, when the former are immerſed in water, or otherwiſe prevented from having reſpiration, the circulation ceaſes, and the animal dies. Amphibia.

Again, as land animals would be deſtroyed by too much maceration in water; ſo fiſhes would, on the other hand, be ruined by too much exſiccation: the latter being, from their general ſtructure and conſtitution, made fit to bear, and live in, the water; the former, by their conſtitution and form, to breathe and dwell in the air.

But it may be aſked, Why eels and water ſnakes are capable of living longer in the air than the other kinds of fiſh? This is anſwered, by conſidering the providential care of the great Creator for theſe and every one of his creatures: for ſince they were capable of loco-motion by their form, which they need not be if they were never to go on ſhore, it ſeemed neceſſary that they ſhould be rendered capable of living a conſiderable time on ſhore, otherwiſe their loco-motion would be in vain. How is this provided for? Why, in a moſt convenient manner; for this order of fiſhes have their branchiæ well covered from the external drying air; they are alſo furniſhed with a ſlimy mucus, which hinders their becoming criſp and dry for many hours; and their very ſkins always emit a mucous liquor, which keeps them ſupple and moiſt for a long time: whereas the branchiæ of other kinds of fiſh are much expoſed to the air, and want the ſlimy matter to keep them moiſt. Now, if any of theſe, when brought out of the water, were laid in a veſſel without water, they might be preſerved alive a conſiderable time, by only keeping the gills and ſurface of the ſkin conſtantly wet, even without any water to ſwim in.

It has been advanced, that man may, by art, be rendered amphibious, and able to live under water as well as frogs. As the fœtus lives *in utero* without air, and the circulation is there continued by means of the foramen ovale; by preſerving the paſſage open, and the other parts *in ſtatu quo*, after the birth, the ſame faculty would ſtill continue. Now, the foramen, it is alleged, would be preſerved in its open ſtate, were people accuſtomed, from their infancy, to hold their breath a conſiderable time once a-day, that the blood might be forced to reſume its priſtine paſſage, and prevent its drying up as it uſually does. This conjecture ſeems, in ſome meaſure, ſupported by the practice of divers, who are taught from their childhood to hold their breath, and keep long under water, by which means the ancient channel is kept open.—A Calabrian monk at Madrid laid claim to this amphibious capacity, making an offer to the king of Spain, to continue twice twenty-four hours under water, without ever coming up to take breath. Kircher gives an account of a Sicilian, named the *fiſh Colas*, who by a long habitude from his youth, had ſo accuſtomed himſelf to live in water, that his nature ſeemed to be quite altered; ſo that he lived rather after the manner of a fiſh than a man.

Amphibole ‖ Amphicty-ons.

AMPHIBOLE. See MINERALOGY *Index*.

AMPHIBOLOGY, in *Grammar* and *Rhetoric*, a term uſed to denote a phraſe ſuſceptible of two different interpretations. Amphibology ariſes from the order of the phraſe, rather than from the ambiguous meaning of a word.

Of this kind was that anſwer which Pyrrhus received from the oracle: *Aio te, Æacida, Romanos vincere poſſe;* where the amphibology conſiſts in this, that the words *te* and *Romanos*, may either of them precede, or either of them follow, the words *poſſe vincere*, indifferently. See ORACLE.

The Engliſh language uſually ſpeaks in a more natural manner, and is not capable of any amphibologies of this kind: nor is it ſo liable to amphibologies in the articles, as the French and moſt other modern tongues.

AMPHIBRACHYS, in *Greek* and *Latin Poetry*, the name of a foot conſiſting of three ſyllables, whereof that in the middle is long, and the other two ſhort; ſuch are the words [ăbīrĕ, ămārĕ.]

AMPHICOME, in *Natural Hiſtory*, a kind of figured ſtone, of a round ſhape, but rugged, and beſet with eminences, celebrated on account of its uſe in divination. The word is originally Greek, αμφικομη, *q. d. utrinque comata*, or "hairy on all ſides." This ſtone is alſo called *Erotylos*, Ερωτυλος, *Amatoria*, probably on account of its ſuppoſed power of creating love. The amphicome is mentioned by Democritus and Pliny. Mercatus takes it for the ſame with the *lapis lumbricatus*, of which he gives a figure.

AMPHICTYONS, in *Grecian Antiquity*, an aſſembly compoſed of deputies from the different ſtates of Greece; and reſembling, in ſome meaſure, the diet of the German empire. Some ſuppoſe the word Αμφικτιονες to be formed of αμφι, "about," and κτιζειν or κτιζειν, in regard the inhabitants of the country round about met here in council: others, with more probability, from Amphictyon, ſon of Deucalion, whom they ſuppoſe to have been the founder of this aſſembly; though others will have Acriſius, king of the Argives, to have been the firſt who gave a form and laws to it.

Authors give different accounts of the number of the Amphictyons, as well as of the ſtates who were entitled to have their repreſentatives in this council. According to Strabo, Harpocration, and Suidas, they were twelve from their firſt inſtitution, ſent by the following cities and ſtates; the Ionians, Dorians, Perrhæbians, Bœotians, Magneſians, Achæans, Phthians, Melians, Dolopians, Ænianians, Delphians, and Phocians. Æſchines reckons no more than eleven: inſtead of the Achæans, Ænianians, Delphians, and Dolopians, he only gives the Theſſalians, Oetians, and Locrians. Laſtly, Pauſanias's liſt contains only ten viz. the Ionians, Dolopians, Theſſalians, Ænianians, Magneſians, Melians, Phthians, Dorians, Phocians, and Locrians.

In the time of Philip of Macedon, the Phocians were excluded the alliance, for having plundered the Delphian temple, and the Lacedæmonians were admitted in their place; but the Phocians, 60 years after, having behaved gallantly againſt Brennus and his Gauls, were reſtored to their ſeat in the Amphictyonic council. Under Auguſtus, the city Nicopolis was admitted into the body; and to make room for it, the Magneſians, Melians, Phthians, and Ænianians, who till then had diſtinct voices, were ordered to be numbered with the Theſſalians, and to have only one common repreſentative. Strabo ſpeaks as if this council were extinct in the times of Auguſtus and Tiberius: but Pauſanias, who lived many years after, under Antoninus Pius, aſſures us it remained entire in his time, and that the number of Amphictyons was then 30. Amphicty-ons ‖ Amphilochia.

The members were of two kinds. Each city ſent two deputies, under different denominations; one called Ἱερομνημων, whoſe buſineſs ſeems to have been more immediately to inſpect what related to ſacrifices and ceremonies of religion; the other, Πυλαγορας, charged with hearing and deciding of cauſes and differences between private perſons. Both had an equal right to deliberate and vote, in all that related to the common intereſts of Greece. The *hieromnemon* was elected by lot, the *pylagoras* by plurality of voices.

Though the Amphictyons were firſt inſtituted at Thermopylæ, M. de Valois maintains, that their firſt place of reſidence was at Delphi; where, for ſome ages, the tranquillity of the times found them no other employment than that of being, if we may ſo call it, church-wardens of the temple of Apollo. In after-times, the approach of armies frequently drove them to Thermopylæ, where they took their ſtation, to be nearer at hand to oppoſe the enemies progreſs, and order timely ſuccour to the cities in danger. Their ordinary reſidence, however, was at Delphi.

Here they decided all public differences and diſputes between any of the cities of Greece; but before they entered on buſineſs, they jointly ſacrificed an ox cut into ſmall pieces, as a ſymbol of their union. Their determinations were received with the greateſt veneration, and even held ſacred and inviolable.

The Amphictyons, at their admiſſion, took a ſolemn oath never to diveſt any city of its right of deputation; never to avert its running waters; and if any attempts of this kind were made by others, to make mortal war againſt them: more particularly, in caſe of any attempt to rob the temple of any of its ornaments, that they would employ hands, feet, tongue, their whole power, to revenge it.—This oath was backed with terrible imprecations againſt ſuch as ſhould violate it; *e.g.* May they meet all the vengeance of Apollo, Diana, Minerva, &c. their ſoil produce no fruit, their wives bring forth nothing but monſters, &c.

The ſtated terms of their meeting were in ſpring and autumn: the ſpring meeting was called Εαρινη Πυλαια, that in autumn Μετοπωρινη. On extraordinary occaſions, however, they met at any time of the year, or even continued ſitting all the year round.

Philip of Macedon uſurped the right of preſiding in the aſſembly of the Amphictyons, and of firſt conſulting the oracle which was called Προμαντια.

AMPHIDROMIA, a feaſt celebrated by the ancients on the fifth day after the birth of a child.

AMPHIDRYON, in *Eccleſiaſtical Writers*, denotes the veil or curtain which was drawn before the door of the *bema* in ancient churches.

AMPHILOCHIA, in *Ancient Geography*, the territory of the city of Argos in Acarnania; *Amphilochium*, (Thucydides); called *Amphilochi* (from the people), in the lower age, (Stephanus.) A town alſo of Spain, in Galicia, built by Teucer, and denominated

Amphilochius ‖ Amphifbæna.

nated from Amphilochus one of his companions, (Strabo): now *Orenſe*. W. Long. 8. 20. Lat. 42. 36.

AMPHILOCHIUS, biſhop of Iconium, in the fourth century, was the friend of St Gregory Nazianzen and St Baſil. He aſſiſted at the firſt general council of Conſtantinople in 381; preſided at the council of Sidæ; and was a ſtrenuous oppoſer of the Arians. He died in 394; and his works were publiſhed in Greek and Latin at Paris 1644, by Francis Combeſis.

AMPHILOCHUS, ſon of Amphiaraus and Eriphyle, was a celebrated diviner. He had an altar erected to him at Athens, and an oracle at Mallus in Cilicia, which city was founded by him and Mopſus. The anſwers of this oracle were given by dreams; the party inquiring uſed to paſs a night in the temple, and that night's dream was the anſwer. Dion Caſſius mentions a picture done by order of Sextus Condianus, repreſenting the anſwer he received of the oracle, in the reign of the emperor Commodus.

AMPHIMACER, in *Ancient Poetry*, a foot conſiſting of three ſyllables, whereof the firſt and laſt are long, and that in the middle ſhort; ſuch is the word [cāſtĭtās.]

AMPHION, ſon of Jupiter and Antiope; who, according to the poets, made the rocks follow his muſic; and at his harp the ſtones of Thebes danced into walls and a regular city.

AMPHIPOLES, in *Antiquity*, the principal magiſtrates of Syracuſe. They were eſtabliſhed by Timoleon in the 109th Olympiad, after the expulſion of the tyrant Dionyſius. They governed Syracuſe for the ſpace of 300 years: and Diodorus Siculus aſſures us, that they ſubſiſted in his time.

AMPHIPOLIS, in *Ancient Geography*, a city of Macedonia, an Athenian colony, on the Strymon, but on which ſide is not certain: Pliny places it in Macedonia, on this ſide; but Scylax, in Thrace, on the other. The name of the town, *Amphipolis*, however, ſeems to reconcile their difference; becauſe, as Thucydides obſerves, it was waſhed on two ſides by the Strymon, which dividing itſelf into two channels, the city ſtood in the middle, and on the ſide towards the ſea there was a wall built from channel to channel. Its ancient name was Ενεα οδοι, the *Nine ways* (Thucydides, Herodotus.) The citizens were called *Amphipolitani*, (Livy). It was afterwards called *Criſtopolis*; now *Chriſopoli*, or *Chiſopoli*, (Holſtenius.)

AMPHIPOLIS, in *Ancient Geography*, a town of Syria, on the Euphrates, built by Seleucus, called by the Syrians *Turmeda*, (Stephanus): the ſame with *Thapſacus*, (Pliny); and ſuppoſed to have been only renewed and adorned by Seleucus, becauſe long famous before his time, (Xenophon.)

AMPHIPPII, in *Grecian Antiquity*, ſoldiers who, in war, uſed two horſes without ſaddles, and were dexterous enough to leap from one to the other.

AMPHIPRORÆ, in the naval affairs of the ancients, veſſels with a prow at each end. They were uſed chiefly in rapid rivers and narrow channels, where it was not eaſy to tack about.

AMPHIPROSTYLE, in the architecture of the ancients, a temple which had four columns in the front, and as many in the aſpect behind.

AMPHISBÆNA. See OPHIOLOGY *Index*.

AMPHISBÆNA Aquatica. See GORDIUS, HELMINTHOLOGY *Index*.

Amphiſbæna ‖ Amphitheatre.

AMPHISCII, among *Geographers*, a name applied to the people who inhabit the torrid zone. The Amphiſcii, as the word imports, have their ſhadows one part of the year towards the north, and the other towards the ſouth, according to the ſun's place in the ecliptic. They are alſo called *Aſcii*. See ASCII.

AMPHISSA, in *Ancient Geography*, the capital of the Locri Oxolæ, 120 ſtadia (or 15 miles) to the weſt of Delphi, (Pauſanias.) So called, becauſe ſurrounded on all ſides by mountains, (Stephanus.) Hence *Amphiſſæi*, the inhabitants; who plundered the temple at Delphi (Demoſthenes.)—Alſo a town of Magna Græcia, at the mouth of the Sagra, on the coaſt of the Farther Calabria, ſituated between Locri and Caulona; now called *Rocelia*. *Amphiſſius* the epithet, (Ovid.)

AMPHITHEATRE, in *Ancient Architecture*, a building of an elliptic form, of two or more ſtories of open arcades, with a number of interior galleries and arched paſſages, which ſerved both as a communication and ſupport to ſeveral rows of ſeats which roſe above each other, and were arranged round a large ſpace called the *arena*. The derivation of the word *amphitheatre*, indicates that it is a place where the ſpectators, circuitouſly arranged, ſaw the performance equally well on all ſides.

The hiſtory of amphitheatres is of conſiderable importance, in conſequence of its connexion with ancient manners. Theſe ſtructures owed their origin to the barbarity of the ancients, and their ruin to the humanity of the moderns. They are the production of Roman invention in the laſt ages of the republic. The ferocious diſpoſition of the Romans was immoderately fond of every ſpecies of amuſement; but eſpecially that which was of a bloody and horrible nature. The political rulers improved this general feature in the Roman character, to rouſe and foſter that martial ſpirit which rendered them maſters of the world. After the Samnite war had extended the Roman ſceptre over Etruria and the whole peninſula of Italy, the firſt gladiatory conflicts were exhibited in Rome in the year of the city 490. Lucius Metellus brought into the circus the elephants which were part of the ſpoil of the Carthaginians, in the year 502, and this proved the introduction of wild beaſts into the ſpectacles of Rome. This addition was equally agreeable to the Roman taſte; and thoſe who courted the popular favour, vied with each other in entertaining the people in this barbarous manner. This ſoon gave birth to a profeſſion of men denominated *gladiators*, who were trained to the combat, and for reward ſlaughtered one another in the forum, whilſt every devouring animal which the wilds of Aſia or Africa produced, added to the horrid ſcene.

In the days of Pompey and Cæſar theſe barbarous amuſements were given with an aſtoniſhing profuſion. In theſe games given by Pompey, the elephants attempted to break down the barrier between them and the people, and the ſituation of the circus prevented the people from ſeeing equally well: this induced Cæſar to alter the original form, and conſtruct edifices where the populace might be entertained without danger or interruption. Amphitheatres were ſuited

to

Amphitheatre.

to this purpoſe; therefore they were adopted, and became the common place for the exhibitions both of gladiators and wild beaſts.

It is ſuppoſed, that the firſt amphitheatre was compoſed of thoſe ſingular machines, formed by Caius Curio; for the games which Cæſar preſented among the funeral honours of his father. In a ſemicircular form Caius made two large theatres, and oppoſed their backs to each other: and, having amuſed the people in theſe the one half of the day, then they wheeled round, forming one ſpacious theatre where the gladiators contended during the remainder of the day. Pliny is the only one who makes mention of this amphitheatre; and from his account it is difficult to aſcertain whether this was the firſt idea of an amphitheatre, or whether the previous fight of one had ſuggeſted this huge and wonderful ſtructure. It is reported, that Julius Cæſar, a few years after, formed a hunting theatre of wood; and, in conſequence of the circular poſition of the ſeats, it obtained the name of an *amphitheatre*. This appears to have been of very ſuperior kind and in great eſtimation.

In the reign of Auguſtus, Statilius Taurus erected one of ſtone, but it ſeems to have been ſeldom uſed; and, from its being conſumed by fire in the time of Nero, it is evident that it was not wholly of ſtone. Theſe wooden buildings appear to have been temporary, and a few of them permanent from the embelliſhment conferred upon them. The politic ſpirit of Auguſtus induced him to erect ſeveral of theſe, and Caligula began one, which he left unfiniſhed. Nero formed a large and ſpacious one, which is ſaid to have been a year in building. Herod of Judea erected amphitheatres both in Jeruſalem and in Cæſarea. During the reign of Tiberius, one was built at Fidenæ, which Tacitus informs us fell while the games were performing, and ſlew or hurt about 50,000 perſons. There was another at Placentia, reported to have been the moſt ſpacious in Italy; but it was deſtroyed by fire in the conteſt between Vitellius and Otho.

The unfortunate accidents, which happened to theſe wooden buildings, led the public to conſtruct others of a more durable and ſtronger nature, where the crowd might be entertained without danger. This honour was reſerved to Veſpaſian and Titus. In his eighth conſulate, the former began the Flavian amphitheatre, which the latter finiſhed during his reign. It is ſaid, that the expence of this building would have erected a capital city, and it is deſervedly eſteemed one of the moſt celebrated edifices of ancient times. Dio ſays, that 9000 wild beaſts were deſtroyed at the dedication of this huge building, but Eutropius reſtricts their number to 5000. After the hunting of theſe ferocious animals was ended, inſtantly the arena was filled with water, and ſea animals were made to contend, and a ſea-fight exhibited. This immenſe building obtained the appellation of the *Coliſeum*. See Plate XX. fig. 1.

This amphitheatre became the model of other amphitheatres throughout the empire. Compared with the original model, theſe were merely natural valleys, with ſeats formed in the ſurrounding heights ſimilar to the amphitheatre at Corinth. On the declivity of two hills ſeats of ſtone were ſometimes placed, and the extremes formed by regular works of ſtone. Of this kind was that of Gortyna in Candia. One in the vicinity of Sandwich in Kent had its benches formed of turf; and ſimilar muſt have been thoſe amphitheatres, which were formed along with the camps and military ſtations of the Roman ſoldiers. Amphitheatre.

When Chriſtianity became the religion of the empire, it meliorated the diſpoſitions of the Romans, and induced them to lay aſide this barbarous cuſtom. Conſtantine the Great terminated the gladiatory combats in the eaſt during his reign; but they were not finally aboliſhed at Rome until the beginning of the fifth century, in the reign of Honorius. The combats of wild beaſts continued, however, ſome time longer; but during the progreſs of the fifth century theſe gradually declined, until they were finally aboliſhed, and the amphitheatres were abandoned to the ravages of time and accident. During the middle ages they were ſometimes employed for judicial conflicts, tilts, and tournaments; but theſe practices having been diſcontinued, the amphitheatres experienced univerſal neglect and ruin.

It it very difficult to give an accurate deſcription of an amphitheatre. It is ſcarcely poſſible to give a clear idea of the manner in which ſuch immenſe crowds of people were ſeated and arranged, and how they had a convenient entrance and a returning. It has already been mentioned, that theſe buildings were circuitous, and that the exterior circuit was compoſed of two or more ſtories of arcades; and it may now be added, that the number of theſe ſtories varied according to the nature of the building. A correſponding number of arched paſſages and ſtaircaſes opened upon the ground floor towards theſe ſtories in the direction of radii towards the arena. Theſe communications were again interſected by arched paſſages which encircled the whole ſtructure, and afforded an uninterrupted entrance to every part of the amphitheatre. Sometimes an intermediate gallery ſurrounded the whole in the centre of the fabric, and ſerved as a common place of reſort to all the ſtairs which led to the higher galleries. This was the form of one at Niſmes. Sometimes each ſtaircaſe had its diſtinct communication by itſelf. Such was the caſe with one at Verona. See Plate XX. fig. 2. Conſtruction.

The four radiating entries on the diameter were uſually more capacious; and by the two principal of theſe the emperor, the ſenate, and other perſons of diſtinction, were conducted to their ſeats on a place which was called the *podium*. The other two led to the arena, and by theſe the gladiators and beaſts made their entrance. The various ranks of the people paſſed by to the ſtaircaſes, which led to their reſpective ſeats. The doors which opened from the ſtaircaſes were called *vomitories*, and varied in magnitude, according to the extent of the amphitheatre, and the number of exterior arches. The number of ſeats between the ſeveral vomitories was unequal, and ſeems to have been ſubject to no poſitive regulation. Theſe benches were about one foot and eight inches in height, and about two feet four inches in breadth. A platform four feet eight inches broad was formed of one of theſe benches, which ſerved as a circular communication to the whole building. Theſe obtained the name of *precinctions*, and the boundaries on the ſide were called *belts*. The latter were ſurmounted by balluſtrades, to protect the perſons from falling who occupied

Amphitheatre.

occupied the benches in the vicinity. The podium was more ſpacious than the precinctions, and was a platform encircling the arena. From one precinction to the belt of another, a flight of ſtairs two feet ſix inches in breadth deſcended oppoſite to every vomitory. Small canals were cut in the tops of the benches, by which the rain and urine were conducted from bench to bench, until they reached the inſtruments prepared to convey them to the drains below. Theſe ſtairs radiated from the higheſt bench to the podium; ſo that, with the precinctions, they ſeparated the whole cavity into wedge-like diviſions, which the people occupied according to their rank.

The amphitheatre called the *Coliſeum*, was of an elliptical form, whoſe longeſt diameter was about 615 Engliſh feet ſix inches, and the ſhorteſt 510. The length of the diameter of the arena was about 281 feet, and the breadth 176, reſerving a ſpace for the ſeats and galleries of about 157 feet in breadth. The external circumference covered a ſuperficies of about five acres and a half, and could ſcarcely be included in a parallelogram of ſeven acres. Three ſtories of arcades, adorned with columns of the Doric, Ionic, and Corinthian orders, and encloſed with a pilaſtrade of the Corinthian order, compoſed the external elevation. The firſt ſtory roſe about four feet from the ground, and the pavement ſupported the baſis of the columns. The columns which ſupported the upper ſtories were placed upon pedeſtals. A ſtylobata ſupported the pilaſtrade, in which were the windows of an intermediate gallery, and in every ſecond interpilaſter was a window to illuminate the higheſt gallery. A cantaliver cornice, perforated with ſquare holes, through which the erect pieces of wood paſſed that ſupported the awning to a range of corbels, about the centre of the pilaſtrade, crowned the building. Theſe various columns, pilaſters, and ſtories, appear to have been continued without interruption around the whole edifice. The height of the firſt ſtory is about 33 feet ſix inches, the ſecond about 39, and the third about 38; the pilaſtrade about 46; and the whole, including the blocking courſe and the ſteps, was about 164 feet in height.

An ellipſis of 80 open arches formed the exterior circuit of the ground plan; the piers, with three-quarter columns in front, of about two feet 10 inches diameter. The four which correſponded to the four ſemi-diameters formerly mentioned, were about 14 feet two inches, and 76 of the arches were about 13 feet eight inches. Theſe arches led to a large double corridor, that encircled the whole; this corridor is a magnificent and diſtinguiſhing feature in the Coliſeum theatre. Square openings in the precinction above, illuminated the interior corridor, and the corridor which was united with the wall of the podium appears to have been illuminated in a ſimilar manner. A double corridor was ſeen on the floor of the ſecond ſtory directly above the corridor of the lower floor, and an interior corridor, which ſent forth ſtairs leading to a range of vomitories on the one hand, and on the other hand an intermediate corridor which formed a mezzanine floor above the double corridor of the interior circuit. Here the ſtairs began to aſcend to the next ſtory, and ſquare holes in the upper floor enlightened this gallery. A double corridor formed the third ſtory, and it appears that here the ſtairs commenced that led to the galleries above. There were alſo ſome windows in the interior wall, and vomitories which opened to the uppermoſt cunei of benches. In a ſimilar manner were other three ſtories conſtructed and filled above the whole, compoſing a moſt magnificent and ſpacious ſtructure. Amphitheatre.

Juſtus Lipſius ſuppoſes that this amphitheatre was capable of containing 87,000 ſpectators on the benches; and Fontana adds 22,000 for the galleries and other paſſages. Upon a fair calculation it appears, that if all was crowded, it might contain about 80,000. This magnificent ſtructure certainly excelled both the monuments of Grecian and Egyptian genius which have reached our times. When this amphitheatre was in its glory, and crowded with Romans, the ſight muſt have been magnificent and ſtriking. If the report is accurate, that this was completed in two years and nine months, it affords an aſtoniſhing inſtance of Roman vigour and perſevering induſtry. Beſides former depredations, Michael Angelo removed near the one half of the external wall to build the Palazzo Farneſe. To prevent theſe depredations, Pope Benedict XIV. conſecrated theſe ruins, and erected ſeveral altars, which were much frequented on the Sundays and Fridays, before the revolution in France. To guard theſe relicks, a hermit was ſtationed in a ſmall dwelling near the centre.

The different kinds of amuſement have already been mentioned during the progreſs of the hiſtory. Gladiators contended together, or entered the liſts with wild beaſts. Theſe wild animals were hunted or encountered, or left to devour each other, according to the humour of the times or the taſte of him who gave the entertainment. It appears alſo, that criminals were ſometimes forced to fight with theſe ferocious creatures for the entertainment of the people of Rome; and, in the dawn of Chriſtianity, many of the Chriſtians ſuffered death in this brutal manner. It is alſo reported, that artificial mountains were ſometimes conſtructed with caves below, from whence theſe devouring animals ruſhed forth to attack their prey. Amuſements.

Information concerning the laws that regulated the amphitheatre is rather ſcanty; but the following are among the number. In the centre of one ſide of the podium was the emperor's ſeat, called the *ſuggeſtum*, and highly adorned. The remainder of the podium was occupied by ſenators; and when this ſpace was not ſufficient, ſeveral of the adjacent wedges were appropriated to the other ſenators and to perſons of diſtinction. The equeſtrians, and the civil and military tribunes, had their places next aſſigned them. From this order both the liberti and the legati were excluded. The married men ſat by themſelves. The young men were alſo arranged by themſelves, and their tutors ſat near them to obſerve their conduct. The attendants and ſervants occupied the higheſt gallery. The veſtals were ſeated, and frequently the princeſſes and the ladies of diſtinguiſhed rank ſat along with them. The front of the gallery was aſſigned to the women, who were placed on chairs, and the loweſt order of plebeians ſtood behind them. It appears alſo, that for the better accommodation of the people, the different tribes had particular wedges allotted to them. It is alſo proper to remark, that the arrangements in the different provinces, was different from that of Rome

Amphitheatre ‖ Amphorarium.

as circumſtances varied. The general direction of the amphitheatre was under the care of an officer, named *villicus amphitheatri*; and different officers who were called *locarii*, had the direction of the cunei. By carefully preventing any perſon from occupying a place to which he was not entitled, all confuſion was prevented, and ſtrict order maintained.

Remains.

The means uſed by Pope Benedict to preſerve the Coliſeum at Rome, have already been mentioned. Of one which was erected at Verona, only four arches of the external circuit remained in the commencement of the eighteenth century. Theſe conſiſt of three ſtories of about 90 Engliſh feet. The whole building was erected without cement, and joined and ſecured by iron cramps, overlaid with lead. The whole ſuperficies is about four acres and nearly one third. One has been erected at Nimes, which has ſuffered much dilapidation; but the remains are yet worthy of the attention of the traveller. In the year 1533, Francis I. gave orders to have the rubbiſh removed; but his misfortunes prevented this order from being carried into execution. Louis XVI. iſſued a ſimilar order, but the work is not yet finiſhed. This amphitheatre is ſaid, by Governor Pownall, to be occupied with houſes arranged in the form of ſtreets, and reſembles a ſmall walled town. The galleries are converted into wretched dwellings, but the exterior gallery of the ſecond ſtory, and that of the attic, were in their original ſtate.

At Pola in Iſtria, there are the remains of an amphitheatre built on the declivity of a hill. The whole of the exterior circuit was ſtanding, except a few yards of the parapet, when Maffei viſited theſe remains. It was erected of ſtone, with cramps of iron; and all the benches and other parts conſtructed of wood, have been deſtroyed.

AMPHITHEATRE, in *Gardening*, certain diſpoſitions of trees and ſhrubs on the ſides of hilly places, which, if the hill or riſing be naturally of a circular figure, always have the beſt effect. They are to be formed of evergreens, ſuch as hollies, phillereys, lauruſtines, bays, and ſuch plants, obſerving to plant the ſhorteſt growing trees in the front, and thoſe which will be the talleſt behind, ſuch as pines, firs, cedars of Lebanon, &c.

Amphitheatres are alſo ſometimes formed of ſlopes on the ſides of hills, covered only with turf; and, when well kept, they are a great ornament to large gardens.

AMPHITRITE, (from αμφιτρεπω, *circumferendo*), in the *Heathen Mythology*, the wife of Neptune, and goddeſs of the ſea, ſometimes taken for the ſea.

AMPHITRYON, ſon of Alcæus, and the father of Hercules, leſs known by his own exploits than from his wife Alcmena's adventure. See ALCMENA.

AMPHORA, in *Antiquity*, a liquid meaſure among the Greeks and Romans. The Roman amphora contained 48 ſextaries, equal to about ſeven gallons one pint Engliſh wine meaſure; and the Grecian or Attic amphora contained one-third more.

AMPHORA was alſo a dry meaſure uſed by the Romans, and contained about three buſhels.

AMPHORA, among the *Venetians*, is the largeſt meaſure uſed for liquids, containing about 16 quarts.

AMPHORARIUM VINUM, in *Antiquity*, denotes that which is drawn or poured into *amphoræ* or pitchers; by way of diſtinction from *vinum doliare*, or caſk wine.—The Romans had a method of keeping wine in *amphoræ* for many years to ripen, by faſtening the lids tight down with pitch or gypſum, and placing them either in a ſituation within reach of ſmoke, or under ground.

Amphotides ‖ Ampſaga.

AMPHOTIDES, in *Antiquity*, a kind of armour or covering for the ears, worn by the ancient pugiles, to prevent their adverſaries from laying hold of that part.

AMPHRYSUS, or AMPHRYSSUS, in *Ancient Geography*, a river of Phthiotis, a diſtrict of Theſſaly, running by the foot of Mount Othrys, from ſouth to north, into the Enipeus at Thebes of Theſſaly; where Apollo fed the herds of King Admetus (Virgil, Lucan). Another Amphryſus in Phrygia, rendering women barren, according to Pliny: Hence the epithet *Amphryſiacus* (Statius). Alſo a town of Phocis, at the foot of Mount Parnaſſus, encompaſſed with a double wall by the Thebans in the war with Philip (Pauſanias): *Amphryſia Vates*, in Virgil, denotes the Sibyl.

AMPHTHILL, a town of Bedfordſhire in England, ſituated pleaſantly between two hills, near the centre of the county, but in a barren ſoil. W. Long. 0. 29. N. Lat. 52. 2.

AMPLIATION, in a general ſenſe, denotes the act of enlarging or extending the compaſs of a thing.

On a medal of the emperor Antoninus Pius, we find the title *Ampliator civium* given him, on account of his having extended the *jus civitatis*, or right of citizenſhip, to many ſtates and people before excluded from that privilege. In effect, it is generally ſuppoſed to have been this prince that made the famous conſtitution, whereby all the ſubjects of the empire were made citizens of Rome.

AMPLIATION, in *Roman Antiquity*, was the deferring to paſs ſentence in certain cauſes. This the judge did, by pronouncing the word *amplius*; or by writing the letters N. L. for *non liquet*; thereby ſignifying, that, as the cauſe was not clear, it would be neceſſary to bring further evidence.

AMPLIFICATION, in *Rhetoric*, part of a diſcourſe or ſpeech, wherein a crime is aggravated, a praiſe or commendation heightened, or a narration enlarged, by an enumeration of circumſtances; ſo as to excite the proper emotions in the ſouls of the auditors. Such is the paſſage in Virgil, where, inſtead of ſaying merely that Turnus died, he amplifies the circumſtances of his death:

—Aſt illi ſolvuntur frigore membra,
Vitaque cum gemitu fugit indignata ſub umbras.

The maſters of eloquence make an amplification to be the ſoul of diſcourſe. See ORATORY.

AMPLITUDE, in *Aſtronomy*, an arch of the horizon intercepted between the eaſt or weſt point and the centre of the ſun, or a planet, at its riſing or ſetting; and ſo is either north and ſouth, or ortive and occaſive.

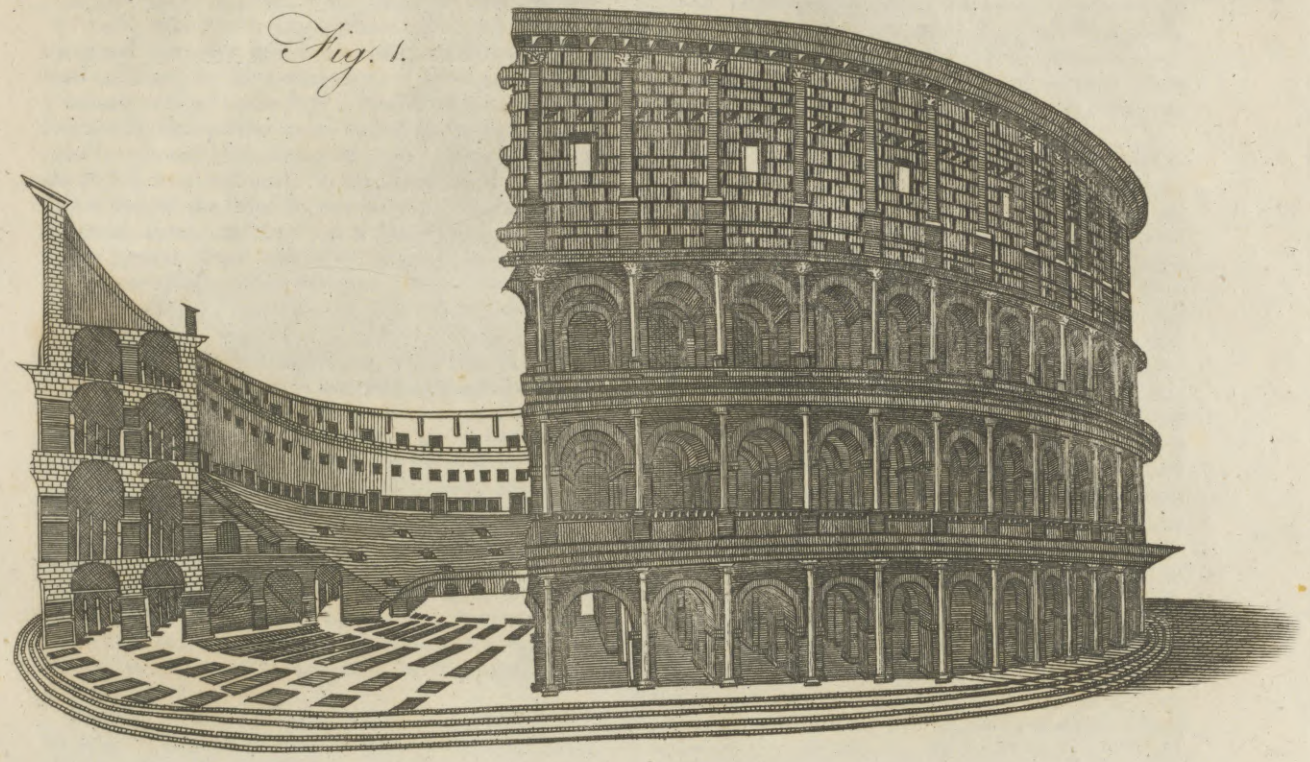
Magnetical AMPLITUDE, the different riſing or ſetting of the ſun from the eaſt or weſt points of the compaſs. It is found by obſerving the ſun, at his riſing and ſetting, by an amplitude compaſs.

AMPSAGA, a river of ancient Numidia. See ALGIERS.

AMPSANCTI

Vespasian's Amphitheatre which contain'd eighty-seven thousand spectators.

Fig. 1.



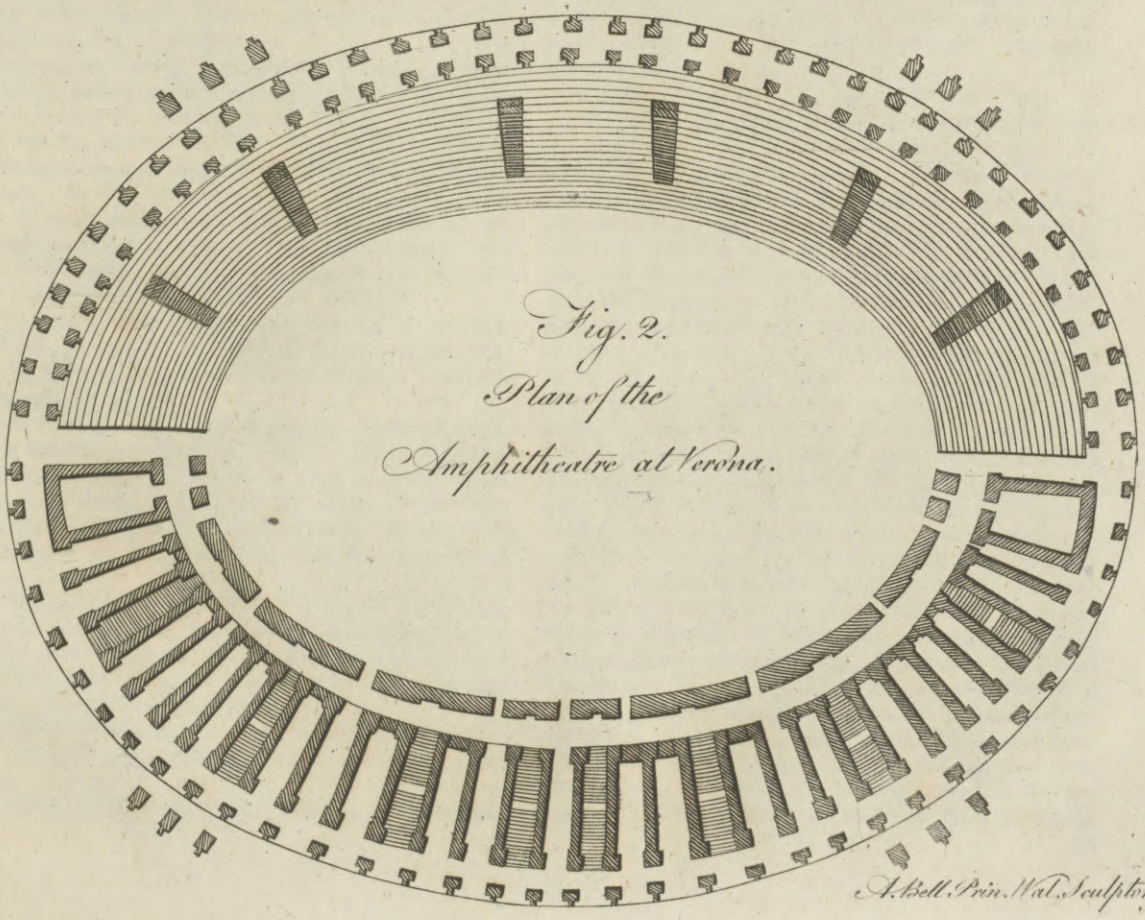
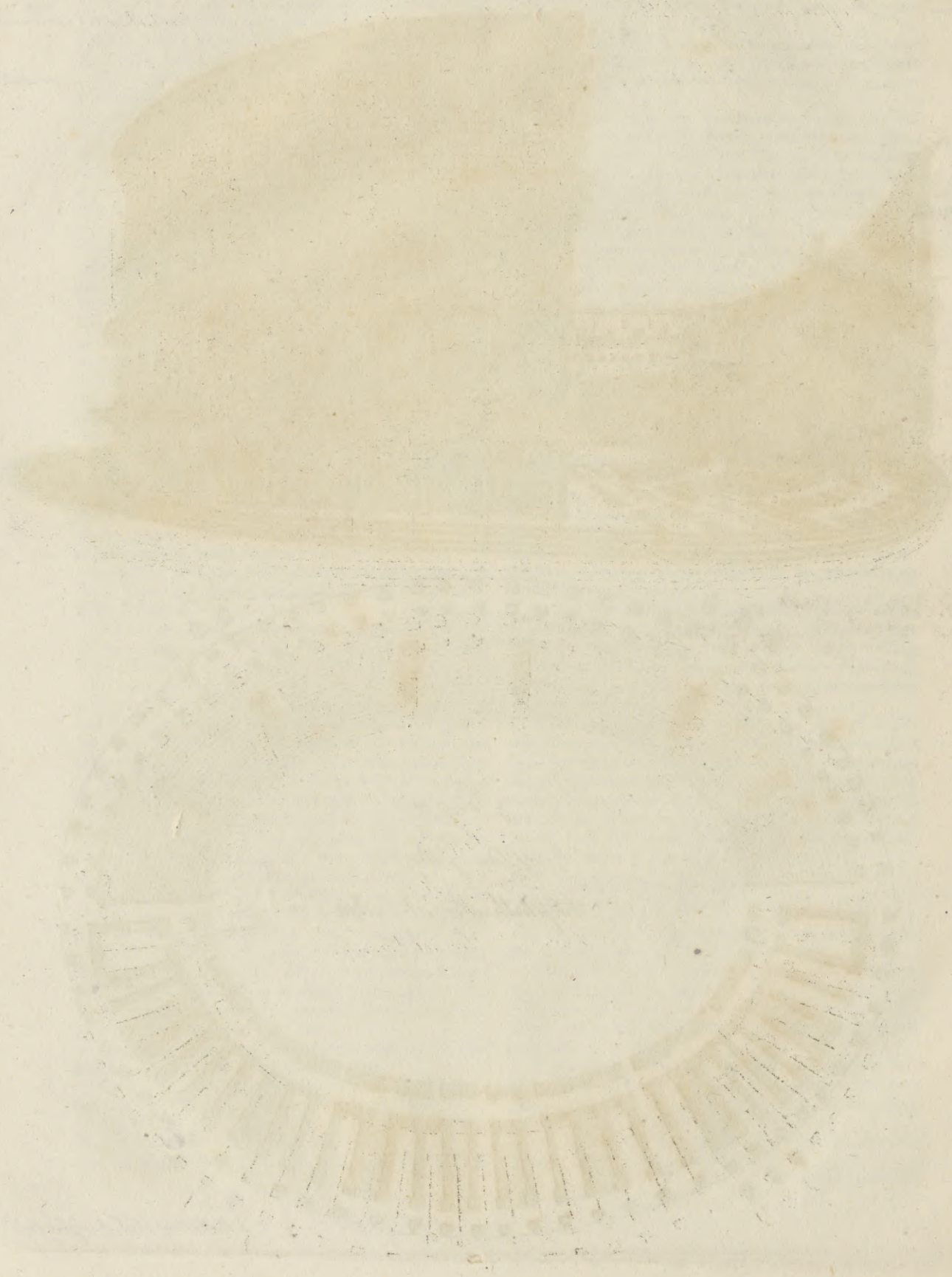


Fig. 2.
Plan of the
Amphitheatre at Verona.

A. Bell. Prin. Wal. Sculptor fecit.



Ampſancti Lacus || Amraphel.

AMPSANCTI VALLIS, or AMPSANCTI LACUS, a cave or lake in the heart of the Hirpini, or Principato Ultra, near the city Tricento (Cicero, Virgil, Pliny); it is now called *Moffeta*, from Mephitis, the goddeſs of ſtench, who had a temple there. The ancient poets imagined that this gulf led to hell. The Moffeta is thus deſcribed by Mr Swinburne: "We were led into a narrow valley, extending a conſiderable way to the ſouth-weſt, and preſſed in on both ſides by high ridges thickly covered with copſes of oak. The bottom of the dell is bare and arid: in the loweſt part, and cloſe under one of the hills, is an oval pond of muddy aſh-coloured water, not above 50 feet in diameter: it boils up in ſeveral places with great force in irregular fits, which are always preceded by a hiſſing ſound. The water was ſeveral times ſpouted up as high as our heads in a diagonal direction, a whirlpool being formed round the tube, like a baſon, to receive it as it fell. A large body of vapour is continually thrown out with a loud rumbling noiſe. The ſtones on the riſing ground that hangs over the pool are quite yellow, being ſtained with the fumes of ſulphur and ſal ammoniac. A moſt nauſeous ſmell riſing with the ſteam obliged us to watch the wind, and keep clear of it, to avoid ſuffocation. The water is quite inſipid both as to taſte and ſmell; the clay at the edges is white, and carried into Puglia to rub upon ſcabby ſheep, on which account the lake is farmed out at 100 ducats a-year. On a hill above this lake ſtood formerly a temple dedicated to the goddeſs Mephitis; but I perceived no remains of it."

AMPULLA, in *Antiquity*, a round big-bellied veſſel which the ancients uſed in their baths, to contain oil for anointing their bodies; alſo the name of a cup for drinking out of at table.

AMPULLA, among *Eccleſiaſtical Writers*, denotes one of the ſacred veſſels uſed at the altars. Ampullæ were alſo uſed for holding the oil uſed in chriſmation, conſecration, coronation, &c. Among the ornaments of churches we find frequent mention made of ampuls or vials. In the inventory of the cathedral of Lincoln we meet with ampuls of cryſtal, variouſly enriched with ſilver feet and covers; one containing a tooth of St Chriſtopher, another a tooth of St Cecily, another a bone of the head of St John Baptiſt.

Knights of St AMPULLA, belong to an order inſtituted by Clovis I. king of France; at the coronation they bear up the canopy under which the ampulla is carried in proceſſion.

AMPURA, a province of the kingdom of Peru, before its conqueſt by the Spaniards. Here the inhabitants worſhipped two lofty mountains from a principle of gratitude, becauſe of the deſcent of the water from them by which their lands were fertilized. It is ſaid to have been conquered by Virachoca the eighth inca.

AMPURIAS, the capital of the territory of Ampurdan, in Catalonia, ſeated at the mouth of the river Fluvia, in E. Long. 2. 56. N. Lat. 42. 5. The land about it is barren, full of briars and bulruſhes, except in ſome places, which produce flax.

AMPUTATION, in *Surgery*, the cutting off a limb, or any part, from the body. See SURGERY *Index*.

AMRAPHEL, the king of Shinar, or Babylonia, confederated with Chedorlaomer, king of the Elamites, and two other kings, to make war againſt the kings of Pentapolis; that is to ſay, of Sodom, Gomorrah, and the three neighbouring cities. The kings who were in league with Amraphel worſted thoſe of Pentapolis, plundered their city, and carried off abundance of captives, among whom was Lot, Abraham's nephew: but Abraham purſued them, retook Lot, and recovered all the ſpoil. See ABRAHAM.

Amras, Amru-ebn-al-as.

AMRAS, a ſtrong caſtle of Germany, ſeated in Tirol; by ſome German writers called *Arx Ambroſiana*, which was a houſe of pleaſure for the archdukes to retire to in the heat of the ſummer. By others this fort is called *Ombraſs*; a name derived from the deſign of it, which was to be a ſhady ſummer-houſe. It is moſt delightfully ſituated at the foot of a mountain, but has no great external beauty. All the furniture of ordinary uſe has been carried away; yet it is ſtill remarkable for its galleries, which contain a very large collection of antiquities, and both natural and artificial curioſities. It excels all others in its curious collection of armour and coats of mail, many of which belonged to very great men. There is alſo a great collection of gold medals, which weigh, as they affirm, about 16 pounds; there are alſo 3000 cameos and intaglios, but few of them very fine. A great part of theſe antiquities were ſent to this place by Charles V. On the walls and ceiling there are ſome very good paintings; and, among the reſt, they have an admirable picture of Noah's ark, done by Baſſano, for which the grand duke of Tuſcany is ſaid to have offered 100,000 crowns. They have a library, which is not in very good order; and a gallery full of buſts and other pieces of antiquity, beſides many other apartments adorned with pictures of great value. E. Long. 11. 40. N. Lat. 47. 0.

AMRU-EBN-AL-AS, one of the moſt famous of the firſt race of Saracen leaders, was deſcended of Aaſi, of the tribe of Koreiſh, by a notorious proſtitute. In his youth he indulged in poetry, and wrote ſatirical verſes againſt the perſon and doctrine of Mahomet. His zeal in oppoſing the new religion prompted him to undertake an embaſſy to the king of Ethiopia, to ſtimulate him againſt the converts whom he had taken under his protection. It is uncertain by what arguments he was induced to change his religious ſentiments; but he returned a convert to the Mahometan faith, and, along with Caled, joined the fugitive prophet at Medina. The military talents of Amru had begun to attract general attention when Abubeker reſolved to make a new attack upon Syria, in which he obtained the chief command. After ſeveral diſplays of his military valour and addreſs in ſome ſucceſsful enterpriſes, he roſe to the elevated ſtation of chief in Irak, when Caled requeſted the attendance of all the Arabian generals before Damaſcus. During the caliphate of Omar, he alſo ſerved in Paleſtine, under Abu Obeidah. While beſieging Cæſarea, he held a memorable conference with Conſtantine, the ſon of the emperor Heraclius. Hiſtorians mention that their time was chiefly occupied in producing genealogical arguments to prove the affinity of the Greeks and Arabians, and the conſequent rights of the latter as their deſcendants. Amru concluded with the candid declaration, "That the Arabians were tired of living

Amru-ebn-al-as.

in their ſcorching deſerts, and were reſolved to re-enter into the poſſeſſion of the delightful country which was the inheritance of their forefathers." He withdrew from the conference, after denouncing perpetual enmity againſt the Greeks, unleſs they ſhould either become converts to the Mahometan faith or tributaries to that government. In the year of the Hegira 17, A. D. 638, Amru took Cæſarea, and reduced to ſubjection all the maritime towns of Syria.

After the death of Obeidah, Amru aſſumed the chief command in Syria, in which he was confirmed by the caliph, notwithſtanding the oppoſition of Othman. An expedition againſt Egypt being formerly reſolved upon, Amru wrote to the caliph, informing him that he would inſtantly march into Egypt. During the progreſs of his march, attended only by 4000 Arabs, a meſſenger from Omar arrived with a letter, containing directions to return, if he ſhould receive this letter in the territories of Syria; but if he ſhould receive it in thoſe of Egypt, he might advance, and all needful aſſiſtance would be inſtantly ſent him. Anticipating the contents, he haſtened on to the frontiers of Egypt, and there collecting his principal officers, he opened and read the inſtructions of the caliph. Then requeſting ſome of the inhabitants to be brought before them, and enquiring at them in what country they were, and being informed that they were in Egypt, Amru replied, "Let us, then, continue our march." Having taken Pharma, he advanced to Miſrah, the ancient Memphis, and beſieged it during the ſpace of ſeven months. Although numerous reinforcements arrived, he would have found it very difficult to ſtorm the place previous to the inundation of the Nile, if Mokawkas had not treacherouſly leſſened the forces of the citadel, which was accordingly taken by ſtorm; and the Greeks who remained there were either made priſoners or put to the ſword. On the ſame ſpot Amru erected a city named Foſtat, the ruins of which are now known by the name of Old Cairo. The Coptic Chriſtians, who compoſed the great majority of the Egyptian natives, and who were enemies to the Catholic Greeks, after this victory ſubmitted to Amru, and engaged to provide quarters and ſupport for the Muſſulman army.

Amru purſued the Greeks to Alexandria, and, after an obſtinate and bloody ſiege of 14 months, the city was taken, A. D. 640. During the ſiege, the general, along with one of his officers and a ſlave, was taken priſoner, and brought before the governor, who was at that time ignorant of the value of his priſoner. The manner, however, in which the general at firſt conducted himſelf induced the governor to ſuppoſe that he was a perſon of rank, therefore he ordered him to be beheaded. This order would have immediately been carried into effect, had not the ſlave, who underſtood the Greek tongue, in which the command was given, fortunately chaſtiſed the imprudent language of Amru by giving him a box on the ear. This circumſtance changed the mind of the governor, and obtained a repeal of his order. By an engagement to propoſe an accommodation, the captive officer obtained the releaſe of all the three; and the acclamations of the army on the return of their general firſt informed the governor of his egregious miſtake. Amru prevailed upon his ſoldiers to refrain from the pillage of Alexandria, and to content themſelves with the preſervation of the money, jewels, and other valuable articles, to defray the expence of the war. Amru was diſpoſed to preſerve the famous library, and to have given it in a preſent to John the grammarian, but, by the command of the caliph, he was obliged to commit it to the flames. If the relation is not exaggerated, ſuch was the number of books in that famous library, that they afforded fuel to 5000 baths during the ſpace of ſix months.

Amru-ebn-al-as.

The capital being taken, all Egypt ſoon fell into the hands of the conqueror. Amru obſerved a wiſe and equitable policy, although his pecuniary demands were great. Egypt became the ſtorehouſe to famiſhing Arabia, and camels carrying proviſions covered the whole road from Memphis to Medina. Amru alſo employed his army in opening the canal from the Nile to the Red ſea. The adjacent parts of Africa next felt the conquering power of Amru, but, upon the elevation of Othman, he was ſucceeded in the government of Egypt by Abdallah-ebn-Said. The inhabitants were ſo diſpleaſed with this change, that they formed a confederacy, and delivered up the city to a Grecian fleet. Amru was diſpatched in haſte to retake Alexandria, which, after an obſtinate defence, was taken with great ſlaughter. The general at length interpoſing his authority, the ſlaughter was ſtopped, and upon the ſpot where the maſſacre ceaſed the *Moſque of Mercy* was erected. To prevent future rebellion, he diſmantled the town, and was again ſucceeded by Abdallah; and he himſelf retired to Medina.

When Ali aſcended the throne, he became an adverſary, and united himſelf to the intereſt of Moawiyah, whom he acknowledged caliph, and ſwore allegiance to him. Ali propoſed to decide the quarrel by ſingle combat, and the valour of Amru inclined him to urge his maſter to accept of the propoſal; but Moawiyah poſitively declined the challenge. Amru, however, continued firm to the intereſt of Moawiyah, and took poſſeſſion of Egypt in his name, having defeated the governor of Ali. About this time, he fortunately eſcaped aſſaſſination by the hands of the frantic Charegites, who had marked him out as one of the three who, by their death, was to reſtore peace to the contending parties. The aſſaſſin waited his arrival at the moſque, but being prevented by a fit of the colic, his friend who was ſent to officiate for him was ſlain in his ſtead.

In the year 663, of the Hegira 43, he died in his government of Egypt, highly eſteemed, and much regretted by his countrymen. In a pathetic oration to his children on his deathbed, he bitterly lamented his youthful offence in ſatirizing the prophet, although Mahomet had forgiven the offence, and had frequently affirmed "that there was no Muſſulman more ſincere and ſtedfaſt in the faith than Amru." It is reported, that one day the caliph deſired to ſee the ſword of Amru, which had cut in pieces ſo many Chriſtians. Amru drew his ſword, which was a ſhort and common ſcymitar; and when Omar manifeſted ſigns of unuſual ſurpriſe, he exclaimed, "Alas! the ſword itſelf, without the arm of its maſter, is neither ſharper nor more weighty than the ſword of Pharezdak the poet." The greatneſs of the man, the firmneſs of the friend, the valour of the general, the policy of the ſtateſman, and the

Amſancti ‖ Amſterdam.

the ſanctity of the Mahometan moraliſt, were united in the character of Amru. (*Mod. Univ. Hiſt. Gen. Biog.*)

AMSANCTI. See AMPSANCTI.

AMSBURY, or AMBERSBURY. See AMBRESBURY.

AMSDORFIANS, in *Church Hiſtory*, a ſect of Proteſtants in the 16th century, who took their name from Amſdorf their leader. They maintained, that good works were not only unprofitable, but were obſtacles to ſalvation.

AMSTERDAM, the capital city of the province of Holland and of the United Netherlands, is ſeated on the river Amſtel and an arm of the ſea called the *Wye*. The air is but indifferent, on account of the marſhes that ſurround it, and render the city almoſt inacceſſible: but this inconvenience is abundantly recompenſed by the utility of its commerce, which the port ſerves greatly to promote; for it will contain above 1000 large ſhips.

In 1204, it was nothing but a ſmall caſtle, called *Amſtel* from the name of the river, which its lords made a retreat for fiſhermen, who at firſt lived in huts covered with thatch: but it ſoon became conſiderable, and had a bridge and towers built about it, inſomuch that it roſe to a ſmall city; though, till the year 1490, it was ſurrounded with nothing but a weak palliſado. The walls were then built with brick, to defend it from the incurſions of the inhabitants of Utrecht, with whom the Hollanders were often quarrelling; but ſome months afterwards it was almoſt reduced to aſhes. In 1512, it was beſieged by the people of Guelderland; who not being able to take it, ſet fire to the ſhips in the harbour. In 1525, an Anabaptiſt leader, with 600 of his followers, got into the city in the night-time, attacked the townhouſe, and defeated thoſe that made any reſiſtance. At length they barricaded, with wool and hop ſacks, the avenues to the market place, where theſe enthuſiaſts were poſted; and ſo put a ſtop to their fury till day appeared, at which time the citizens fell upon them on all ſides, and forced them to retire into the townhouſe, where moſt of them were cut to pieces. About ten years after, there was another tumult raiſed by a parcel of fanatics, conſiſting of men and women, who ran about the ſtreets ſtark naked, and had a deſign of making themſelves maſters of the townhouſe. Their ſhrieks and cries, which were dreadful enough, ſoon alarmed the inhabitants, who ſeized the greateſt part of them, and gave them the chaſtiſement they deſerved.

Amſterdam was one of the laſt cities that embraced the reformed religion. It was beſieged by the Hollanders in 1578, and ſubmitted after a ſiege of ten months. One article of the capitulation was, a free exerciſe of the Roman Catholic religion: but this was not obſerved by the Proteſtants; for they ſoon drove the eccleſiaſtics, monks, and nuns, out of the city, broke the images, and demoliſhed the altars. From this time it became the general rendezvous of all nations and of every ſect, which raiſed it to that degree of grandeur and opulence it now enjoys. The inhabitants were often obliged to enlarge the bounds of their city, and in 1675 it was increaſed to its preſent extent. It was ſurrounded with a brick wall, and a large ditch 80 feet broad full of running water. The walls were fortified with 26 baſtions, on each of which there is now a wind-mill. There are eight gates towards the land, and one towards the water. Amſterdam.

Amſterdam being ſeated on a marſhy ſoil, is built on piles of wood; for which reaſon no coaches are allowed, except to great men and phyſicians, who pay a tax for that privilege; and all kinds of goods are drawn on ſledges. It ſtands ſo low, that they would be expoſed to inundations, if they did not ſecure themſelves by dykes and ſluices. The fineſt ſtreets are, the Keyſar's Graft, or Emperor's Canal; the Heer Graft, or Lords Canal; the Cingel; and the ſtreet of Haerlem. The principal canal is remarkable for its houſes, which are magnificent ſtructures of an equal height. Here are three prodigious ſluices, and a great number of canals which croſs the city in many parts, and render the ſtreets clean and pleaſant. The canals are deep, their ſides are lined with hewn ſtone, they have generally rows of trees planted on each ſide, and many ſtone bridges over different parts of them.

The fineſt is that called the *Amarrack*, which is formed by the waters of the Amſtel, into which the tide comes up, and on the ſides of which are two large quays. This canal has ſeveral bridges. The principal is that next the ſea, called *Pont Neuf*, or the *New Bridge*: it is 600 feet long, and 70 broad, with iron baluſtrades on each ſide; it has 36 arches, of which 11 are very high, and eight are ſhut up to encloſe the yachts. From this bridge there is a moſt charming proſpect of the city, port, and ſea. The port is a mile and a half in length, and above 1000 paces in breadth. It is always filled with a multitude of veſſels, which look like a foreſt, or rather a floating city. The ſtreets in general are well paved, and the houſes built of brick or ſtone. Towards the ſides of the haven, the city is encloſed with great poles driven into the ground, which are joined by large beams placed horizontally. There are openings to let the ſhips in and out, which are ſhut every night at the ringing of a bell.

Amſterdam is computed to be half as big as London, including the fortifications, and almoſt as populous in proportion. There are people here of almoſt every nation and religion in Europe, who are all tolerated in their reſpective perſuaſions; but none admitted to any ſhare in the government except the Calviniſts. There are 11 churches for the Dutch of the eſtabliſhed or Calviniſtical religion, with two French and one High Dutch. The Engliſh have alſo three churches in this city: one for the Preſbyterians, whoſe miniſters are paid by the magiſtrates; a ſecond for thoſe of the church of England, whoſe miniſter is paid by his Britannic Majeſty; and a third for the Browniſts, who maintain their own miniſters. None but the Calviniſts are allowed to have bells, and their miniſters are maintained by the magiſtrates. All theſe churches or congregations make up only a third part of the inhabitants of the city. The Roman Catholics, who have 27 houſes or chapels for their worſhip, form another third part. Here they have a long ſquare of houſes for their beguines (a kind of nuns) to live in; who are not ſhut up in cloiſters as other nuns in Roman Catholic countries, but have liberty to walk abroad, and may even marry when they are tired of this kind of life. Theſe chapels of the Roman Catholics have no bells allowed

Amſterdam.

lowed them, being looked upon as conventicles, and may be ſhut up and opened according as the government pleaſes. The other third part of the city is made up of Jews, Lutherans, Arminians, Anabaptiſts, &c. none of whom, as was ſaid of the Roman Catholics, are allowed to have bells in their churches. Thoſe who marry, and are not of the eſtabliſhed religion, are obliged to be joined firſt by the magiſtrates, and then they may perform the ceremony in their own aſſemblies. The Jews, who are very conſiderable in this place, have two ſynagogues; one of which, namely the Portugueſe, is the largeſt in Europe. Within the court yard, where their ſynagogue ſtands, they have ſeveral rooms or ſchools, where their children are taught Hebrew, and very carefully inſtructed in the Jewiſh religion.

The moſt remarkable of the religious buildings is the New Church, dedicated to St Catharine. It was begun in the year 1408, others ſay 1414; and was 100 years of building. It had the misfortune of being burnt in the year 1645, but was in a ſhort time after built in a more magnificent manner. The foundation of a ſteeple is laid before this church, which was deſigned to be very high. The piles on which it was to be erected are not above 100 feet ſquare, and yet they are 6334 in number, and thoſe very large. Nevertheleſs it was thought that theſe vaſt piles, or rather the ground, were not able to ſupport the prodigious weight they intended to lay upon it; for which reaſon the ſteeple remains unfiniſhed. The pulpit is a maſterpiece of the kind, where the four evangeliſts and many other curious pieces of ſculpture are repreſented. The glaſs windows are adorned with paintings, among which the emperor Maximilian is deſcribed, preſenting an imperial crown to the burgomaſters of Amſterdam for the creſt of the arms of this city. The organ is very large, and reckoned one of the beſt in the world. It has a ſet of pipes that counterfeit a chorus of voices, and has 52 whole ſtops beſides half ſtops, with two rows of keys for the feet, and three rows of keys for the hands. Thoſe who hear it play for the firſt time imagine they hear a human voice. The grate dividing the chancel from the body of the church is all of Corinthian braſs. The branches of candleſticks are the richeſt in the Seven Provinces. There is a very fine marble monument erected to Admiral Ruyter, who was killed at Meſſina.

The public buildings of a civil nature are very magnificent. The ſtadthouſe was founded in 1648. It is built upon 14,000 wooden piles; and its front is 282 feet long, its ſides 255 feet, and its height to the roof 116. There is a marble pediment in the front, whereon a woman is carved in relievo, holding the arms of the city; ſhe is ſeated in a chair, ſupported by two lions, with an olive branch in her right hand; on each ſide are four Naiads who preſent her with a crown of palm and laurel, and two other marine goddeſſes preſent her with different ſorts of fruit; beſides, there is Neptune with his trident, accompanied with Tritons, a ſea-unicorn, and a ſea-horſe. On the top ſtand three ſtatues in bronze, repreſenting Juſtice, Strength, and Plenty. On the top of the ſtructure is a round tower, 50 feet above the roof, adorned with ſtatues, and an harmonious chime of bells, the biggeſt of which weighs about 7000 pounds, and the next 6000. They are made to play different tunes every month. It has not one handſome gate, but only ſeven doors to anſwer to the number of the United Provinces. On the floor of the great hall are two globes, the celeſtial and terreſtrial, which are 22 feet in diameter and 69 in circumference. They are made of black and white marble, and are inlaid with jaſper and copper. In general, all the chambers are enriched with paintings, carvings, and gildings. While this ſtadthouſe was building, the old one was ſet on fire, and conſumed with all the archives and regiſters.

Amſterdam.

Under the ſtadthouſe is a prodigious vault, wherein is kept the bank of Amſterdam, where there is a vaſt quantity of ingots both of gold and ſilver, as alſo bags which are ſuppoſed to be full of money. The doors are proof againſt petards, and are never opened but in the preſence of one of the burgomaſters. The priſons for debtors and criminals are likewiſe under the ſtadthouſe; as alſo the guard-room for the citizens, wherein the keys of the city are locked every night. At the end of the great hall is the ſchepens or aldermen's chamber, where civil cauſes are tried. Beſides theſe, there are the chambers of the ſenate and council, the burgomaſters chamber, the chambers of accounts, &c. In the ſecond ſtory is a large magazine of arms; and on the top of the building are ſix large ciſterns of water, which may be conveyed to any room in the houſe in caſe of fire; to prevent which the chimneys are lined with copper.

The bourſe, or exchange, where the merchants aſſemble, is all of free-ſtone, and built upon 2000 wooden piles. Its length is about 250 feet, and its breadth 140. The galleries are ſupported by 26 marble columns, upon each of which are the names of the people that are to meet there. They are all numbered; and there is a place fixed for every merchandiſe under ſome one of theſe numbers. On the right hand of the gate is a ſuperb ſtaircaſe which leads to the galleries; on one ſide of which there are ſeveral ſhops, and on the other a place to ſell clothes. It is not unlike the royal exchange in London.

The admiralty office is in a houſe which belonged formerly to the princes of Orange. The arſenal for their men of war is in the harbour. This is a very handſome building, 200 feet long and 22 broad. The ground floor is filled with bullets; the ſecond floor contains the arms and cordage; the third their ſails, pulleys, flags, &c. This arſenal contains a great many curioſities; among the reſt an Indian canoe brought from the ſtraits of Davis, and a conſervatory of water, on the top of the houſe that holds 1600 tuns of water, which may be diſtributed in caſe of fire into 16 different parts by leaden pipes. Hard by this edifice you ſee the dock or yard where they build their men of war. This dock is 508 feet long, and contiguous to it are houſes for lodging the ſhip carpenters. The dock is plentifully ſupplied with every thing neceſſary for the conſtruction of ſhips.

The Eaſt India Company occupy a large building divided into ſeveral offices or apartments. In ſome of thoſe they have great ſtores of packed goods, and likewiſe a room with all ſorts of drugs, tea, wax, ambergris, and muſk. Here they have a magazine full of medicaments for ſurgeons cheſts, to furniſh the Company's ſhips and garriſons in the Indies; as alſo

large

Amſterdam. large magazines of nutmegs, cloves, mace, and cinnamon. In the court-yard there is a guard chamber, where every night the houſekeeper has a watch; and on the other ſide of the gate there is a chemiſt, who with his men prepares medicines for the Indies; and adjoining to this court-yard is their warehouſe and packhouſe for pepper and groſs goods. In the new part of this city they have a magazine or palace, which may properly be called an *arſenal*. The ground on which this building ſtands is 2000 feet, and ſquare every way, reckoning the moats or burgwall about it. The two rope-alleys are 1800 feet long, on the backſide of which is a ſtore of 500 large anchors beſides ſmall ones. In this arſenal they build the ſhips belonging to the India chamber of Amſterdam; for which reaſon they have all ſorts of workhouſes here for the artificers that ſerve the Company.

The academy called the *Illuſtrious School*, is likewiſe a very fine building. It was formerly a convent belonging to the nuns of St Agnes. Here they teach Latin, the oriental languages, theology, philoſophy, hiſtory, &c. The lawyers and phyſicians have likewiſe their ſchools.

Beſides theſe, there are ſeveral hoſpitals, or houſes for orphans, for poor widows, for ſick perſons, and for mad people; all which are regulated with much prudence. The Raſp-houſe, which was formerly a nunnery, is now a ſort of a workhouſe for men that behave ill. They are commonly ſet to ſaw or raſp Braſil wood; and if they will not perform their taſk, they are put into a cellar which the water runs into, where if they do not almoſt conſtantly ply the pump, they run the riſk of being drowned. There is likewiſe a ſpin-houſe for debauched women, where they are obliged to ſpin wool, flax, and hemp, and do other work. All the hoſpitals are extremely neat, and richly adorned with pictures. They are maintained partly by voluntary contributions, which are raiſed by putting money into the poor's boxes fixed up all over the city; and partly by taxing all public diverſions, as well at fairs as elſewhere. Likewiſe every perſon that paſſes through any of the gates at candle-light pays a penny for the ſame uſes. Theſe charities are taken care of by certain officers called *deacons*. The governors are nominated by the magiſtrates out of the moſt conſiderable men in the city.

The common ſort have places of diverſion called *Spiel-houſes*, where there are muſic and dancing. They are much of the ſame kind as the hops which were ſo frequent about London. If ſtrangers go there, they muſt take care not to make their addreſſes to a woman that is engaged to any other man.

There are two ſuburbs to this city; one at the gate of the regulars; and the other goes as far as Overtoon, a village a little way from Amſterdam, where boats which come from Leyden are rolled over land upon wooden rollers. There is likewiſe in this city an hoſpital for thoſe that are infected with the plague; which was built in the year 1630, and has 360 windows.

This city is governed by a ſenate or council, which conſiſts of 36 perſons called a *Vroedſhap*, who enjoy their places for life; and when any of them dies, the remainder chooſe another in his ſtead. This ſenate elects deputies to be ſent to the States of Holland, and appoints the chief magiſtrates of the city called *Burgomaſters* or *Echevins*, who are like our aldermen. The Amſterdam. number is twelve; out of which four are choſen every year to execute the office, and are called *Burgomaſters-regent*. Three of theſe are diſcharged every year, to make room for three others. One of the four is kept in to inform the new ones of the ſtate of affairs, and alſo preſides the three firſt months in the year, and the others three months each; ſo that when they are in this office, they may be compared to the lord mayor of the city of London. Theſe alterations and appointments are made by their own body. They diſpoſe of all inferior offices which become vacant during their regency. They have likewiſe the direction of all public works, which regard the ſafety, tranquillity, and embelliſhment of the city. The keys of the famous bank of this city are in the hands of theſe magiſtrates.

The college conſiſts of new burgomaſters or echevins who are judges in all criminal affairs, without appeal; but in civil cauſes they may appeal to the council of the province. There are two treaſurers, a bailiff, and a penſionary. The bailiff continues in his office three years; and ſearches after criminals, takes care to proſecute them, and ſees their ſentence executed. The penſionary is the miniſter of the magiſtracy, is well verſed in the laws, makes public harangues, and is the defender of the intereſts of the city. The city of Amſterdam contributes to the public income above 50,000 livres per day, beſides the exciſe of beer, fleſh, and corn; which in all amounts to above 1,600,000l. a-year. This is more than is paid by all the reſt of the provinces put together; and yet Amſterdam bears but the fifth rank in the aſſembly of the ſtates of Holland, with this diſtinction, that whereas other cities ſend two members, this ſends four.

The militia of Amſterdam is very conſiderable. They have 60 companies, each of which has from 200 to 300 men. Jews and Anabaptiſts are excluded from this ſervice, not being admitted to bear arms: But they are obliged to contribute to the maintenance of the city-guard, which conſiſts of 1400 ſoldiers; as alſo to the night-watch, who patrole about the ſtreets and proclaim the hour. Beſides theſe, there are trumpeters on every church ſteeple, who ſound every half hour; and if there happens a fire, they ring the fire-bell, and ſhow where it is. The inhabitants have excellent contrivances to extinguiſh it ſpeedily.

The trade of Amſterdam is prodigious: for almoſt the whole trade of the Eaſt India Company centres in this city, which beſides carries on a commerce with all the reſt of the world, inſomuch that it may be called the magazine or ſtorehouſe of Europe. They import a vaſt deal of corn from the Baltic, not ſo much for preſent conſumption, as to lay up againſt times of ſcarcity. The richeſt ſpices are entirely in the hands of the Eaſt India Company, who furniſh all Europe therewith. They have vaſt quantities of military ſtores, with which they ſupply ſeveral nations; which is owing to their engroſſing moſt of the iron-works on the Rhine and other great rivers that run into Holland. Such was the ſtate of Amſterdam before the late revolution. Since that period, it has probably undergone conſiderable changes, as well in its internal government, as in its foreign connexions. The longitude of Amſterdam is 4. 30. E.; the latitude, 52. 25. N.

AMSTERDAM, or *Tongataboo*, is alſo the name of an iſland

Amſterdam. iſland in the South ſea, ſaid to have been diſcovered by Taſman a Dutch navigator. It was alſo viſited by Captain Cook. Its greateſt extent from eaſt to weſt is about 21 miles, and from north to ſouth about 13. It is broad at the eaſt end, and runs taper towards the weſt, where it turns, and runs to a point due north. It is about ſix leagues to the weſt of Middleburgh. The ſhore is ſurrounded by a coral rock, and its moſt elevated parts are not above ſix or eight yards above the level of the ſea. S. Lat. 21. 11. W. Long. 175. It is wholly laid out in plantations, in which are cultivated ſome of the richeſt productions of nature.

Here are bread-fruit, cocoa-nut trees, plantains, bananas, ſhaddocks, yams, and ſome other roots, ſugar-canes, and a fruit like a nectarine called by the natives *fighega*. There did not appear an inch of waſte ground: the roads occupied no more ſpace than was abſolutely neceſſary: the fences did not take up above four inches each; and even theſe were not wholly loſt, for in many grew ſome uſeful trees or plants: it was everywhere the ſame, change of place altered not the ſcene: nature, aſſiſted by a little art, nowhere appeared with more ſplendour than on this iſland. Water is not ſo plentiful here as at the Society iſlands; but the chief pointed out a pool of freſh water unaſked, to ſupply the ſhips with that neceſſary article. Caſuarinas, pandangs, and wild ſago palms, appear here with their various tints of green, and barringtoniæ as big as the loftieſt oaks. The bread-fruit does not, however, thrive here with the ſame luxuriance as at the Society iſlands; the coral rock, which compoſes the baſis of this ſpot, being much more thinly covered with mould.

Both men and women are of the common ſize of Europeans, and their colour is that of a lightiſh copper; they are well ſhaped, have regular features, are active, briſk, and lively. They have fine eyes, and in general good teeth, even to an advanced age. The women are the merrieſt creatures imaginable, and inceſſant talkers. In general, they appear to be modeſt; although there was no want of thoſe of a different ſtamp. Among the natives, who ſwam about the ſhip very vociferouſly, were a conſiderable number of women, who wantoned in the water like amphibious creatures, and were eaſily perſuaded to come on board perfectly naked; but none of them ventured to ſtay there after ſunſet, but returned to the ſhore to paſs the night, like the greater part of the inhabitants, under the ſhade of the wild wood which lined the coaſt. There they lighted great fires, and were heard converſing almoſt the whole night. The hair of both ſexes in general is black, but eſpecially that of the women; both ſexes wear it ſhort, except a ſingle lock on the top of the head, and a ſmall quantity on each ſide. The men cut or ſhave their beards quite cloſe; which operation they perform with two ſhells. The hair of many was obſerved to be burnt at the ends, and ſtrewed with a white powder, which was found, on examining it, to be lime made of ſhell or coral, which had corroded or burnt the hair; ſome made uſe of a blue powder, and others, both men and women, of an orange-coloured powder made of turmeric.

The dreſs of both ſexes conſiſts of a piece of cloth or matting wrapped round the waiſt, and hanging down below the knees. From the waiſt upwards they are generally naked; and it ſeems to be a cuſtom to anoint theſe parts every morning. The practice of tattowing, or puncturing the ſkin, likewiſe prevails. The men are tattowed from the middle of the thigh to above the hips; the women have it only on their arms and fingers, and on thoſe parts but very ſlightly. Their ornaments are amulets, necklaces, and bracelets, the bone, ſhells, and beads of mother-of-pearl, tortoiſe-ſhell, &c. which are worn by men as well as women. The women alſo wear on their fingers neat rings made of tortoiſe-ſhell, and pieces in their ears about the ſize of a ſmall quill: but here ornaments are not commonly worn, though all have their ears pierced. They have alſo a curious apron, made of the cocoa-nut ſhell; and compoſed of a number of ſmall pieces ſewed together in ſuch a manner as to form ſtars, half-moons, little ſquares, &c.; it is ſtudded with beads and ſhells, and covered with red feathers, ſo as to have a pleaſing effect. They make the ſame kind of cloth, and of the ſame materials, as at Otaheite, though they have not ſuch a variety, nor do they make any ſo fine; but as they have a method of glazing it, it is more durable, and will reſiſt rain for ſome time, which the other cloth would not. Their colours are black, brown, yellow, purple, and red; all made from vegetables. They make various ſorts of matting, ſome of a very fine texture, which is generally uſed for clothing; and the thick and ſtronger ſort ſerves to ſleep upon, and to make ſails for their canoes, &c. Among other uſeful utenſils, they have various ſorts of baſkets, ſome made of the ſame materials as their mats, and others of the twiſted fibres of cocoa-nuts. Theſe are not only durable, but beautiful, being generally compoſed of different colours, and ſtudded with beads made of ſhells or bones. They have many little nick-nacks among them, which ſhow that they neither want taſte to deſign, nor ſkill to execute, whatever they take in hand. Their fiſhing implements are much the ſame as in other iſlands: here was purchaſed a fiſh-net made like our caſting nets, knit of very firm though ſlender threads.

Notwithſtanding their friendly diſpoſition, theſe people have very formidable weapons; ſome of their ſpears have many barbs, and muſt be very dangerous weapons when they take effect. A large flat ſhell or breaſt-plate was purchaſed, made of a roundiſh bone, white and poliſhed like ivory, about 18 inches in diameter, which appeared to have belonged to an animal of the whale tribe.

Amſterdam, Amulet.

AMULET, a charm, or preſervative againſt miſchief, witchcraft, or diſeaſes.

Amulets were made of ſtone, metal, ſimples, animals, and in a word of every thing that imagination ſuggeſted.

Sometimes they conſiſted of words, characters, and ſentences, ranged in a particular order, and engraved upon wood, &c. and worn about the neck, or ſome other part of the body. See ABRACADABRA.

At other times they were neither written nor engraved; but prepared with many ſuperſtitious ceremonies, great regard being uſually paid to the influence of the ſtars. The Arabians have given to this ſpecies of amulet the name of TALISMAN.

All nations have been fond of amulets: the Jews were extremely ſuperſtitious in the uſe of them, to drive

Amulet, Amurat.

drive away diſeaſes: and the Miſhna forbids them, unleſs received from an approved man who had cured at leaſt three perſons before by the ſame means.

Among the Chriſtians of the early times, amulets were made of the wood of the croſs, or ribbands with a text of Scripture written in them, as preſervatives againſt diſeaſes. Notwithſtanding the progreſs of learning and refinement, there is not any country in Europe, even at this day, where they do not believe in ſome charm or other. The pope is ſuppoſed to have the virtue of making amulets, which he exerciſes in the conſecrating of *Agnus Dei's*, &c. The ſponge which has wiped his table, was formerly in great veneration as a preſervative from wounds, and from death itſelf: on this account it was ſent with great ſolemnity by Gregory II. to the duke of Aquitain.

Amulets are now much fallen from the repute they were anciently in; yet the great Mr Boyle alleges them as an inſtance of the ingreſs of external effluvia into the habit, in order to ſhow the great poroſity of the human body. He adds, that he is perſuaded ſome of theſe external medicines do anſwer; for that he himſelf, having once been ſubject to bleed at the noſe, and reduced to uſe ſeveral remedies to check it, found the moſs of a dead man's ſkull, though only applied ſo as to touch the ſkin till the moſs was warm thereby, the moſt effectual of any. The ſame Mr Boyle ſhows how the effluvia, even of cold amulets, may, in courſe of time, pervade the pores of a living animal; by ſuppoſing an agreement between the pores of the ſkin and the figure of the corpuſcles. Bellini has attempted to demonſtrate the poſſibility of the thing in his laſt propoſitions *De Febribus;* and the like is done by Dr Wainwright, Dr Keill, &c,

AMURAT, or AMURATH I. the fourth emperor of the Turks, and one of the greateſt princes of the Ottoman empire, ſucceeded Solyman in 1360. He took from the Greeks Gallipoli, Thrace, and Adrianople, which laſt he choſe for the place of his reſidence. He defeated the prince of Bulgaria, conquered Miſnia, chaſtiſed his rebellious baſhaws, and is ſaid to have gained 36 battles. This prince, in order to form a body of devoted troops that might ſerve as the immediate guards of his perſon and dignity, appointed his officers to ſeize annually, as the imperial property, the fifth part of the Chriſtian youth taken in war. Theſe, after being inſtructed in the Mahometan religion, inured to obedience by ſevere diſcipline, and trained to warlike exerciſes, were formed into a body diſtinguiſhed by the name of *Janiſſaries*, or *New Soldiers*. Every ſentiment which enthuſiaſm can inſpire, every mark of diſtinction that the favour of the prince could confer, were employed in order to animate this body with martial ardour, and with a conſciouſneſs of its own pre-eminence. The Janiſſaries ſoon became the chief ſtrength and pride of the Ottoman armies, and were diſtinguiſhed above all the troops whoſe duty it was to attend on the perſon of the ſultan.—At length the death of Lazarus, deſpot of Servia, who had endeavoured in vain to ſtop the progreſs of Amurath's arms, touched Milo, one of his ſervants, in ſo ſenſible a manner, that, in revenge, he ſtabbed the ſultan in the midſt of his troops, and killed him upon the ſpot, A. D. 1389, after he had reigned 23 years.

AMURAT II. the 10th emperor of the Turks, was the eldeſt ſon of Mahomet I. and ſucceeded his father in 1421. He beſieged Conſtantinople and Belgrade without ſucceſs; but he took Theſſalonica from the Venetians, and compelled the prince of Boſnia and John Caſtriot prince of Albania to pay him tribute. He obliged the latter to ſend his three ſons as hoſtages; among whom was George, celebrated in hiſtory by the name of *Scanderbeg*. John Hunniades defeated Amurat's troops, and obliged him to make peace with the Chriſtian princes, in 1442. Theſe princes afterwards breaking the peace, Amurat defeated them in the famous battle of Varna, November 10th, 1444, which proved ſo fatal to the Chriſtians, and in which Ladiſlaus king of Hungary was killed. He afterwards defeated Hunniades, and killed above 20,000 of his men; but George Caſtriot, better known by the name of *Scanderbeg*, being re-eſtabliſhed in the eſtates of his father, defeated the Turks ſeveral times, and obliged Amurat to raiſe the ſiege of Croia, the capital of Albania. Amurat died, chagrined with his ill ſucceſs, and infirm with age, February 11th, 1451, at Adrianople. It is obſerved to this prince's honour, that he always kept his treaties with the greateſt fidelity. Amurath.

AMURATH IV. ſurnamed the *Valiant*, was the ſon of Achmet I. and in the year 1622, at the age of 13 ſucceeded his uncle Muſtapha. Bagdad fell into the hands of the Perſians, and ſeveral other diſaſtrous events clouded the commencement of his reign. The pacha of Erzerum had raiſed the ſtandard of rebellion in the former reign; and, continuing his oppoſition, he overran many of the provinces of Leſſer Aſia. But the military talents of the ſultan were ſoon rouſed to exertion; and, making peace with Germany, he haſtened with a formidable army to regain Bagdad. But new rebellions in his Aſiatic dominions, and ſeveral other cauſes, prevented him from recovering the city. The Spahis alſo rebelled at home, and ſeveral viziers were ſlain during the tumults of the Porte.

The natural diſpoſitions of the young monarch were ill adapted to his ſituation, and extremely deſtructive to his people. It is reported, that a flaſh of lightning ruſhing into his chamber during the darkneſs of the night, ſtrongly impaired his reaſon, and produced a violence and intemperance of character which remained to the end of his days. It was therefore nothing more than reaſonable to expect that his policy ſhould be variable and inconſtant; it appears, however, that he actively reſiſted the foes who preſſed upon his dominions from different quarters. The recovery of Bagdad being ſtill his favourite object, in the year 1637, he again marched againſt it; and after 30 days of unremitting aſſault, with the expence of much blood, he took poſſeſſion of the city. By puſhing his men forward to the attack by the point of the ſcimitar; and, by ſlaughtering 30,000 Perſians in cold blood after their ſurrender, he diſplayed the brutal ferocity of his diſpoſition. One perſon alone is reported to have moved his obdurate heart on the preſent occaſion. A famous player upon the harp entreated thoſe who were ſent to maſſacre him, to allow him to ſpeak to the ſultan previous to his death. Informed who he was, the ſultan requeſted him to give a ſpecimen of his ſkill in his profeſſion: with this he readily complied, and touched his harp ſo melodiouſly, and ſung

Amurath, Amyclæ.

ſung in ſuch pathetic ſtrains the lamentations on the tragedy of Bagdad, intermixed with the praiſes of Amurath, that the hard heart of the cruel monarch being at length ſoftened, he melted into tears, and ſaved both the muſician and the remaining inhabitants. The loſs ſuſtained by the Perſians at this time, ſo reduced their military ſtrength, that they were unable for a long period to attack the Ottoman empire.

The violence of Amurath ſoon enfeebled his conſtitution; and the fruits of his debaucheries and exceſſes were obvious even in the prime of life. At the age of 31, he fell a victim to an exceſs of revelling in the feaſt of Bairam, in the year 1640. Beholding his end approaching, he is reported to have given orders to aſſaſſinate his brother, in order to ſecure the throne for his favourite Muſtapha; but the affection of his mother prevented the cruel mandate from being carried into effect. The manners and amorous adventures of this monarch have afforded materials for numerous Turkiſh deſcriptions full of extravagance, ſingularity, and cruelty. He ſurpaſſed all his predeceſſors in the abominable vice of intoxication, and even violated the eſtabliſhed laws of the country, by iſſuing an edict permitting the ſale and uſe of wine. But, as if it was not ſufficient to violate the common law, he alſo oppoſed himſelf to the common uſage of the country, by ſhutting up the coffeehouſes, and prohibiting opium and tobacco upon the pain of death. The wanton cruelty of this prince was almoſt unexampled. During his hours of diſſipation, he would ruſh forth into the ſtreets with a drawn ſword in his hand, and cut in pieces all the unhappy perſons who chanced to be in his way. Nay, even in his calmeſt moments, he often diſcharged arrows from his upper windows at the innocent paſſengers as they went along. In ſhort, to ſuch extravagance did his cruelty extend, that the very name of Amurath carried terror along with it, and the opium-chewers fell into fits upon the ſimple mention thereof. The number of perſons that fell victims to his cruelty during a reign of 17 years, amounted to no leſs than 14,000; among whom were many officers of high power and diſtinction in the ſtate. The meanneſs of his diſpoſitions, however, manifeſted themſelves in his deſcending to familiarities with his favourites, and even joining in the meaneſt ſervices. He alſo diſplayed a ſingular humour in making marriages between old men and girls, and young men and women of fourſcore. It may, however, on the whole, be aſſerted, that if he had not been intoxicated with wine and power, the qualities of his mind and body might have rendered him a more reſpectable member of ſociety. He was very remarkable for ſwiftneſs of foot and dexterity in drawing the bow. The reverſes of fortune made ſmall impreſſion on his mind, and he purſued with reſolute firmneſs any object in which he ſeriouſly engaged. Diſſembling, avaricious, and blaſphemous, he gave full proof, that his moral qualities were greatly depraved. (*Mod. Un. Hiſt. Gen. Biog.*)

AMYCLÆ, a city of Laconia, diſtant about 18 miles from the metropolis, founded by Amyclas the ſon of Lacedæmon, and famed afterwards for the birth of Caſtor and Pollux the ſons of Tyndarus, eighth king of Sparta. It was afterwards famed for ſending a conſiderable colony of its own inhabitants into Upper Calabria, who built there a city which they called by the ſame name. This laſt city was ſituated between Cajeta and Terracina, and gave its name to the neighbouring ſea. According to Pliny and Solinus, the territory of Amyclæ was ſo infeſted with vipers and other ſerpents, that the inhabitants were obliged to abandon their dwellings and ſettle elſewhere. Among the ancient poets, the Amycli, or inhabitants of this city, obtained the epithet of *taciti*, "ſilent." The reaſon of this was, either becauſe it was built by the Lacedæmonians, who, as they followed the doctrine of Pythagoras, were always inculcating the precept of ſilence, and thence called *taciti*: or becauſe of a law which obtained in this place, forbidding any one, under ſevere penalties, to mention the approach of an enemy. Before this law was made, the city was daily alarmed by falſe reports, as the enemy had been already at the gates. From terrors of this kind the above-mentioned law indeed delivered them; but, in the end, it proved the ruin of the city: for the Dorians appearing unexpectedly under the walls, no one ventured to tranſgreſs the law; ſo that the city was eaſily taken. They reduced it to an inconſiderable hamlet; in which, however, were ſeen ſome of the remains of its ancient grandeur. One of the fineſt buildings that eſcaped the common ruin, was the temple and ſtatue of Alexandra, whom the inhabitants pretended to be the ſame with Caſſandra the daughter of Priam.

Amygdalus ‖ Amyot.

AMYGDALUS, the ALMOND and PEACH. See BOTANY *Index*.

AMYLACEOUS, from *amylum*, "ſtarch;" a term applied to the fine flour of farinaceous ſeeds, in which conſiſts their nutritive part. See BREAD.

AMYNTA, in *Literary Hiſtory*, a beautiful paſtoral comedy, compoſed by Taſſo; the model of all dramatic pieces wherein ſhepherds are actors. The *Paſtor Fido*, and *Filli di Sciro*, are only copies of this excellent piece.

AMYNTOR, αμυντωρ, formed of the verb αμυνω, *I defend* or *avenge*, properly denotes a perſon who defends or vindicates a cauſe, In this ſenſe, Mr Toland entitles his defence of Milton's life, *Amyntor*, as being a vindication of that work againſt Mr Blackhall and others, who had charged him with queſtioning the authority of ſome of the books of the New Teſtament, and declaring his doubt that ſeveral pieces under the name of Chriſt and his Apoſtles, received now by the whole Chriſtian church, were ſuppoſititious.

AMYOT, JAMES, biſhop of Auxerre and great almoner of France, was born of an obſcure family at Melun, the 30th of October 1514, and ſtudied philoſophy at Paris, in the college of Cardinal Le Moine. He was naturally dull and heavy; but diligence and application made amends for theſe natural defects. He left Paris at the age of 23; and went to Bourges with the Sieur Colin, who had the abbey of St Ambroſe in that city. At the recommendation of this abbot, a ſecretary of ſtate took Amyot into his houſe to be tutor to his children. The great improvements they made under his direction induced the ſecretary to recommend him to the Princeſs Margaret ducheſs of Berry, only ſiſter of Francis I. and by means of this recommendation Amyot was made public profeſſor of Greek and Latin in the univerſity of Bourges. It was during this time he tranſlated into French the

" Amours

Amyraldism || Ana.

"Amours of Theagines and Chariclea," which Francis I. was ſo pleaſed with, that he conferred upon him the abbey of Belloſane. He alſo tranſlated Plutarch's Lives, which he dedicated to the king; and afterwards undertook that of Plutarch's Morals which he ended in the reign of Charles IX. and dedicated to that prince. Charles conferred upon him the abbey of St Cornelius de Compiegne, and made him great almoner of France and biſhop of Auxerre. He died in 1593, aged 79.

AMYRALDISM, a name given by ſome writers to the doctrine of univerſal grace, as explained and aſſerted by Amyraldus, or Moſes Amyrault, and others his followers, among the reformed in France, towards the middle of the 17th century.

This doctrine principally conſiſted of the following particulars, viz. that God *deſires* the happineſs of all men, and none are excluded by a divine decree; that none can obtain ſalvation without faith in Chriſt; that God refuſes to none the *power* of *believing*, though he does not grant to *all* his aſſiſtance, that they may improve this power to ſaving purpoſes; and that many periſh through their own fault. Thoſe who embraced this doctrine were called *Univerſaliſts;* though it is evident they rendered grace *univerſal* in words, but *partial* in reality, and are chargeable with greater inconſiſtencies than the *Supralapſarians*.

AMYRAULT, Moses, an eminent French Proteſtant divine, born at Bourgueil in Touraine in 1566. He ſtudied at Saumur, where he was choſen profeſſor of theology; and his learned works gained him the eſteem of Catholics as well as Proteſtants, particularly of Cardinal Richelieu, who conſulted him on a plan of reuniting their churches, which however, as may well be ſuppoſed, came to nothing. He publiſhed a piece in which he attempted to explain the myſtery of predeſtination and grace, which occaſioned a controverſy between him and ſome other divines. He alſo wrote, An Apology for the Proteſtants; a Paraphraſe on the New Teſtament; and ſeveral other books. This eminent divine died in 1664.

AMYRIS. See Botany *Index*.

ANA, among *Phyſicians*, denotes a quantity equal to that of the preceding ingredient. It is abbreviated thus, āā, or ā.

Ana, in *Matters of Literature*, a Latin termination, adopted into the titles of ſeveral books in other languages.—*Anas*, or *books in ana*, are collections of the memorable ſayings of perſons of learning and wit; much the ſame with what we otherwiſe call *table-talk*.

Wolfius has given the hiſtory of books in ana, in the preface to the Caſauboniana. He there obſerves, that though ſuch titles be new, the thing itſelf is very old; that Xenophon's books of the deeds and ſayings of Socrates, as well as the dialogues of Plato, are *Socratiana;* that the apophthegms of the philoſophers collected by Diogenes Laërtius, the ſentences of Pythagoras and thoſe of Epictetus, the works of Athenæus, Stobeus, and divers others, are ſo many anas. Even the Gemara of the Jews, with ſeveral other oriental writings, according to Wolfius, properly belong to the ſame claſs. To this head of ana may likewiſe be referred the Orphica, the Pythagorœa, Æſopica, Pyrrhonea, &c.

Scaligerana was the firſt piece that appeared with a title in Ana. It was compoſed by Iſan de Vaſſan, a young Champanois, recommended to Joſ. Scaliger by Caſaubon. Being much with Scaliger, who was daily viſited by the men of learning at Leyden, De Vaſſan wrote down whatever things of any moment he heard Scaliger ſay. And thus aroſe the Scaligerana, which was not printed till many years after, at Geneva in 1666. Patin. Let. 431.—Soon after came the Perroniana, Thuana, Naudæana, Patineana, Sorberiana, Menagiana, Anti-Menagiana, Furetiana, Chevræana, Leibnitziana, Arlequiniana, Poggiana, &c.

Anabaptiſton, Anabaptiſts.

ANABAPTISTON, the ſame with Abaptiſton.

ANABAPTISTS, a name which has been indiſcriminately applied to Chriſtians of very different principles and practices; though many of them object to the denomination, and hold nothing in common, beſides the opinion that baptiſm ought always to be performed by immerſion, and not adminiſtered before the age of diſcretion.

The word Anabaptiſt is compounded of ανα, "new," and βαπτιστης, "a baptiſt;" and in this ſenſe the Novatians, the Cataphrygians, and the Donatiſts, may be conſidered as a kind of Anabaptiſts in the earlier ages, though not then denoted by this name; for they contended, that thoſe Chriſtians of the Catholic church who joined themſelves to their reſpective parties ſhould be rebaptized. But we muſt not claſs under the ſame denomination thoſe biſhops of Aſia and Africa, who, in the third century, maintained, that baptiſm adminiſtered by thoſe whom they called heretics was not valid, and therefore that ſuch of them as returned into their churches ought to be rebaptized. Nor do the Engliſh and Dutch Baptiſts conſider the denomination as at all applicable to their ſect: by whom the baptiſm appointed by Chriſt is held to be "nothing ſhort of *immerſion upon a perſonal profeſſion of faith;* of which profeſſion infants being incapable, and ſprinkling being no adequate ſymbol of the thing intended, the baptizing of proſelytes to their communion, who in their infancy had undergone the ceremony of ſprinkling, cannot, it is urged, be interpreted a repetition of the baptiſmal ordinance.

Anabaptiſts, in a ſtrict and proper ſenſe, appear to be thoſe who not only rebaptize, when they arrive at an adult age, perſons that were baptized in their infancy, but alſo, as often as any perſon comes from one of their ſects to another, or as often as any one is excluded from their communion and again received into the boſom of their church, they baptize him. And ſuch were many of the German Baptiſts. But the ſingle opinion common to all the ſects to which the name of *Anabaptiſts* has been indiſcriminately applied, is that of the invalidity of *infant baptiſm*, in whatever way adminiſtered: And hence the general denomination of *Antipædobaptiſts;* which includes Anabaptiſts, Baptiſts, Mennonites, Waterlandians, &c. as diſtinguiſhed by their reſpective peculiarities; though *Anabaptiſts* ſeems to have been adopted by moſt writers as the general term.

To the above peculiar notion concerning the baptiſmal ſacrament, the Anabaptiſts added principles of a different nature, depending upon certain ideas which they entertained concerning a perfect church eſtabliſhment, pure in its members, and free from the inſtitutions of human policy.

Anabaptiſts.

The Anabaptiſts appear to have made little noiſe, or to have been little noticed, before the time of the reformation in Germany. The moſt prudent and rational part of them conſidered it poſſible, by human wiſdom, induſtry, and vigilance, to purify the church from the contagion of the wicked, provided the manners and ſpirit of the primitive Chriſtians could but recover their loſt dignity and luſtre; and ſeeing the attempts of Luther, ſeconded by ſeveral perſons of eminent piety, prove ſo ſucceſsful, they hoped that the happy period was arrived in which the reſtoration of the church to purity was to be accompliſhed, under the divine protection, by the labours and counſels of pious and eminent men. Others, far from being ſatisfied with the plan of reformation propoſed by Luther, looked upon it as much beneath the ſublimity of their views; and conſequently undertook a more perfect reformation, or, to expreſs more properly their viſionary enterpriſe, they propoſed to found a new church, entirely ſpiritual, and truly divine.

This ſect was ſoon joined by great numbers, and (as uſually happens in ſudden revolutions of this nature) by many perſons, whoſe characters and capacities were very different, though their views ſeemed to turn upon the ſame object. Their progreſs was rapid; for, in a very ſhort ſpace of time, their diſcourſes, viſions, and predictions, excited commotions in a great part of Europe, and drew into their communion a prodigious multitude, whoſe ignorance rendered them eaſy victims to the illuſions of enthuſiaſm. The moſt pernicious faction of all thoſe which compoſed this motley multitude, was that which pretended that the founders of the new and *perfect church*, already mentioned, were under the direction of a divine impulſe, and were armed againſt all oppoſition by the power of working miracles. It was this faction that, in the year 1521, began their fanatical work, under the guidance of Munzer, Stubner, Storck, &c.

Theſe perſons were diſciples of Luther; but well knowing that their opinions were ſuch as would receive no ſanction from him, they availed themſelves of his abſence to diſſeminate them in Wittenburg, and had the addreſs to overreach the piety of Melancthon. Their principal purpoſe was to gain over the populace, and to form a conſiderable party. To effect this, ſays Bayle, they were induſtrious and active, each in his own way. Storck wanting knowledge, boaſted of inſpiration; and Stubner, who had both genius and erudition, laboured at commodious explications of Scripture. Not content with diſcrediting the court of Rome, and decrying the authority of conſiſtories, they taught, That among Chriſtians, who had the precepts of the goſpel to direct, and the Spirit of God to guide them, the office of magiſtracy was not only unneceſſary, but an unlawful encroachment on their ſpiritual liberty: that the diſtinctions occaſioned by birth, or rank, or wealth, being contrary to the ſpirit of the goſpel, which conſiders all men as equal, ſhould be entirely aboliſhed; that all Chriſtians, throwing their poſſeſſions into one common ſtock, ſhould live together in that ſtate of equality which becomes members of the ſame family; that as neither the laws of nature nor the precepts of the New Teſtament had placed any reſtraint upon men with regard to the number of wives which they might marry, they ſhould uſe that liberty which God himſelf had granted to the patriarchs. Anabaptiſts.

They employed at firſt the various arts of perſuaſion in order to propagate their doctrine. They preached, exhorted, admoniſhed, and reaſoned, in a manner that ſeemed proper to impreſs the multitude; and related a great number of viſions and revelations with which they pretended to have been favoured from above. But when they ſaw that theſe methods of making proſelytes were not attended with ſuch a rapid ſucceſs as they fondly expected, and that the miniſtry of Luther and other eminent reformers was detrimental to their cauſe, they then had recourſe to more expeditious meaſures, and madly attempted to propagate their fanatical doctrine by force of arms. Munzer and his aſſociates, in the year 1525, put themſelves at the head of a numerous army, compoſed for the moſt part of the peaſants of Suabia, Thuringia, Franconia, and Saxony; and declared war againſt all laws, government, and magiſtrates of every kind, under the chimerical pretext that Chriſt was now to take the reins of civil and eccleſiaſtical government into his own hands, and to rule alone over the nations. But this ſeditious crowd was routed and diſperſed, without much difficulty, by the elector of Saxony and other princes; and Munzer their ringleader ignominiouſly put to death, and his factious counſellors ſcattered abroad in different places.

Many of his followers, however, ſurvived and propagated their opinions through Germany, Switzerland, and Holland. In the year 1533, a party of them ſettled at Munſter under the direction of two Anabaptiſt prophets, John Matthias a baker of Haerlem, and John Bockholdt a journeyman taylor of Leyden. Having made themſelves maſters of the city, they depoſed the magiſtrates, confiſcated the eſtates of ſuch as had eſcaped, and depoſited the wealth they amaſſed together in a public treaſury for common uſe. They made preparations of every kind for the defence of the city: and ſent out emiſſaries to the Anabaptiſts in the Low Countries, inviting them to aſſemble at Munſter, which was now dignified with the name of Mount Sion, that from hence they might be deputed to reduce all the nations of the earth under their dominion. Matthias, who was the firſt in command, was ſoon cut off in an act of frenzy by the biſhop of Munſter's army; and was ſucceeded by Bockholdt, who was proclaimed by a ſpecial deſignation of Heaven, as he pretended, king of Sion, and inveſted with legiſlative powers like thoſe of Moſes. The extravagancies of Bockholdt were too numerous to be recited: it will be ſufficient to add, that the city of Munſter was taken after a long ſiege and an obſtinate reſiſtance; and Bockholdt, the mock monarch, was puniſhed with a moſt painful and ignominious death.

It muſt, however, be acknowledged, that the true riſe of the numerous inſurrections of this period ought not to be attributed to religious opinions. The firſt inſurgents groaned under the moſt grievous oppreſſions; they took up arms principally in defence of their civil liberties; and of the commotions that took place, the Anabaptiſt leaders above mentioned ſeem rather to have availed themſelves, than to have been the prime movers. See the article REFORMATION.—That a great part of the main body, indeed, conſiſted

of

Anabaptists ‖ Anabolæum.

of Anabaptiſts, ſeems indiſputable; and whatever fanaticiſm exiſted among them would naturally be called forth or be inflamed by the ſituations that occurred, and run riot in its wildeſt ſhapes. At the ſame time it appears from hiſtory, that a great part alſo conſiſted of Roman Catholics, and a ſtill greater of perſons who had ſcarcely any religious principles at all. Indeed, when we read of the vaſt numbers that were concerned in thoſe inſurrections, of whom it is reported that 100,000 fell by the ſword, it appears reaſonable to conclude that a great majority of them were not Anabaptiſts.

Before concluding this artiele, it muſt be remarked, that the Baptiſts or Mennonites in England and Holland are to be conſidered in a very different light from the enthuſiaſts we have been deſcribing: And it appears equally uncandid and invidious, to trace up their diſtinguiſhing ſentiment, as ſome of their adverſaries have done, to thoſe obnoxious characters, and there to ſtop, in order as it were to aſſociate with it the ideas of turbulence and fanaticiſm, with which it certainly has no natural connexion. Their coincidence with ſome of thoſe oppreſſed and infatuated people in denying baptiſm to infants, is acknowledged by the Baptiſts: but they diſavow the practice which the appellation of *Anabaptiſts* implies; and their doctrines ſeem referable to a more ancient and reſpectable origin. They appear ſupported by hiſtory in conſidering themſelves as the deſcendants of the Waldenſes, who were ſo grievouſly oppreſſed and perſecuted by the deſpotic heads of the Romiſh hierarchy; and they profeſs an equal averſion to all principles of rebellion on one hand, and to all ſuggeſtions of fanaticiſm on the other. See BAPTISTS. The denomination of *Mennonites*, by which they are diſtinguiſhed in Holland, they derive from Menno, the famous man who latterly gave conſiſtence and ſtability to their ſect. See MENNONITES.

ANABASII, in *Antiquity*, were couriers who were ſent on horſeback or in chariots, with deſpatches of importance.

ANABASIS. See BOTANY *Index*.

ANABATHRA, in *Ancient Writers*, denotes a kind of ſteps or ladder whereby to aſcend to ſome eminence. In this ſenſe we read of the anabathra of theatres, pulpits, &c. Anabathra appears to have been ſometimes alſo applied to ranges of ſeats riſing gradually over each other.

ANABATHRA is more particularly applied to a kind of ſtone blocks raiſed by the highway ſides, to aſſiſt travellers in mounting or alighting, before the uſe of ſtirrups was invented. The firſt author of this contrivance among the Romans was C. Gracchus brother of Tiberius.

ANABLEPS, in *Ichthyology*, the trivial name of a ſpecies of cobitis. See COBITIS.

ANABOA, a ſmall iſland ſituated near the coaſt of Loango in Africa, in E. Long. 9°, N. Lat. 1°. Here are ſeveral fertile valleys, which produce plenty of bananas, oranges, pine apples, lemons, citrons, tamarinds, cocoa nuts, &c. together with vaſt quantities of cotton. In this iſland are two high mountains, which, being continually covered with clouds, occaſion frequent rains.

ANABOLÆUM, or ANABOLE, in *Antiquity*, a kind of great or upper coat, worn over the tunica.

ANABOLEUS, in *Antiquity*, an appellation given to grooms of the ſtable, or equerries, who aſſiſted their maſters in mounting their horſes. As the ancients had no ſtirrups, or inſtruments that are now in uſe for mounting a horſe, they either jumped upon his back, or were aided in mounting by anabolei. Anaboleus ‖ Anacharſis.

ANACALYPTERIA, according to Suidas, were preſents made to the bride by her huſband's relations and friends, when ſhe firſt uncovered her face and ſhowed herſelf to men. Theſe preſents were alſo called επαυλεια: for, among the Greeks, virgins before marriage were under ſtrict confinement, being rarely permitted to appear in public, or converſe with the other ſex; and when allowed that liberty, wore a veil over their faces, termed Καλυπτρον, or Καλυπτρα, which was not left off in the preſence of men till the third day after marriage; whence, according to Heſychius, this day was alſo called *anacalypterion*.

ANACAMPSEROS, in *Botany*, a ſynonime of the portulaca and ſeveral other plants.

ANACAMPTERIA, in *Eccleſiaſtical Antiquity*, a kind of little edifices adjacent to the churches, deſigned for the entertainment of ſtrangers and poor perſons.

ANACAMPTIC, a name applied by the ancients to that part of optics which treats of reflection, being the ſame with what is now called CATOPTRICS.

ANACARDIUM, or CASHEW-NUT TREE. See BOTANY *Index*.

ANACEPHALÆOSIS, in *Rhetoric*, the ſame with Recapitulation. See RECAPITULATION.

ANACHARSIS, a Scythian philoſopher, who lived about 600 years before Chriſt. His father was one of the chiefs of his nation, and married a woman of Greece. Inſtructed in the Greek language by his mother, he caught the flame for Grecian literature, and prevailed upon the king to intruſt him with an embaſſy to Athens. Arrived in that renowned city, he was introduced to Solon by one of his own countrymen, named *Foxaris*; and it is reported, that when he came to the door of Solon, he requeſted a ſervant to inform his maſter, that Anacharſis a Scythian was at the door, and was deſirous of being received as his friend and gueſt. Solon is ſaid to have returned for anſwer, that "friendſhips are beſt formed at home." To this the Scythian philoſopher replied, "then let Solon who is at home, make me his friend and receive me into his houſe." Solon was ſo aſtoniſhed at the propriety of this reply, that he gave him admittance; and, finding him upon farther acquaintance worthy of his confidence, he honoured him with his friendſhip. From ſuch a well qualified maſter, Anacharſis rapidly acquired a knowledge of the wiſdom of Greece, and the literature then in circulation. By the influence of Solon he was introduced to the principal characters of Athens, and was the firſt ſtranger who was honoured with the title of citizen by the Athenians.

After he had reſided ſeveral years at Athens, he travelled through different countries in queſt of knowledge, and then returned to his native country inflamed with the deſire of inſtructing them in the laws and the religion of the Greeks. But his countrymen were not prepared to profit by his inſtructions; and while he was performing ſacrifice to the goddeſs Cybele, correſpondent to a vow which he had made on

his

Anachoret ‖ Anaclaſtic.

his way home, he was ſlain by an arrow, ſaid to have proceeded from the king's own hand. Thus fell the Scythian philoſopher a victim to the folly and ignorance of his countrymen, who wantonly rejected the wiſdom and learning of Greece.

The energetic manner in which he was accuſtomed to expreſs himſelf, gave birth to the proverbial ſaying, "Scythian eloquence." Although the potter's wheel was invented in the days of Homer, ſome have inaccurately aſcribed its invention to Anacharſis. The following ingenious ſayings may be mentioned as a ſpecimen of his genius. "The beſt way of teaching a youth ſobriety, is to ſet before his eyes a drunken man. The vine bears three ſorts of fruit; the firſt pleaſure, the ſecond intoxication, the third remorſe. An ape is by nature ridiculous; man by art and ſtudy. An Athenian of bad morals reproached him with being a Scythian: to him he replied, "My country may be a diſgrace to me, but you are a diſgrace to your country." Some ſuppoſe, that the epiſtles which bear his name are ſpurious. (*Gen. Biog.*)

ANACHORET, in *Church Hiſtory*, denotes a hermit, or ſolitary monk, who retires from the ſociety of mankind into ſome deſert, with a view to avoid the temptations of the world, and to be more at leiſure for meditation and prayer. Such were Paul, Anthony, and Hilarion, the firſt founders of monaſtic life in Egypt and Paleſtine.

Anachorets, among the Greeks, conſiſt principally of monks, who retire to caves or cells, with the leave of the abbot, and an allowance from the monaſtery; or who, weary of the fatigues of the monaſtery, purchaſe a ſpot of ground, to which they retreat, never appearing again in the monaſtery unleſs on ſolemn occaſions.

ANACHRONISM, in *Matters of Literature*, an error with reſpect to chronology, whereby an event is placed earlier than it really happened.—The word is compounded of ανα, "higher," and χρονος, "time." Such is that of Virgil, who placed Dido in Africa at the time of Æneas, though in reality ſhe did not come there till 300 years after the taking of Troy.—An error on the other ſide, whereby a fact is placed later and lower than it ſhould be, is called a *parachroniſm*.

ANACLASTIC GLASSES, a kind of ſonorous phials or glaſſes, chiefly made in Germany, which have the property of being flexible, and emitting a vehement noiſe by the human breath.—They are alſo called *vexing glaſſes* by the Germans (*vexier glaſer*), on account of the fright and diſturbance they occaſion by their reſilition. The anaclaſtic glaſſes are a low kind of phials with flat bellies, reſembling inverted funnels, whoſe bottoms are very thin, ſcarce ſurpaſſing the thickneſs of an onion peel: this bottom is not quite flat, but a little convex. But upon applying the mouth to the orifice, and gentling inſpiring, or as it were ſucking out the air, the bottom gives way with a prodigious crack, and of convex becomes concave. On the contrary, upon exſpiring or breathing gently into the orifice of the ſame glaſs, the bottom with no leſs noiſe bounds back to its former place, and becomes gibbous as before.—The anaclaſtic glaſſes firſt taken notice of were in the caſtle of Goldbach; where one of the academiſts *Naturæ Curioſorum*, having ſeen and made experiments on them, publiſhed a piece expreſs on their hiſtory and phenomena. They are all made of a fine white glaſs. It is to be obſerved, 1. That if the bottom be concave at the time of inſpiration, it will burſt; and the like will happen if it be convex at the time of exſpiration. 2. A ſtrong breath will have the ſame effect even under the contrary circumſtances. Anaclaſtics ‖ Anacreon.

ANACLASTICS, that part of optics which conſiders the refraction of light, and is commonly called *Dioptrics*. See DIOPTRICS.

ANACLETERIA, in *Antiquity*, a ſolemn feſtival celebrated by the ancients when their kings or princes came of age, and aſſumed the reins of government. It is ſo called, becauſe proclamation being made of this event to the people, they went to ſalute their prince during the anacleteria, and to congratulate him upon his new dignity.

ANACLETICUM, in the *Ancient Art of War*, a particular blaſt of the trumpet, whereby the fearful and flying ſoldiers were rallied, and recalled to combat.

ANACLINOPALE, Αναϰλινοπαλη, in *Antiquity*, a kind of wreſtling, wherein the champions threw themſelves voluntarily on the ground, and continued the combat by pinching, biting, ſcratching, and other methods of offence. The *Anaclinopale* were contradiſtinguiſhed from the *Orthopale*, wherein the champions ſtood erect. In the *Anaclinopale*, the weaker combatants ſometimes gained the victory.

ANACLINTERIA, in *Antiquity*, a kind of pillows on the dining bed, whereon the gueſts uſed to lean. The ancient tricliniary beds had four pillows, one at the head, another at the feet, a third at the back, and fourth at the breaſt. That on which the head lay, was properly called by the Greeks αναϰλινηριον or αναϰλιντρον; by the Romans *fulcrum*, ſometimes *pluteus*.

ANACOLLEMA, a compoſition of aſtringent powders, applied by the ancients to the head, to prevent defluxions on the eyes.

ANACONDO, in *Natural Hiſtory*, is a name given in the iſle of Ceylon to a very large and terrible ſnake, which often devours the unfortunate traveller alive, and is itſelf accounted excellent and delicious fare. It is probably the *Boa Conſtrictor*.

ANACREON, a Greek poet, born at Teos, a city of Ionia, flouriſhed about 532 years before the Chriſtian era. Polycrates, tyrant of Samos, invited him to his court, and made him ſhare with him in his buſineſs and his pleaſures. He had a delicate wit, as may be judged from the inexpreſſible beauties and graces that ſhine in his works: but he was fond of pleaſure, was of an amorous diſpoſition, and addicted to drunkenneſs: yet, notwithſtanding his debaucheries, he lived to the age of 85; when, we are told, he was choked by a grapeſtone which ſtuck in his throat as he was regaling on ſome new wine.

There is but a ſmall part of Anacreon's works that remain: for, beſides his odes and epigrams, he compoſed elegies, hymns, and iambics. His poems which are extant were reſcued from oblivion by Henry Stephens, and are univerſally admired. The verſes of Anacreon are ſweeter, ſays Scaliger, than Indian ſugar. His beauty and chief excellence, ſays Madame Dacier, lay in imitating nature, and in following reaſon; ſo that he preſented to the mind no images but what were noble and natural. The odes of Anacreon, ſays Rapin,

Anacreontic ‖ Anaduomene.

pin, are flowers, beauties, and perpetual graces; it is familiar to him to write what is natural, and to the life, he having an air ſo delicate, ſo eaſy, and graceful, that among all the ancients there is nothing comparable to the method he took, nor to that kind of writing he followed. He flows ſoft and eaſy, everywhere diffuſing the joy and indolence of his mind through his verſe, and tuning his harp to the ſmooth and pleaſant temper of his ſoul. But none has given a juſter character of his writings than the God of Love, as taught to ſpeak by Mr Cowley:

All thy verſe is ſofter far
Than the downy feathers are
Of my wings, or of my arrows,
Of my mother's doves and ſparrows:
Graceful, cleanly, ſmooth, or round,
All with Venus' girdle bound.

ANACREONTIC VERSE, in *Ancient Poetry*, a kind of verſe, ſo called from its being much uſed by the poet Anacreon. It conſiſts of three feet and a half, uſually ſpondees and iambuſes, and ſometimes anapeſts: Such is that of Horace,

Lydia, dic per omnes.

ANACRISIS, among the *Ancient Greeks*, was uſed for a kind of trial or examination, which the archons, or chief magiſtrates of Athens, were to undergo before their admiſſion into that office. The *anacriſis* ſtands diſtinguiſhed from the *docimaſia*, which was a ſecond examination in the forum. The anacriſis was performed in the ſenate-houſe. The queſtions here propoſed to them were concerning their family, kindred, behaviour, eſtate, &c. Some will have it that all magiſtrates underwent the anacriſis.

ANACRISIS, among *Civilians*, an inveſtigation of truth, interrogation of witneſſes, and inquiry made into any fact, eſpecially by torture.

ANACROSIS, in *Antiquity*, denotes a part of the Pythian ſong, wherein the combat of Apollo and Python are deſcribed.—The anacroſis was the firſt part, and contained the preparation to the fight.

ANACYCLUS. See BOTANY *Index*.

ANADAVADÆA, in *Ornithology*, a barbarous name of a ſpecies of alauda. See ALAUDA, ORNITHOLOGY *Index*.

ANADEMA, among the *Ancients*, denotes an ornament of the head, wherewith victors at the ſacred games had their temples bound.

ANADIPLOSIS, in *Rhetoric* and *Poetry*, a repetition of the laſt word of a line, or clauſe of a ſentence, in the beginning of the next: Thus,

Pierides, vos hæc facietis maxima Gallo:
Gallo, cujus amor, &c.
Et matutinis accredula vocibus inſtat,
Vocibus inſtat, et aſſiduas jacit ore querelas.

ANADROMOUS, among *Ichthyologiſts*, a name given to ſuch fiſhes as go from the ſea to the freſh waters at ſtated ſeaſons, and return back again; ſuch as the ſalmon, &c. See SALMO.

ANADUOMENE VENUS, in the *Grecian Mythology*, anſwered to the Sea Venus in the Roman, and was the appellation given to one of the chief deities of the ſea. The moſt celebrated picture in all antiquity was that of this goddeſs by Apelles; and the famous Venus of Medicis is a Sea Venus.

Anadæia ‖ Anagram.

ANÆDEIA, in *Antiquity*, a denomination given to a ſilver ſtool placed in the Areopagus, on which the defendant, or perſon accuſed, was ſeated for examination. The word is Greek, *Αναδεια*, which imports imprudence; but according to Junius's correction, it ſhould rather be *Ανεϊλια*, q. d. *innocence*. The plaintiff or accuſer, was placed on an oppoſite ſtool called *hybris*, or injury; here he propoſed three queſtions to the party accuſed, to which poſitive anſwers were to be given. The firſt, Are you guilty of this fact? The ſecond, How did you commit the fact? The third, Who were your accomplices?

ANÆSTHESIA, ſignifies a privation of the ſenſes.

ANAGALIS, PIMPERNEL. See BOTANY *Index*.

ANAGNIA, in *Ancient Geography*, a town of Latium, capital of the Hernici; which, after a faint reſiſtance, ſubmitting to the Romans, was admitted to the freedom of the city, yet without the right of ſuffrage, (Livy). It was afterwards a colony of Druſus Cæſar, and walled round, and its territory aſſigned to the veterans, (Frontinus). Here Antony married Cleopatra, and divorced Octavia. Now *Anagni*, 36 miles to the eaſt of Rome. Long. 13. 45. N. Lat. 42. 48.

ANAGNOSTA, or ANAGNOSTES, in *Antiquity*, a kind of literary ſervant, retained in the families of perſons of diſtinction, whoſe chief buſineſs was to read to them during meals, or at any other time when they were at leiſure. Cornelius Nepos relates of Atticus, that he had always an agnoſtes at his meals. He never ſupped without reading; ſo that the minds of his gueſts were no leſs agreeably entertained than their appetites. The ſame cuſtom, Eginhard obſerves, was kept up by Charlemagne, who at table had the hiſtories and acts of ancient kings read to him. This cuſtom ſeems to have been a relick of that of the ancient Greeks, who had the praiſes of great men and heroes ſung to them while at table. The ancient monks and clergy kept up the like uſage, as we are informed by St Auguſtin.

ANAGOGICAL, ſignifies myſterious, tranſporting; and is uſed to expreſs whatever elevates the mind, not only to the knowledge of divine things, but of divine things in the next life. This word is ſeldom uſed, but with regard to the different ſenſes of Scripture. The anagogical ſenſe is, when the ſacred text is explained with regard to eternal life, the point which Chriſtians ſhould have in view: for example, the reſt of the Sabbath, in the anagogical ſenſe, ſignifies the repoſe of everlaſting happineſs.

ANAGOGY, or ANAGOGE, among *Eccleſiaſtical Writers*, the elevation of the mind to things celeſtial and eternal.—It is particularly uſed, where words, in their natural or primary meaning, denote ſomething ſenſible, but have a further view to ſomething ſpiritual or inviſible.

ANAGOGY, in a more particular ſenſe, denotes the application of the types and allegories of the Old Teſtament to ſubjects of the New; thus called, becauſe the veil being here drawn, what before was hidden is expoſed to open ſight.

ANAGRAM (from the Greek *ανα*, *backwards*, and *γραμμα*,

Anagram ‖ Anak.

γραμμα, *letter*), in matters of literature, a tranſpoſition of the letters of ſome name, whereby a new word is formed, either to the advantage or diſadvantage of the perſon or thing to which the name belongs. Thus, the anagram of Galenus is *angelus;* that of Logica, *caligo;* that of Alſtedius, *ſedulitas;* that of Loraine is *alerion*, on which account it was that the family of Loraine took *alerions* for their armoury.—Calvin, in the title of his *Inſtitutions*, printed at Straſburg in 1539, calls himſelf *Alcuinas*, which is the anagram of Calvinus, and the name of an eminently learned perſon in the time of Charlemagne, who contributed greatly to the reſtoration of learning in that age.

Thoſe who adhere ſtrictly to the definition of an anagram, take no other liberty than that of omitting or retaining the letter H, at pleaſure; whereas others make no ſcruple to uſe E for Æ, V for W, S for Z, and C for K; and *vice verſa*.

Beſides anagrams formed as above, we meet with another kind in ancient writers, made by dividing a ſingle word into ſeveral; thus, *ſus tinea mus*, are formed out of the word *ſuſtiniamus*.

Anagrams are ſometimes alſo made out of ſeveral words: ſuch as that on the queſtion put by Pilate to our Saviour, *Quid eſt veritas?* whereof we have this admirable anagram, viz. *Eſt vir qui adeſt*.

The Cabbaliſts among the Jews are profeſſed anagrammatiſts; the third part of their art, which they call *themuru*, i. e. "changing," being nothing but the art of making anagrams, or of finding hidden and myſtical meanings in names; which they do by changing, tranſpoſing, and differently combining, the letters of thoſe names.—Thus, of נח the letters of Noah's name, they make חן *grace;* of משיח *the Meſſiah*, they make ישמח *he ſhall rejoice*.

ANAGRAMMATIST, a maker or compoſer of anagrams. Thomas Billon, a Provençal, was a celebrated anagrammatiſt, and retained by Louis XIII. with a penſion of 1200 livres, in quality of anagrammatiſt to the king.

ANAGROS, in *Commerce*, a meaſure for grain uſed in ſome cities of Spain, particularly at Seville; 46 anagros make about 10¼ quarters of London.

ANAGYRIS, STINKING BEAN-TREFOIL. See Botany *Index*.

ANAGYRIS, or ANAGYRUS, in *Ancient Geography*, the name of a place in Attica, of the tribe Erechtheis, where a fetid plant, called *Anagyris*, probably the ſame with the foregoing, grew in great plenty, (Dioſcorides, Pliny, Stephanus); and the more it was handled, the ſtronger it ſmelled; hence *commovere anagyrin* or (*anagyrum*), is to bring a misfortune on one's ſelf, (Ariſtophanes).

ANAK, the father of the Anakims, was the ſon of Arba, who gave his name to Kirjath-arba, or Hebron, (Joſh. xiv. 15.) Anak had three ſons, Sheſhai, Ahiman, and Talmai, (chap. xv. 14. and Numb. xiii. 22.), who, as well as their father, were giants, and who, with their poſterity, all terrible for their fierceneſs and extraordinary ſtature, were called the *Anakims;* in compariſon of whom the Hebrews, who were ſent to view the land of Canaan, reported that they were but as graſhoppers, Numb. xiii. *ult.* Caleb, aſſiſted by the tribe of Judah, took Kirjath-arba, and deſtroyed the Anakims (Judges i. 20. and Joſh. xv. 14.) in the year of the world 2559.

Analecta ‖ Analogy.

ANALECTA, or ANALECTES, in *Antiquity*, a ſervant whoſe employment it was to gather up the offals of tables.

ANALECTA, *Analects*, in a literary ſenſe, is uſed to denote a collection of ſmall pieces; as, eſſays, remarks, &c.

ANALEMMA, in *Geometry*, a projection of the ſphere on the plane of the meridian, orthographically made by ſtraight lines and ellipſes, the eye being ſuppoſed at an infinite diſtance, and in the eaſt or weſt points of the horizon.

ANALEMMA, denotes likewiſe an inſtrument of braſs or wood, upon which this kind of projection is drawn, with a horizon and curſor fitted to it, wherein the ſolſtitial colure, and all circles parallel to it will be concentric circles; all circles oblique to the eye will be ellipſes; and all circles whoſe planes paſs through the eye, will be right lines. The uſe of this inſtrument is to ſhow the common aſtronomical problems; which it will do, though not very exactly, unleſs it be very large.

ANALEPSIS, the augmentation or nutrition of an emaciated body.

ANALEPTICS, reſtorative or nouriſhing medicines.

ANALOGY, in *Philoſophy*, a certain relation and agreement between two or more things, which in other reſpects are entirely different.

There is likewiſe an analogy between beings that have ſome conformity or reſemblance to one another; for example, between animals and plants; but the analogy is ſtill ſtronger between two different ſpecies of certain animals.

Analogy enters much into all our reaſoning, and ſerves to explain and illuſtrate. A great part of our philoſophy, indeed, has no other foundation than analogy.

It is natural to mankind to judge of things leſs known, by ſome ſimilitude, real or imaginary, between them and things more familiar or better known. And where the things compared have really a great ſimilitude in their nature, when there is reaſon to think that they are ſubject to the ſame laws, there may be a conſiderable degree of probability in concluſions drawn from analogy. Thus we may obſerve a very great ſimilitude between this earth which we inhabit, and the other planets, Saturn, Jupiter, Mars, Venus, and Mercury. They all revolve round the ſun, as the earth does, although at different diſtances, and in different periods. They borrow all their light from the ſun, as the earth does. Several of them are known to revolve round their axis like the earth, and, by that means, muſt have a like ſucceſſion of day and night. Some of them have moons, that ſerve to give them light in the abſence of the ſun, as our moon does to us. They are all, in their motions, ſubject to the ſame law of gravitation as the earth is. From all this ſimilitude, it is not unreaſonable to think, that thoſe planets may, like our earth, be the habitation of various orders of living creatures. There is ſome probability in this concluſion from analogy.

But it ought to be obſerved, that, as this kind of reaſoning

Analogy. reaſoning can afford only probable evidence at beſt; ſo unleſs great caution be uſed, we are apt to be led into error by it. To give an inſtance of this: Anatomiſts, in ancient ages, ſeldom diſſected human bodies; but very often the bodies of thoſe quadrupeds whoſe internal ſtructure was thought to approach neareſt to that of the human body. Modern anatomiſts have diſcovered many miſtakes the ancients were led into, by their conceiving a greater ſimilitude between the ſtructure of men and of ſome beaſts than there is in reality.

Reid on the Intellectual Powers, Eſſay I. ch. iv. p. 52.

Perhaps no author has made a more juſt and a more happy uſe of this mode of reaſoning, than Biſhop Butler in his Analogy of Religion, Natural and Revealed, to the Conſtitution and Courſe of Nature. In that excellent work, the author does not ground any of the truths of religion upon analogy, as their proper evidence. He only makes uſe of analogy to anſwer objections againſt them. When objections are made againſt the truths of religion, which may be made with equal ſtrength againſt what we know to be true in the courſe of nature, ſuch objections can have no weight.

Analogical reaſoning, therefore, may be of excellent uſe in anſwering objections againſt truths which have other evidence. It may likewiſe give a greater or a leſs degree of probability in caſes where we can find no other evidence. But all arguments drawn from analogy are ſtill the weaker, the greater diſparity there is between the things compared; and therefore muſt be weakeſt of all when we compare body with mind, becauſe there are no two things in nature more unlike.

There is no ſubject in which men have always been ſo prone to form their notions by analogies of this kind, as in what relates to the mind. We form an early acquaintance with material things by means of our ſenſes, and are bred up in a conſtant familiarity with them. Hence we are apt to meaſure all things by them; and to aſcribe to things moſt remote from matter the qualities that belong to material things. It is for this reaſon that mankind have, in all ages, been ſo prone to conceive the mind itſelf to be ſome ſubtle kind of matter: That they have been diſpoſed to aſcribe human figure and human organs not only to angels, but even to the Deity.

To illuſtrate more fully that analogical reaſoning from a ſuppoſed ſimilitude of mind to body, which appears to be the moſt fruitful ſource of error with regard to the operations of our minds, the following inſtance may be given. When a man is urged by contrary motives, thoſe on one hand inciting him to do ſome action, thoſe on the other to forbear it; he deliberates about it, and at laſt reſolves to do it, or not to do it. The contrary motives are here compared to the weights in the oppoſite ſcales of a balance; and there is not perhaps any inſtance that can be named of a more ſtriking analogy between body and mind. Hence the phraſes of weighing motives, of deliberating upon actions, are common to all languages.

From this analogy, ſome philoſophers draw very important concluſions. They ſay, that as the balance cannot incline to one ſide more than the other when the oppoſite weights are equal, ſo a man cannot poſſibly determine himſelf if the motives on both hands are equal; and as the balance muſt neceſſarily turn to that ſide which has moſt weight, ſo the man muſt neceſſarily be determined to that hand where the motive is ſtrongeſt. And on this foundation ſome of the ſchoolmen maintained, that if a hungry aſs were placed between two bundles of hay equally inviting, the beaſt muſt ſtand ſtill and ſtarve to death, being unable to turn to either, becauſe there are equal motives to both. This is an inſtance of that analogical reaſoning, which, it is conceived, ought never to be truſted; for the analogy between a balance and a man deliberating, though one of the ſtrongeſt that can be found between matter and mind, is too weak to ſupport any argument. A piece of dead inactive matter, and an active intelligent being, are things very unlike; and becauſe the one would remain at reſt in a certain caſe, it does not follow that the other would be inactive in a caſe ſomewhat ſimilar. The argument is no better than this, that becauſe a dead animal moves only as it is puſhed, and if puſhed with equal force in contrary directions, muſt remain at reſt; therefore the ſame thing muſt happen to a living animal: for ſurely the ſimilitude between a dead animal and a living is as great as that between a balance and a man.

Analogy.

The derivation of the word Analogy indicates, as Profeſſor Caſtillon of Berlin * obſerves, a reſemblance diſcernible by reaſon. This is confirmed by the ſenſe in which the term is uſed in geometry, where it ſignifies an equality of ratios. In explaining this ſubject, it is obſerved, there may be a reſemblance between ſenſations and a reſemblance between perceptions: the former is called *phyſical reſemblance*, becauſe it acts upon the phyſical or ſenſitive faculty; the latter *moral reſemblance*, becauſe it affects the moral or rational faculty of man.

* *Haerlem Memoirs* for 1786, or vol. xxii.

Every reſemblance may be reduced to an equality in ſenſations or perceptions; but this ſuppoſes ſome equality in their cauſes: we ſay *ſome equality*, becauſe the diſpoſition of the organs, or of the ſoul, muſt neceſſarily affect the ſenſations or perceptions; but this can influence only their degree, and not their nature.

The character of one perſon reſembles that of another only when they both ſpeak and act ſo as to excite equal perceptions, or, to ſpeak more ſtrictly, the ſame perception; when they both diſplay vivacity or indifference, anger or meekneſs, on the ſame occaſions, and both excite in the ſoul of the obſerver identical perceptions, or rather the ſame perception of vivacity or indifference, of anger or meekneſs. Theſe identical perceptions, the degree of which will depend much on the diſpoſition of the obſerver's mind, muſt have identical cauſes, or, in other words, the ſame cauſe; which is the vivacity or indifference, the anger or meekneſs, diſplayed by each of theſe characters.

Every phyſical reſemblance may therefore be reduced to one or more equalities, and every moral reſemblance to one or more identities. Wherever there is moral reſemblance there is analogy. Analogy may, therefore be reduced to identity, and always ſuppoſes compariſon.

Two objects are ſaid to have an analogy to each other, or are called *analogous*, when ſome identity is diſcovered upon comparing them. An *analogical concluſion* is a concluſion deduced from ſome identity.

The principles of analogy are a compariſon of two objects; and one or more identities reſulting from their being thus compared. The characters of analogy are —that two objects be compared—that there be one or more identities between theſe objects—and that this is diſcernible only by reaſon or intellect.

Analogy, Analyſis.

Phyſical reſemblance is to the ſenſes what *analogy* is to the underſtanding. The former, when perfect, becomes equality; but the latter, identity.

Reſemblance and analogy are the foundations both of probability and of certainty. When we are not ſatisfied that the reſemblance or the analogy is complete, we ſtop at probability; which becomes certainty when we are, or think we are, aſſured that the reſemblance or the analogy is perfect.

In reaſoning by analogy, we ſhould be careful not to confound it with reſemblance; and alſo not to deduce from the identity or identities, on which the analogy is founded, a concluſion which has either no relation, or only a partial relation, to theſe identities.

The principal uſe of analogy in the inveſtigation of phyſical and moral truth, according to our author, may be reduced to the four following: 1. By means of our ſenſes to improve, firſt our own judgment, and afterwards that of others, with reſpect to intellectual ſubjects. 2. To deduce a general from a particular truth. Having diſcovered and proved the truth of a propoſition with reſpect to any particular object, examine whether this truth flows from a quality peculiar to this ſingle object, or common to ſeveral objects. In the latter caſe all theſe objects may be comprehended under one general idea, founded on their common quality. Subſtitute this general idea inſtead of the particular object, and the propoſition will become general, without ceaſing to be true; becauſe whatever evidently and ſolely reſults from the identity on which an analogy is founded, muſt neceſſarily be true with reſpect to all thoſe objects in which the analogy is the ſame. 3. To prove the truth or falſehood of propoſitions which cannot be otherwiſe demonſtrated. 4. To diſcover new truths in both natural and moral philoſophy.

Analogy, among *Grammarians*, is the correſpondence which a word or phraſe bears to the genius and received forms of any language.

ANALYSIS, in a general ſenſe, implies the reſolution of ſomething compounded into its original and conſtituent parts. The word is Greek, and derived from *αναλυω*, to reſolve.

Analysis, in *Mathematics*, is properly the method of reſolving problems by means of algebraical equations; whence we often find that theſe two words, *analyſis* and *algebra*, are uſed as ſynonymous.

Analyſis, under its preſent improvements, muſt be allowed the apex or height of all human learning: it is this method which furniſhes us with the moſt perfect examples of the art of reaſoning; gives the mind an uncommon readineſs at deducing and diſcovering, from a few data, things unknown; and, by uſing ſigns for ideas, preſents things to the imagination, which otherwiſe ſeemed out of its ſphere: by this, geometrical demonſtrations may be greatly abridged, and a long ſeries of argumentations, wherein the mind cannot without the utmoſt effort and attention diſcover the connection of ideas, are hereby converted into ſenſible ſigns, and the ſeveral operations required therein effected by the combination of thoſe ſigns. But, what is more extraordinary, by means of this art, a number of truths are frequently expreſſed by a ſingle line, which in the common way of explaining and demonſtrating things would fill whole volumes. Thus, by mere contemplation of one ſingle line, whole ſciences may be ſometimes learned in a few minutes time, which otherwiſe could ſcarce be attained in many years. Analyſis.

Analysis is divided, with regard to its object, into that of *finites* and *infinites*.

Analysis of Finite Quantities, is what we otherwiſe call ſpecious arithmetic or algebra. See Algebra.

Analysis of Infinites, called alſo the *New Analyſis*, is particularly uſed for the method of fluxions, or the differential calculus. See Fluxions.

Analysis, in *Logic*, ſignifies the method of tracing things backward to their ſource, and of reſolving knowledge into its original principles. This is alſo called the method of *reſolution*; and ſtands oppoſed to the ſynthetic method, or that of *compoſition*. The art of logical analyſis conſiſts principally in combining our perceptions, claſſing them together with addreſs, and contriving proper expreſſions for conveying our thoughts, and repreſenting their ſeveral diviſions, claſſes, and relations.

Analysis, in *Rhetoric*, is that which examines the connexions, tropes, figures, and the like, inquiring into the propoſition, diviſion, paſſions, arguments, and other apparatus of rhetoric.

Several authors, as Freigius and others, have given analyſes of Cicero's Orations, wherein they reduce them to their grammatical and logical principles; ſtrip them of all the ornaments and additions of rhetoric which otherwiſe diſguiſe their true form, and conceal the connexion between one part and another. The deſign of theſe authors is to have thoſe admired harangues juſt ſuch as the judgment diſpoſed them, without the help of imagination; ſo that here we may coolly view the force of each proof, and admire the uſe Cicero made of rhetorical figures to conceal the weak part of a cauſe.

A collection has been made of the analyſes formed by the moſt celebrated authors of the 16th century, in 3 vols. folio.

Analysis is alſo uſed, in *Chemiſtry*, for the decompounding of a mixed body, or the ſeparation of the principles and conſtituent parts of a compounded ſubſtance.

To analyze bodies, or reſolve them into their component parts, is indeed the chief object of the art of chemiſtry. Chemiſtry furniſhes ſeveral means for the decompoſition of bodies, which are all founded on the differences of the properties belonging to the different principles of which the body to be analyzed is compoſed. If, for example, a body be compoſed of ſeveral principles, ſome of which have a great and others a moderate degree of volatility, and, laſtly, others are fixed, its moſt volatile parts may be firſt ſeparated by a gradual heat in diſtilling veſſels; and then the parts which are next in volatility will paſs over in diſtillation; and laſtly, thoſe parts which are fixed, and capable of reſiſting the action of fire, will remain at the bottom of the veſſel.

Analysis is alſo uſed for a kind of ſyllabus, or table of the principal heads or articles of a continued diſcourſe, diſpoſed in their natural order and dependency. Analyſes are more ſcientifical than alphabetical indexes; but they are leſs uſed, as being more intricate.

Analysis is likewiſe uſed for a brief, but methodical, illuſtration of the principles of a ſcience; in which

ſenſe

Analytic ‖ Anamboa.

ſenſe it is nearly ſynonymous with what we otherwiſe call a *ſynopſis*.

ANALYTIC, or ANALYTICAL, ſomething that belongs to, or partakes of, the nature of analyſis.—Thus we ſay, an analytical demonſtration, analytical proceſs, analytical table or ſcheme, analytical method of inveſtigation, &c.

The analytic method ſtands oppoſed to the ſynthetic. In natural philoſophy, as in mathematics, the inveſtigation of difficult things by the analytic method ought to precede the method of compoſition. This analyſis conſiſts in making experiments and obſervations, and in drawing general concluſions therefrom by induction; and admitting of no objections againſt the concluſions, but ſuch as are drawn from experiments, and other certain truths: and though the reaſoning from experiments and obſervations by induction be no demonſtration of general concluſions, yet it is the beſt method of reaſoning which the nature of things admits of; and may be eſteemed ſo much the ſtronger, as the induction is more general; and, if no exception occur from phenomena, the concluſion may be pronounced general. By this way of analyſis, we may proceed from compounds to their ingredients; from motions to the forces producing them; and in general from effects to their cauſes, and from particular cauſes to more general ones, until we arrive at thoſe which are the moſt general. This is the analytic method, according to the illuſtrious Newton.

The ſynthetic method conſiſts in aſſuming the cauſes diſcovered and received as principles: and by them explaining the phenomena proceeding from them, and proving the explanation. See SYNTHESIS.

ANALYTICS, *Analytica*, the ſcience and uſe of analyſis. The great advantage of the modern mathematics above the ancient is in point of analytics.

Pappus, in the preface to his ſeventh book of Mathematical Collections, enumerates the authors on the ancient analytics; being Euclid, in his *Data* and *Periſmata*; Apollonius, *de Sectione Rationis*, and in his *Conics*; Ariſtæus, *de Locis Solidis*; and Eratoſthenes, *de Mediis Proportionalibus*. But the ancient analytics were very different from the modern.

To the modern analytics principally belongs algebra; an hiſtorical account of which, with the ſeveral authors thereon, ſee under the article ALGEBRA.

ANAMABOA, a populous town in the kingdom of Fantin, in Guinea. The natives are generally great cheats, and muſt be carefully looked after in dealing with them, and their gold well examined, for it is commonly adulterated. It lies under the cannon of the Engliſh caſtle. The landing is pretty difficult on account of the rocks: and therefore thoſe that come here to trade are forced to go aſhore in canoes. The earth here is very proper to make bricks; the oyſters, when burnt, afford good lime; and there is timber in great abundance; ſo that here are all the materials for building. The country at Anamaboa is full of hills, beginning at a good diſtance from the town, and affording a very pleaſant proſpect. Indian corn and palm-wine are in great plenty. They have a green fruit called *papas*, as big as a ſmall melon, and which has a taſte like cauliflower. Anamaboa is much frequented by the Engliſh ſhips and others for corn and ſlaves, which laſt are ſometimes to be had in great numbers. The Engliſh fort is built on the foundation of a large old houſe, which ſubſiſted entire in 1679. It is a large edifice, flanked by two towers, and fortified towards the ſea with two baſtions: the whole of brick and ſtone cemented with lime. It ſtands upon a rock at the diſtance of 30 paces from the ſea. It is mounted with 12 pieces of cannon and 12 patereroes; and defended by a garriſon of 12 whites and 18 blacks, under the command of the chief factor.

Anamelech ‖ Anapæſtic Verſes.

The natives treat the garriſon of this fort with great inſolence, inſomuch as often to block them up, and frequently, if they diſlike the governor, ſend him off in a canoe to Cape Coaſt with marks of the utmoſt contempt. Far from being able to oppoſe them, the Engliſh are glad to obtain their favour with preſents. In 1701, they declared war againſt the Engliſh; and having aſſembled in a tumultuous manner before the fort, they ſet fire to the exterior buildings, and went on with their outrages, till they were diſperſed by a diſcharge of the cannon from the batteries. The night following the Engliſh took their revenge, by ſetting fire to the town of Anamaboa: and thus hoſtilities continued for 20 days, till at laſt the natives were obliged to ſue for peace. This fort was abandoned in 1733; but has been reſumed by the Engliſh, who have continued in it ever ſince.

ANAMELECH, an idol of the Sepharvaites, who are ſaid in Scripture to have burned their children in honour of Adrammelech and Anamelech.—Theſe idols probably ſignified the ſun and moon. Some of the rabbins repreſent Anamelech under the figure of a mule, others under that of a quail or pheaſant.

ANAMIM, the ſecond ſon of Mizraim (Gen. x. 13.) Anamim, if we may credit the paraphraſt Jonathan the ſon of Uzziel, peopled the Mareotis; or the Pentapolis of Cyrene, according to the paraphraſt of Jeruſalem. Bocchart is of opinion, that theſe Anamims were the people that dwelt in the parts adjacent to the temple of Jupiter Ammon, and in the Naſamonitis. Calmet thinks the Amanians and Garamantes to be deſcended from Anamim.

ANAMORPHOSIS, in *Perſpective Drawings*, is a deformed or diſtorted portrait or figure, generally confuſed and unintelligible to the common unaſſiſted view; but when ſeen at a certain diſtance and height, or as reflected from a plain or curved mirror, will appear regular and in right proportion. See OPTICS (the *Index*) and PERSPECTIVE.

ANANAS, in *Botany*, the trivial name of a ſpecies of bromelia. See BROMELIA, BOTANY *Index*.

ANANCITIS, in *Antiquity*, a kind of figured ſtone, otherwiſe called *ſynochitis*, celebrated for its magical virtue of raiſing the ſhadows of the infernal gods.

ANANIAS, a Sadducee, high-prieſt of the Jews, who put to death St James the brother of our Lord, and was depoſed by Agrippa.

ANANISABTA, or ANANISAPTA, a magical word frequently found inſcribed on coins and other amulets, ſuppoſed to have a virtue of preſerving the wearer from the plague.

ANAPÆST, in *Ancient Poetry*, a foot conſiſting of two ſhort ſyllables and one long: Such is the word ſcŏpŭlōs. It is juſt the reverſe of the dactyl.

ANAPÆSTIC VERSES, thoſe conſiſting wholly or chiefly of anapæſts.

Anaphe ‖ Anas.

ANAPHE, in *Ancient Geography*, an iſland ſpontaneouſly emerging out of the Cretan ſea, near Thera (Pliny, Strabo); now called *Nanſio*. Its name is from the ſudden appearance of the new moon to the Argonauts in a ſtorm (Apollonius). *Anaphæus*, an epithet of Apollo, who was worſhipped there. *Anaphæi*, the people.

ANAPHORA, in *Rhetoric*, the repetition of the ſame word or words in the beginning of a ſentence or verſe: Thus Virgil,

Pan etiam Arcadia mecum ſe judice certet,
Pan etiam Arcadia dicat ſe judice victum.

ANAPHORA, among *Phyſicians*, the throwing off purulent matter by the mouth.

ANAPHRODISIA, ſignifies impotence, or want of power to procreate. See IMPOTENCE.

ANAPLASIS, ſignifies the replacing or ſetting a fractured bone.

ANAPLORETICS, medicines that promote the growth or granulation of the fleſh in wounds, ulcers, &c.

ANARCHI, Αναρχοι, in *Antiquity*, a name given by the Athenians to four ſupernumerary days in their year, during which they had no magiſtrates. The Attic year was divided into 10 parts, according to the number of tribes, to whom the precedency of the ſenate fell by turns. Each diviſion conſiſted of 35 days; what remained after the expiration of theſe, to make the lunar year complete, which according to their computation conſiſted of 354 days, were employed in the creation of magiſtrates, and called αναρχοι ἡμεραι, and αρχαιρεσιαι.

ANARCHY, the want of government in a nation, where no ſupreme authority is lodged either in the prince or other rulers; but the people live at large, and all things are in confuſion. The word is derived from the Greek privative α, and αρχη, *command*, *principality*. Anarchy is ſuppoſed to have reigned after the deluge, before the foundation of monarchies. We ſtill find it obtain in ſeveral parts, particularly of Africa and America.

ANARCHY is alſo applied to certain troubleſome and diſorderly periods, even in governments otherwiſe regular. In England, the period between the death of Cromwell and King Charles's reſtoration is commonly repreſented as an *anarchy*. Every month produced a new ſcheme or form of government. Enthuſiaſts talked of nothing but annulling all the laws, aboliſhing all writings, records, and regiſters, and bringing all men to the primitive level. No modern nation was more ſubject to anarchies than Poland; where every interval between the death of one king and the election of another was a ſcene of great diſorder, ſo that it was a proverb among that people, *Poland is governed by confuſion*. The Jewiſh hiſtory preſents numerous inſtances of anarchies in that ſtate, uſually denoted by this phraſe, that *in thoſe days there was no king in Iſrael, but every man did that which was right in his own eyes*; which is a juſt picture of an *anarchy*.

ANARRHICAS. See ICHTHYOLOGY *Index*.

ANARROPIA, among *Phyſicians*, a tendency of the humours to the head or ſuperior parts.

ANAS, in *Ancient Geography*, a river of Spain, riſing in the territory of Laminium in the Hither Spain, and now ſpreading into lakes, again reſtraining its waters, or, burrowing itſelf entirely in the earth, is pleaſed often to reappear. It pours into the Atlantic (Pliny). Now *Guadiana*, riſing in the ſouth-eaſt of New Caſtile, in a diſtrict commonly called Campo de Montiel, not far from the mountain Conſuegra, from the lakes called *las Lagunas de Guadiana*, and then it is called *Rio Roydera;* and, after a courſe of ſix leagues, burying itſelf in the earth for a league, it then riſes up again from three lakes, called *los Ojos de Guadiana*, near the village Villa Harta, five leagues to the north of Calatrava, and directs its courſe weſtward through New Caſtile, by Medelin, Merida, and Badajox, where it begins to bend its courſe ſouthwards, between Portugal and Andaluſia, falling into the bay of Cadiz near Ayamonte.

Anas ‖ Anaſtaſius.

ANAS. See ORNITHOLOGY *Index*.

ANASARCA, a ſpecies of dropſy. See MEDICINE.

ANASSER. See BOTANY *Index*.

ANASSUS, or ANAXUS, in *Ancient Geography*, a river in the territory of Venice, (Pliny); now the *Piave*, which riſing from the mountains of Tyrol, not far from the borders of Carinthia, runs from north to ſouth, through the territories of Cadorina, Belluno, Feltre, and, after running from weſt to eaſt, through Trevigi, falls into the Adriatic, 13 miles to the ſouth-eaſt of Venice.

ANASTATICA. See BOTANY *Index*.

ANASTASIS, a term among ancient phyſicians, for a riſing up to go to ſtool. It alſo ſignifies the paſſage of any humour, when expelled from one part, and obliged to remove to another.

ANASTASIUS I. emperor of the eaſt, ſucceeded Zeno in the year 491, and was inaugurated that ſame year on April the 11th. The Manicheans and Arians were greatly in hopes of being ſupported by the new emperor; the former becauſe his mother was their friend, and favoured their ſect; the latter becauſe the emperor's uncle was of their opinion: but if Anaſtaſius did not perſecute them (as we do not find he ever did), yet it does not appear that he ſupported either of theſe ſects. But in order to maintain the peace of the church, upon which the tranquillity of the ſtate very much depends, he declared, that ſuch biſhops or other clergymen who ſhould diſturb the public tranquillity, by maintaining with too much heat either ſide of the queſtion for or againſt the council of Chalcedon, ſhould be deprived of their benefices. Accordingly the diſputes concerning Eutychianiſm running to a very great height, and Euphemius being deeply concerned in them, the emperor expelled him from his ſee, and choſe Macedonius in his ſtead. The hatred which the different parties entertained againſt one another occaſioned often ſuch tumults and ſeditions at Conſtantinople as threatened the life of the emperor himſelf; who, to keep the people in awe, ordered that the governor of the city ſhould be preſent at all church aſſemblies and public proceſſions. This was ſo much the more neceſſary, becauſe theſe tumults were chiefly occaſioned by a kind of doxology or ſhort hymn which uſed to be ſung at divine ſervice. This doxology conſiſted only of the following words, αγιος ὁ Θεος, αγιος ισχυρος, αγιος αθανατος, that is, "Holy God, holy the powerful, holy the immortal;" for which reaſon it was called

Anaſtaſius. called τρισαγιος, *Triſagius*, "three times holy;" becauſe the word *holy* was therein three times repeated. The orthodox uſed to ſing that hymn without any addition, or by adding only to it, αγια τρια, ελεησον ημας, i. e. "Holy Trinity, have mercy upon us:" But Peter the Fuller, biſhop of Antioch, pretended to add theſe words to it, viz. ὁ σαυρωθεις δι ημας, i. e. "who haſt been crucified for us;" and as it was ſuppoſed that the firſt holy related to the Father, the ſecond to the Son, the third to the Holy Ghoſt, the adding theſe words, *who has been crucified for us*, ſeemed to inſinuate that the whole conſubſtantial Trinity had ſuffered; for which reaſon the orthodox were reſolved not to admit this addition. Anaſtaſius deſiring to have theſe fatal words added to that hymn whenever it ſhould be ſung at Conſtantinople, this occaſioned a terrible ſedition in the city, as though the very fundamentals of Chriſtianity had been overthrown. Macedonius and his clergy are ſaid to have raiſed that ſedition, which came to ſuch a height, that the emperor himſelf was obliged to come, without his crown on his head, and in a very humble manner, to the circus, where he declared to the people that he was very willing to quit the imperial throne; but he told them at the ſame time, that they could not all enjoy the ſovereign power, which does not admit of a partnerſhip; and that one perſon ſtill muſt govern them if he reſigned the crown. This diſcourſe had ſuch a power over the raging multitude, that, as if they had been divinely inſpired, they immediately requeſted the emperor to take up his crown, promiſing that they would be quiet and obedient for the future. Anaſtaſius is by the Popiſh writers repreſented as a great perſecutor of the orthodox, becauſe he baniſhed and deprived Euphemius and Macedonius; but they ſhould prove that theſe two prelates had been unjuſtly baniſhed, which is a very hard taſk. As to his civil government, it is confeſſed that at the beginning of his reign he ſhowed himſelf a very good prince: he eaſed the people of a very heavy tax called *Chryſargyrum*, under which they had groaned for a long time; he prohibited the fighting with wild beaſts; he raiſed ſeveral buildings; and avoided being involved in dangerous wars as much as lay in his power. Anaſtaſius reigned 27 years three months and three days, or, according to F. Pagi, wanting three days; and died July the 10th, A. C. 518, in the 88th year of his age.

Anaſtaſius II. whoſe proper name was *Artemius*, was in the year 713 elevated to the throne of Conſtantinople, from the low ſtation of a ſecretary, by the free voice of the ſenate and Roman people. His natural talents, improved by education and daily exertion, enabled him to manage with great prudence the affairs of the empire during the time that he was ſecretary to his predeceſſor Philippicus. The Saracens had made inroads upon Aſia Minor, in the beginning of his reign; but he ſent a ſtrong army to the frontiers of Syria for its protection, under the command of Leo the Iſaurian, a man of great military experience. Theſe enemies of the empire alſo meditated the deſign of taking Conſtantinople; but the vigilance of Anaſtaſius defeated their purpoſe, by providing a formidable naval force, repairing and ſtrengthening the walls of the city, and by forcing all the inhabitants either to provide themſelves with proviſions for three years, or inſtantly to depart from the city. Diſappointed in their deſign, the enemy's fleet ſailed to Phœnicia, and the imperial fleet aſſembled at Rhodes to watch the motions of the enemy. But the meaſures of the emperor received a ſevere check from the conduct of the ſailors, who raiſed a mutiny and ſlew their admiral for no other cauſe but his honourable endeavours to maintain proper diſcipline in the fleet. Juſtly dreading ſevere puniſhment, the ſeamen raiſed the ſtandard of rebellion, declared Anaſtaſius unworthy to reign, and conferred the purple upon one Theodoſius, a perſon of mean birth. Anaſtaſius ‖ Anathema.

Informed of this ſedition, Anaſtaſius fled from his tottering throne to Nice. The new emperor haſtened to beſiege Conſtantinople, which, after a feeble defence of ſix months, he reduced to his ſubjection. The late emperor being aſſured of his life, abandoned his claim to the crown, aſſumed the character of a monk, and was baniſhed to Theſſalonica, having worn the purple only during the ſpace of two years. Having, however, prevailed upon the Bulgarians to eſpouſe his cauſe, he laid aſide the habit of the monk for that of the warrior, and in the year 719, in the time of the emperor Leo, he reſumed his claim to the throne. A numerous army of theſe barbarians haſtened to the capital; but, being unable to reduce it, they delivered up the unhappy Anaſtaſius to the emperor, who put him to death along with his principal aſſociates. (*Anc. Un. Hiſt.*)

Anastasius, ſurnamed *Bibliothecarius*, a Roman abbot, library-keeper of the Vatican, and one of the moſt learned men of the ninth century, aſſiſted in 869 at the fourth general council, the acts and canons of which he tranſlated from the Greek into Latin. He alſo compoſed the lives of ſeveral popes, and other works; the beſt edition of which is that of the Vatican.

ANASTATICA, the rose of Jericho. See Botany *Index*.

ANASTOMOSIS, in *Anatomy*, the opening of the mouths of veſſels, in order to diſcharge their contained fluids. It is likewiſe uſed for the communication of two veſſels at their extremities; as the inoſculation of a vein with a vein, of an artery with an artery, or of an artery with a vein.

ANASTOMATICS, medicines ſuppoſed to have the power of opening the mouths of the veſſels, and promoting the circulation; ſuch as deobſtruent, cathartic, and ſudorific medicines.

ANASTROPHE, in *Rhetoric* and *Grammar*, denotes the inverſion of the natural order of the words; ſuch is, *ſaxa per et ſcopulos*, for *per ſaxa et ſcopulos*.

ANASUS, or Anisus, in *Ancient Geography*, now the *Ens*, a river of Germany; which riſing on the borders of the territory of Saltzburg; then ſeparating Upper Stiria from Upper Auſtria, and waſhing the town of Ens, falls, at the diſtance of a mile below it, into the Danube, in a courſe from ſouth to north.

ANATHEMA, among *Eccleſiaſtical Writers*, imports whatever is ſet apart, ſeparated, or divided; but is moſt uſually meant to expreſs the cutting off a perſon from the privileges of ſociety and communion with the faithful.

The anathema differs from excommunication in the circumſtances of being attended with curſes and execrations. It was practiſed in the primitive church againſt notorious offenders; and the form of that pronounced

Anathema. nounced by Synecius againſt one Andronicus is as follows: "Let no church of God be open to Andronicus, but let every ſanctuary be ſhut againſt him. I admoniſh both private men and magiſtrates to receive him neither under their roof nor to their table; and prieſts more eſpecially, that they neither converſe with him living, nor attend his funeral when dead."

Several councils alſo have pronounced anathemas againſt ſuch as they thought corrupted the purity of the following form: *Si quis diverit, &c. anathema ſit.*

There are two kinds of anathemas, the one judiciary and the other abjuratory. The former can only be denounced by a council, a pope, or a biſhop; the latter makes a part of the ceremony of abjuration, the convert being obliged to anathematize the hereſy he abjures.

ANATHEMA, in *Heathen Antiquity*, was an offering or preſent made to ſome deity, and hung up in the temple. Whenever a perſon left off his employment, it was uſual to dedicate the tools to the patron deity of the trade. Perſons too who had eſcaped from imminent danger, as ſhipwreck and the like, or had met with any other remarkable inſtance of good fortune, ſeldom failed to teſtify their gratitude by ſome preſent of this kind. Anathoth ⇓ Anatolia.

ANATHOTH, a hamlet of Paleſtine, very near Jeruſalem (Joſephus), about three miles and a half to the north; the ruins of which are ſtill to be ſeen. It was the birthplace of the prophet Jeremiah, and one of the Levitical towns in the tribe of Benjamin.

ANATIFERA CONCHA, the trivial name of a ſpecies of the lepas, a teſtaceous animal. See LEPAS.

ANATOCISM, ANATOCISMUS, an uſurious contract, wherein the intereſts ariſing from the principal ſum are added to the principal itſelf, and intereſt exacted upon the whole. The word is originally Greek, but uſed by Cicero in Latin; whence it is deſcended into moſt other languages. It comes from the preposition ανα, which in compoſition ſignifies *repetition* or *duplication*, and τοκος, *uſury*. Anatociſm is what we properly call *intereſt upon intereſt*, or *compound intereſt*. This is the worſt kind of uſury, and has been ſeverely condemned by the Roman law, as well as by the common laws of moſt other countries. See INTEREST.

ANATOLIA. See NATOLIA.

ANATOMY,

History. IN its moſt general ſenſe, is the art of diſſecting, or artificially ſeparating and taking to pieces the different parts of organized bodies, in order to an exact diſcovery of their ſituation, ſtructure, and economy; but here we limit its ſignification to animal bodies. The word is Greek, ανατομη; derived from ανατεμνω, to diſſect, or ſeparate by cutting.

INTRODUCTION.

§ 1. *Hiſtory of Anatomy.*

THIS art ſeems to have been very ancient; though, for a long time, known only in an imperfect manner.—The firſt men who lived muſt have ſoon acquired ſome notions of the ſtructure of their own bodies, particularly of the external parts, and of ſome even of the internal, ſuch as bones, joints, and ſinews, which are expoſed to the examination of the ſenſes in living bodies.

This rude knowledge muſt have been gradually improved, by the accidents to which the body is expoſed, by the neceſſities of life, and by the various cuſtoms, ceremonies, and ſuperſtitions, of different nations. Thus, the obſervance of bodies killed by violence, attention to wounded men, and to many diſeaſes, the various ways of putting criminals to death, the funeral ceremonies, and a variety of ſuch things, muſt have ſhown men every day more and more of themſelves; eſpecially as curioſity and ſelf-love would here urge them powerfully to obſervation and reflection.

The brute creation having ſuch an affinity to man in outward form, motion, ſenſes, and ways of life; the generation of the ſpecies, and the effect of death upon the body, being obſerved to be ſo nearly the ſame in both; the concluſion was not only obvious, but unavoidable, that their bodies were formed nearly upon the ſame model. And the opportunities of examining the bodies of brutes were ſo eaſily procured, indeed ſo neceſſarily occurred in the common buſineſs of life, that the huntſman in making uſe of his prey, the prieſt in ſacrificing, the augur in divination, and above all, the butcher, or thoſe who might out of curioſity attend upon his operations, muſt have been daily adding to the little ſtock of anatomical knowledge. Accordingly we find, in fact, that the South ſea iſlanders, who have been left to their own obſervation and reaſoning, without the aſſiſtance of letters, have yet a conſiderable ſhare of rude or wild anatomical and phyſiological knowledge. Dr Hunter informs us, that when Omai was in his muſeum with Mr Banks, though he could not explain himſelf intelligibly, they plainly ſaw that he knew the principal parts of the body, and ſomething likewiſe of their uſes; and manifeſted a great curioſity or deſire of having the functions of the internal parts of the body explained to him; particularly the relative functions of the two ſexes, which with him ſeemed to be the moſt intereſting object of the human mind. History.

We may further imagine, that the philoſophers of the moſt early ages, that is, the men of curioſity, obſervation, experience, and reflection, could not overlook an inſtance of natural organization, which was ſo intereſting, and at the ſame time ſo wonderful, more eſpecially ſuch of them as applied to the ſtudy and cure of diſeaſes. We known that phyſic was a branch of philoſophy till the age of Hippocrates.

Thus the art muſt have been circumſtanced in its beginning. We ſhall next ſee from the teſtimony of hiſtorians

History. hiſtorians and other writers, how it actually appeared as an art, from the time that writing was introduced among men; how it was improved, and conveyed down to us through a long ſeries of ages.

Civilization, and improvements of every kind, would naturally begin in fertile countries and healthful climates, where there would be leiſure for reflection, and an appetite for amuſement. Accordingly, writing, and many other uſeful and ornamental inventions and arts, appear to have been cultivated in the eaſtern parts of Aſia long before the earlieſt times that are treated of by the Greek or other European writers; and that the arts and learning of thoſe eaſtern people were in ſubſequent times gradually communicated to adjacent countries, eſpecially by the medium of traffic. The cuſtoms, ſuperſtitions, and climate of eaſtern countries, however, appear to have been as unfavourable to practical anatomy as they were inviting to the ſtudy of aſtronomy, geometry, poetry, and all the ſofter arts of peace.

Animal bodies there run ſo quickly into nauſeous putrefaction, that the early inhabitants muſt have avoided ſuch offenſive employments as anatomical inquiries, like their poſterity at this day. And in fact it does not appear, by the writings of the Grecians, or Jews, or Phœnicians, or of other eaſtern countries, that anatomy was particularly cultivated by any of thoſe eaſtern nations. In tracing it backwards to its infancy, we cannot go farther into antiquity than the times of the Grecian philoſophers. As an art in the ſtate of ſome cultivation, it may be ſaid to have been brought forth and bred up among them as a branch of natural knowledge.

The era of philoſophy, as it was called, began with Thales the Mileſian being declared, by a very general conſent of the people, the moſt wiſe of all the Grecians, 480 years before Chriſt. The philoſophers of his ſchool, which was called the Ionian, cultivated principally natural knowledge. Socrates, the ſeventh in ſucceſſion of their great teachers, introduced the ſtudy of morals, and was thence ſaid to bring down philoſophy from heaven, to make men truly wiſe and happy.

In the writings of his ſcholar and ſucceſſor Plato, we ſee that the philoſophers had carefully conſidered the human body, both in its organization and functions; and though they had not arrived at the knowledge of the more minute and intricate parts, which required the ſucceſſive labour and attention of many ages, they had made up very noble and comprehenſive ideas of the ſubject in general. The anatomical deſcriptions of Xenophon and Plato have had the honour of being quoted by Longinus (§ xxxii.) as ſpecimens of ſublime writing; and the extract from Plato is ſtill more remarkable for its containing the rudiments of the circulation of the blood. "The heart (ſays Plato) is the centre or knot of the blood veſſels, the ſpring or fountain of the blood, which is carried impetuouſly round; the blood is the *pabulum* or food of the fleſh; and for the purpoſe of nouriſhment, the body is laid out into canals, like thoſe which are drawn through gardens, that the blood may be conveyed, as from a fountain, to every part of the pervious body."

Hippocrates was nearly contemporary with the great philoſophers of whom we have been ſpeaking, about 400 years before the Chriſtian era. He is ſaid to have ſeparated the profeſſion of philoſophy and phyſic, and to have been the firſt who applied to phyſic alone as the buſineſs of his life. He is likewiſe generally ſuppoſed to be the firſt who wrote upon anatomy. We know of nothing that was written expreſsly upon the ſubject before; and the firſt anatomical diſſection which has been recorded was made by his friend Democritus of Abdera. History.

If, however, we read the works of Hippocrates with impartiality, and apply his accounts of the parts to what we know of the human body, we muſt allow his deſcriptions to be imperfect, incorrect, ſometimes extravagant, and often unintelligible, that of the bones only excepted. He ſeems to have ſtudied theſe with more ſucceſs than the other parts, and tells us that he had an opportunity of ſeeing a human ſkeleton.

From Hippocrates to Galen, who flouriſhed towards the end of the ſecond century, in the decline of the Roman empire, that is, in the ſpace of 600 years, anatomy was greatly improved; the philoſophers ſtill conſidering it as a moſt curious and intereſting branch of natural knowledge, and the phyſicians as a principal foundation of their art. Both of them, in that interval of time, contributed daily to the common ſtock, by more accurate and extended obſervations, and by the lights of improving philoſophy.

As theſe two great men had applied very particularly to the ſtudy of animal bodies, they not only made great improvements, eſpecially in phyſiology, but raiſed the credit of natural knowledge, and ſpread it as wide as Alexander's empire.

Few of Ariſtotle's writings were made public in his lifetime. He affected to ſay that they would be unintelligible to thoſe who had not heard them explained at his lectures: and, except the uſe which Theophraſtus made of them, they were loſt to the public for above 130 years after the death of Theophraſtus; and at laſt came out defective from bad preſervation, and corrupted by men, who, without proper qualifications, preſumed to correct and to ſupply what was loſt.

From the time of Theophraſtus, the ſtudy of natural knowledge at Athens was for ever on the decline; and the reputation of the Lycæum and Academy was almoſt confined to the ſtudies which are ſubſervient to oratory and public ſpeaking.

The other great inſtitution for Grecian education was at Alexandria in Egypt. The firſt Ptolemies, both from their love of literature, and to give true and permanent dignity to their empire, and to Alexander's favourite city, ſet up a grand ſchool in the palace itſelf, with a muſeum and a library, which, we may ſay, has been the moſt famed in the world. Anatomy, among other ſciences, was publicly taught; and the two diſtinguiſhed anatomiſts were Eraſiſtratus the pupil and friend of Theophraſtus, and Herophilus. Their voluminous works are all loſt; but they are quoted by Galen almoſt in every page. Theſe profeſſors were probably the firſt who were authorized to diſſect human bodies; a peculiarity which marks ſtrongly the philoſophical magnanimity of the firſt Ptolemy, and fixes a great era in the hiſtory of anatomy. And it was, no doubt, from this particular advantage which the Alexandrians had above all others, that their ſchool not only gained, but for many centuries preſerved, the firſt reputation

History. tation for medical education. Ammianus Marcellinus, who lived about 650 years after the ſchools were ſet up, ſays, they were ſo famous in his time, that it was enough to ſecure credit to any phyſician if he could ſay that he had ſtudied at Alexandria.

Herophilus has been ſaid to have anatomized 700 bodies. We muſt allow for exaggeration. Nay, it was ſaid, that both he and Eraſiſtratus made it a common practice to open living bodies, that they might diſcover the more ſecret ſprings of life. But this, no doubt, was only a vulgar opinion, riſing from the prejudices of mankind; and accordingly, without any good reaſon, ſuch tales have been told of modern anatomiſts, and have been believed by the vulgar.

Among the Romans, though it is probable they had phyſicians and ſurgeons from the foundation of the city, yet we have no account of any of theſe applying themſelves to anatomy for a very long time. Archagathus was the firſt Greek phyſician eſtabliſhed in Rome, and he was baniſhed the city on account of the ſeverity of his operations.—Aſclepiades, who flouriſhed in Rome 101 years after Archagathus, in the time of Pompey, attained ſuch a high reputation as to be ranked in the ſame claſs with Hippocrates. He ſeemed to have ſome notion of the air in reſpiration acting by its weight; and in accounting for digeſtion, he ſuppoſed the food to be no farther changed than by a comminution into extremely ſmall parts, which being diſtributed to the ſeveral parts of the body, is aſſimilated to the nature of each. One Caſſius, commonly thought to be a diſciple of Aſclepiades, accounted for the right ſide of the body becoming paralytic on hurting the left ſide of the brain in the ſame manner as has been done by the moderns, viz. from the croſſing of the nerves from the right to the left ſide of the brain.

From the time of Aſclepiades to the ſecond century, phyſicians ſeem to have been greatly encouraged at Rome; and in the writings of Celſus, Rufus, Pliny, Cœlius Aurelianus, and Araeteus, we find ſeveral anatomical obſervations, but moſtly very ſuperficial and inaccurate. Towards the end of the ſecond century lived Claudius Galenus Pergamus, whoſe name is ſo well known in the medical world. He applied himſelf particularly to the ſtudy of anatomy, and did more in that way than all that went before him. He ſeems, however, to have been at a great loſs for human ſubjects to operate upon: and therefore his deſcriptions of the parts are moſtly taken from brute animals. His works contain the fulleſt hiſtory of anatomiſts, and the moſt complete ſyſtem of the ſcience, to be met with anywhere before him, or for ſeveral centuries after; ſo that a number of paſſages in them were reckoned abſolutely unintelligible for many ages, until explained by the diſcoveries of ſucceeding anatomiſts.

About the end of the fourth century, Nimeſius biſhop of Emiſſa wrote a treatiſe on the nature of man, in which it is ſaid were contained two celebrated modern diſcoveries; the one, the uſes of the bile, boaſted of by Sylvius de la Boe; and the other, the circulation of the blood. This laſt, however, is proved by Dr Freind, in his Hiſtory of Phyſic, p. 229. to be falſely aſcribed to this author.

The Roman empire beginning now to be oppreſſed by the barbarians, and ſunk in groſs ſuperſtition, learning of all kinds decreaſed; and when the empire was totally overwhelmed by thoſe barbarous nations, every appearance of ſcience was almoſt extinguiſhed in Europe. The only remains of it were among the Arabians in Spain and in Aſia.—The Saracens, who came into Spain, deſtroyed at firſt all the Greek books which the Vandals had ſpared: but though their government was in a conſtant ſtruggle and fluctuation during 800 years before they were driven out, they received a taſte for learning from their countrymen of the eaſt; ſeveral of their princes encouraged liberal ſtudies; public ſchools were ſet up at Cordova, Toledo, and other towns, and tranſlations of the Greeks into the Arabic were univerſally in the hands of their teachers. History.

Thus was the learning of the Grecians transferred to the Arabians. But though they had ſo good a foundation to build upon, this art was never improved while they were maſters of the world: for they were ſatisfied with commenting upon Galen; and ſeem to have made no diſſections of human bodies.

Abdollatiph, who was himſelf a teacher of anatomy, a man eminent in his time (at and before 1202) for his learning and curioſity; a great traveller, who had been bred at Bagdad, and had ſeen many of the great cities and principal places for ſtudy in the Saracen empire; who had a favourable opinion of original obſervation, in oppoſition to book learning; who boldly corrected ſome of Galen's errors, and was perſuaded that many more might be detected; this man, we ſay, never made or ſaw, or ſeemed to think of a human diſſection. He diſcovered Galen's errors in the oſteology, by going to burying grounds, with his ſtudents and others, where he examined and demonſtrated the bones; he earneſtly recommended that method of ſtudy, in preference even to the reading of Galen, and thought that many farther improvements might be made; yet he ſeemed not to have an idea that a freſh ſubject might be diſſected with that view.

Perhaps the Jewiſh tenets which the Mahometans adopted about uncleanlineſs and pollution, might prevent their handling dead bodies; or their opinion of what was ſuppoſed to paſs between an angel and the dead perſon, might make them think diſturbing the dead highly ſacrilegious. Such however, as Arabian learning was, for many ages together there was hardly any other in all the weſtern countries of Europe. It was introduced by the eſtabliſhment of the Saracens in Spain in 711, and kept its ground till the reſtoration of learning in the end of the 15th century. The ſtate of anatomy in Europe, in the times of Arabian influence, may be ſeen by reading a very ſhort ſyſtem of anatomy drawn up by Mundinus, in the year 1315. It was extracted principally from what the Arabians had preſerved of Galen's doctrine; and, rude as it is, in that age it was judged to be ſo maſterly a performance, that it was ordered by a public decree, that it ſhould be read in all the ſchools of Italy; and it actually continued to be almoſt the only book which was read upon the ſubject for above 200 years. Corteſius gives him the credit of being the great reſtorer of anatomy, and the firſt who diſſected human bodies among the moderns.

A general prejudice againſt diſſection, however, prevailed till the 16th century. The emperor Charles V. ordered a conſultation to be held by the divines of Salamanca, in order to determine whether or not it was lawful

History. lawful in point of conſcience to diſſect a dead body. In Muſcovy, till very lately, both anatomy and the uſe of ſkeletons were forbidden; the firſt as inhuman, and the latter as ſubſervient to witchcraft.

In the beginning of the 15th century, learning revived conſiderably in Europe, and particularly phyſic, by means of copies of the Greek authors brought from the ſack of Conſtantinople; after which the number of anatomiſts and anatomical books increaſed to a prodigious degree.—The Europeans becoming thus poſſeſſed of the ancient Greek fathers of medicine, were for a long time ſo much occupied in correcting the copies they could obtain, ſtudying the meaning, and commenting upon them, that they attempted nothing of their own, eſpecially in anatomy.

And here the late Dr Hunter introduces into the annals of this art, a genius of the firſt rate, Leonardo da Vinci, who had been formerly overlooked, becauſe he was of another profeſſion, and becauſe he publiſhed nothing upon the ſubject. He is conſidered by the Doctor as by far the beſt anatomiſt and phyſiologiſt of his time: and was certainly the firſt man we know of who introduced the practice of making anatomical drawings.

Vaſſare, in his Lives of the Painters, ſpeaks of Leonardo thus, after telling us that he had compoſed a book of the anatomy of a horſe, for his own ſtudy: "He afterwards applied himſelf with more diligence to the human anatomy; in which ſtudy he reciprocally received and communicated aſſiſtance to Marc. Antonio della Torre, an excellent philoſopher, who then read lectures in Pavia, and wrote upon this ſubject; and who was the firſt, as I have heard, who began to illuſtrate medicine from the doctrine of Galen, and to give true light to anatomy, which till that time had been involved in clouds of darkneſs and ignorance. In this he availed himſelf exceedingly of the genius and labour of Leonardo, who made a book of ſtudies, drawn with red chalk, and touched with a pen, with great diligence, of ſuch ſubjects as he had himſelf diſſected; where he made all the bones, and to thoſe he joined, in their order, all the nerves, and covered them with the muſcles. And concerning thoſe, from part to part, he wrote remarks in letters of an ugly form, which are written by the left hand, backwards, and not to be underſtood but by thoſe who know the method of reading them; for they are not to be read without a looking-glaſs. Of theſe papers of the human anatomy, there is a great part in the poſſeſſion of M. Franceſco da Melzo, a Milaneſe gentleman, who, in the time of Leonardo, was a moſt beautiful boy, and much beloved by him, as he is now a beautiful and genteel old man, who reads thoſe writings, and carefully preſerves them, as precious relics, together with the portrait of Leonardo of happy memory. It appears impoſſible that that divine ſpirit ſhould reaſon ſo well upon the arteries, and muſcles, and nerves, and veins; and with ſuch diligence of every thing," &c. &c.

Thoſe very drawings and the writings are happily found to be preſerved in his majeſty's great collection of original drawings, where the Doctor was permitted to examine them; and his ſentiments upon the occaſion he thus expreſſes: "I expected to ſee little more than ſuch deſigns in anatomy as might be uſeful to a painter in his own profeſſion; but I ſaw, and indeed with aſtoniſhment, that Leonardo had been a general and a deep ſtudent. When I conſider what pains he has taken upon every part of the body, the ſuperiority of his univerſal genius, his particular excellence in mechanics and hydraulics, and the attention with which ſuch a man would examine and ſee objects which he was to draw, I am fully perſuaded that Leonardo was the beſt anatomiſt at that time in the world. We muſt give the 15th century the credit of Leonardo's anatomical ſtudies, as he was 55 years of age at the cloſe of that century." History.

In the beginning of the 16th century, Achillinus and Benedictus, but particularly Berengarius and Maſſa, followed out the improvement of anatomy in Italy, where they taught it, and publiſhed upon the ſubject. Theſe firſt improvers made ſome diſcoveries from their own diſſections: but it is not ſurpriſing that they ſhould have been diffident of themſelves, and have followed Galen almoſt blindly, when his authority had been ſo long eſtabliſhed, and when the enthuſiaſm for Greek authors was riſing to ſuch a pitch.

Soon after this, we may ſay about the year 1540, the great Veſalius appeared. He was ſtudious, laborious, and ambitious. From Bruſſels, the place of his birth, he went to Louvain, and thence to Paris, where anatomy was not yet making a conſiderable figure; and then to Louvain to teach; from which place, very fortunately for his reputation, he was called to Italy, where he met with every opportunity that ſuch a genius for anatomy could deſire, that is, books, ſubjects, and excellent draughtſmen. He was equally laborious in reading the ancients, and in diſſecting bodies. And in making the compariſon, he could not but ſee, that there was great room for improvement, and that many of Galen's deſcriptions were erroneous. When he was but a young man, he publiſhed a noble ſyſtem of anatomy, illuſtrated with a great number of elegant figures.—In this work he found ſo many occaſions of correcting Galen, that his contemporaries, partial to antiquity, and jealous of his reputation, complained that he carried his turn for improvement and criticiſms to licentiouſneſs. The ſpirit of oppoſition and emulation was preſently rouſed; and Sylvius in France, Columbus, Fallopius, and Euſtachius in Italy, who were all in high anatomical reputation about the middle of this 16th century, endeavoured to defend Galen at the expence of Veſalius. In their diſputes they made their appeals to the human body: and thus in a few years the art was greatly improved. And Veſalius being detected in the very fault which he condemns in Galen, to wit, deſcribing from the diſſections of brutes, and not of the human body, it expoſed ſo fully that blunder of the older anatomiſts, that in ſucceeding times there has been little reaſon for ſuch complaint.—Beſides the above, he publiſhed ſeveral other anatomical treatiſes. He has been particularly ſerviceable by impoſing names on the muſcles, moſt of which are retained to this day. Formerly they were diſtinguiſhed by numbers, which were differently applied by almoſt every author.

In 1561, Gabriel Fallopius, profeſſor of anatomy at Padua, publiſhed a treatiſe of anatomy under the title of *Obſervationes Anatomicæ*. This was deſigned as a ſupplement to Veſalius; many of whoſe deſcriptions he corrects, though he always makes mention of him

in an honourable manner. Fallopius made many great diſcoveries, and his book is well worth the peruſal of every anatomiſt.

In 1563, Bartholomæus Euſtachius publiſhed his *Opuſcula Anatomica* at Venice, which have ever ſince been juſtly admired for the exactneſs of the deſcriptions, and the diſcoveries contained in them. He publiſhed afterwards ſome other pieces, in which there is little of anatomy; but never publiſhed the great work he had promiſed, which was to be adorned with copperplates repreſenting all the parts of the human body. Theſe plates, after lying buried in an old cabinet for upwards of 150 years, were at laſt diſcovered and publiſhed in the year 1714, by Lanciſi the pope's phyſician; who added a ſhort explicatory text, becauſe Euſtachius's own writing could not be found.

From this time the ſtudy of anatomy gradually diffuſed itſelf over Europe: inſomuch that for the laſt hundred years it has been daily improving by the labour of a number of profeſſed anatomiſts almoſt in every country of Europe.

We may form a judgment about the ſtate of anatomy even in Italy, in the beginning of the 17th century, from the information of Corteſius. He had been profeſſor of anatomy at Bologna, and was then profeſſor of medicine at Maſſana; where, though he had a great deſire to improve himſelf in the art, and to finiſh a treatiſe which he had begun on practical anatomy, in 24 years he could twice only procure an opportunity of diſſecting a human body, and then it was with difficulties and in hurry; whereas he had expected to have done ſo, he ſays, *once every year, according to the cuſtom in the famous academies of Italy.*

In the very end of the 16th century, our great Harvey, as was the cuſtom of the times, went to Italy to ſtudy medicine; for Italy was ſtill the favourite ſeat of the arts: And in the very beginning of the 17th century, ſoon after Harvey's return to England, his maſter in anatomy, Fabricius ab Aquapendente, publiſhed an account of the valves in the veins, which he had diſcovered many years before, and no doubt taught in his lectures when Harvey attended them.

This diſcovery evidently affected the eſtabliſhed doctrine of all ages, that the veins carried the blood from the liver to all parts of the body for nouriſhment. It ſet Harvey to work upon the uſe of the heart and vaſcular ſyſtems in animals; and in the courſe of ſome years he was ſo happy as to diſcover, and to prove beyond all poſſibility of doubt, the *circulation of the blood.* He taught his new doctrine in his lectures about the year 1616, and printed it in 1628.

It was by far the moſt important ſtep that has been made in the knowledge of animal bodies in any age. It not only reflected uſeful lights upon what had been already found out in anatomy, but alſo pointed out the means of further inveſtigation. And accordingly we ſee, that from Harvey to the preſent time, anatomy has been ſo much improved, that we may reaſonably queſtion if the ancients have been further outdone by the moderns in any other branch of knowledge. From one day to another there has been a conſtant ſucceſſion of diſcoveries, relating either to the ſtructure or functions of our bodies; and new anatomical proceſſes, both of inveſtigation and demonſtration, have been daily invented. Many parts of the body which were not known in Harvey's time have ſince then been brought to light: and of thoſe which were known, the internal compoſition and functions remained unexplained; and indeed muſt have remained inexplicable without the knowledge of the circulation.

Harvey's doctrine at firſt met with conſiderable oppoſition; but in the ſpace of about 20 years it was ſo generally and ſo warmly embraced, that it was imagined every thing in phyſic would be explained. But time and experience have taught us, that we ſtill are, and probably muſt long continue to be, very ignorant; and that in the ſtudy of the human body, and of its diſeaſes, there will always be an extenſive field for the exerciſe of ſagacity.

After the diſcovery and knowledge of the circulation of the blood, the next queſtion would naturally have been about the paſſage and route of the nutritious part of the food or chyle from the bowels to the blood veſſels: And, by good fortune, in a few years after Harvey had made his diſcovery, Aſellius, an Italian phyſician, found out the lacteals, or veſſels which carry the chyle from the inteſtines; and printed his account of them, with coloured prints, in the year 1627, the very year before Harvey's book came out.

For a number of years after theſe two publications, the anatomiſts in all parts of Europe were daily opening living dogs, either to ſee the lacteals or to obſerve the phenomena of the circulation. In making an experiment of this kind, Pecquet in France was fortunate enough to diſcover the thoracic duct, or common trunk of all the lacteals, which conveys the chyle into the ſubclavian vein. He printed his diſcovery in the year 1651. And now the lacteals having been traced from the inteſtines to the thoracic duct, and that duct having been traced to its termination in a blood veſſel, the paſſage of the chyle was completely made out.

The ſame practice of opening living animals furniſhed occaſions of diſcovering the lymphatic veſſels. This good fortune fell to the lot of Rudbec firſt, a young Swediſh anatomiſt; and then to Thomas Bartholine, a Daniſh anatomiſt, who was the firſt who appeared in print upon the lymphatics. His book came out in the year 1653, that is, two years after that of Pecquet. And then it was very evident that they had been ſeen before by Dr Highmore and others, who had miſtaken them for lacteals. But none of the anatomiſts of thoſe times could make out the origin of the lymphatics, and none of the phyſiologiſts could give a ſatisfactory account of their uſe.

The circulation of the blood and the paſſage of the chyle having been ſatisfactorily traced out in full grown animals, the anatomiſts were naturally led next to conſider how theſe animal proceſſes were carried on in the child while in the womb of the mother. Accordingly the male and female organs, the appearances and contents of the pregnant uterus, the incubated egg, and every phenomenon which could illuſtrate generation, became the favourite ſubject for about 30 years with the principal anatomiſts of Europe.

Thus it would appear to have been in theory; but Dr Hunter believes, that in fact, as Harvey's maſter Fabricius laid the foundation for the diſcovery of the circulation of the blood by teaching him the valves of the veins, and thereby inviting him to conſider that ſubject; ſo Fabricius, by his lectures, and by his elegant

History. gant work *De Formato Fœtu, et de Formatione Ovi et Pulli*, probably made that likewiſe a favourite ſubject with Dr Harvey. But whether he took up the ſubject of generation in conſequence of his diſcovery of the circulation, or was led to it by his honoured maſter Fabricius, he ſpent a great deal of his time in the inquiry; and publiſhed his obſervations in a book *De Generatione Animalium*, in the year 1651, that is, ſix years before his death.

In a few years after this, Swammerdam, Van Horn, Steno, and De Graaf, excited great attention to the ſubject of generation, by their ſuppoſed diſcovery that the females of viviparous animals have ovaria, that is, cluſters of eggs in their loins, like oviparous animals; which, when impregnated by the male, are conveyed into the uterus: ſo that a child is produced from an egg as well as a chick; with this difference, that one is hatched within, and the other without, the body of the mother.

Malpighi, a great Italian genius, ſome time after, made conſiderable advances upon the ſubject of generation. He had the good fortune to be the firſt who uſed magnifying glaſſes with addreſs in tracing the firſt appearances in the formation of animals. He likewiſe made many other obſervations and improvements in the *minutiæ* of anatomy by his microſcopical labours, and by cultivating comparative anatomy.

This diſtinguiſhed anatomiſt gave the firſt public ſpecimen of his abilities by printing a diſſertation on the lungs, *anno* 1661, a period ſo remarkable for the ſtudy of nature, that it would be injuſtice to paſs it without particular notice.

At the ſame time flouriſhed Laurentius Bellinus at Florence, and was the firſt who introduced mathematical reaſoning in phyſic. In 1662, Simon Pauli publiſhed a treatiſe *De albandis Oſſibus*. He had long been admired for the white ſkeletons he prepared; and at laſt diſcovered his method, which was by expoſing the bones all winter to the weather.

Johannes Swammerdam of Amſterdam alſo publiſhed ſome anatomical treatiſes; but was moſt remarkable for his knowledge of preſerving the parts of bodies entire for many years, by injecting their veſſels. He alſo publiſhed a treatiſe on reſpiration; wherein he mentioned his having figures of all the parts of the body, as big as the life, cut in copper, which he deſigned to publiſh, with a complete ſyſtem of anatomy. Theſe, however, were never made public by Swammerdam; but, in 1683, Gothofridus Bidloo, profeſſor of anatomy at Leyden, publiſhed a work entitled *Anatomia Corporis Humani*, where all the parts were delineated in very large plates almoſt as big as the life. Mr Cowper, an Engliſh ſurgeon, bought 300 copies of theſe figures; and in 1698, publiſhed them, with an Engliſh text, quite different from Bidloo's Latin one; to which were added letters in Bidloo's figures, and ſome few figures of Mr Cowper's own. To this work Cowper's name was prefixed, without the leaſt mention of Bidloo, except on purpoſe to confute him. Bidloo immediately publiſhed a very ill-natured pamphlet, called *Gulielmus Cowperus citatus coram tribunali*; appealing to the Royal Society, how far Cowper ought to be puniſhed as a plagiary of the worſt kind, and endeavouring to prove him an ignorant deceitful fellow. Cowper anſwered him in his own ſtyle, in a pamphlet called his *Vindiciæ*; endeavouring to prove, either that Bidloo did not underſtand his own tables, or that they were none of his. It was even alleged that thoſe were the tables promiſed by Swammerdam, and which Bidloo had got from his widow. This, however, appears to have been only an invidious ſurmiſe, there being unqueſtionable evidence that they were really the performance of Bidloo. History.

Soon after, Iſbrandus Diembroeck, profeſſor of anatomy at Utrecht, began to appear as an author. His work contained very little original; but he was at great pains to collect from others whatever was valuable in their writings, and his ſyſtem was the common ſtandard among anatomical ſtudents for many years.

About the ſame time, Antonius Leeuwenhoek of Delft improved conſiderably on Malpighi's uſe of microſcopes. Theſe two authors took up anatomy where others had dropt it; and, by this new art, they brought a number of amazing things to light. They diſcovered the red globules of the blood; they were enabled to ſee the actual circulation of the blood in the tranſparent parts of living animals, and could meaſure the velocity of its motion; they diſcovered that the arteries and veins had no intermediate cells or ſpongy ſubſtance, as Harvey and all the preceding anatomiſts had ſuppoſed, but communicated one with the other by a continuation of the ſame tube.

Leeuwenhoek was in great fame likewiſe for his diſcovery of the animalcula in the ſemen. Indeed there was ſcarcely a part of the body, ſolid or fluid, which eſcaped his examination; and he almoſt everywhere found, that what appeared to the naked eye to be rude indigeſted matter, was in reality a beautiful and regular compound.

After this period, Nuck added to our knowledge of the abſorbent ſyſtem already mentioned by his injections of the lymphatic glands; Ruyſch, by his deſcription of the valves of the lymphatic veſſels; and Dr Meckel, by his accurate account of the whole ſyſtem, and by tracing thoſe veſſels in many parts where they had not before been deſcribed.

Beſides theſe authors, Drs Hunter and Monro have called the attention of the public to this part of anatomy, in their controverſy concerning the diſcovery of the office of the lymphatics.

When the lymphatic veſſels were firſt ſeen and traced into the thoracic duct, it was natural for anatomiſts to ſuſpect, that as the lacteals abſorbed from the cavity of the inteſtines, the lymphatics, which are ſimilar in figure and ſtructure, might poſſibly do the ſame office with reſpect to other parts of the body: and accordingly, Dr Gliſſon, who wrote in 1654, ſuppoſes theſe veſſels aroſe from cavities, and that their uſe was to abſorb; and Frederic Hoffman has very explicitly laid down the doctrine of the lymphatic veſſels being a ſyſtem of abſorbents. But anatomiſts in general have been of a contrary opinion: for from experiments, particularly ſuch as were made by injections, they have been perſuaded that the lymphatic veſſels did not ariſe from cavities, and did not abſorb, but were merely continuations from ſmall arteries. The doctrine, therefore, that the lymphatics, like the lacteals, were abſorbents, as had been ſuggeſted by Gliſſon and by Hoffman, has been revived by Dr Hunter and Dr Monro, who have controverted the experiments of

Hiſtory. their predeceſſors in anatomy, and have endeavoured to prove that the lymphatic veſſels are not continued from arteries, but are abſorbents.

To this doctrine, however, ſeveral objections have been ſtarted, particularly by Haller (*Elem. Phyſ.* l. 24. § 2, 3.); and it has been found, that before the doctrine of the lymphatics being a ſyſtem of abſorbents can be eſtabliſhed, it muſt firſt be determined whether this ſyſtem is to be found in other animals beſides man and quadrupeds. Mr Hewſon claims the merit of having proved the affirmative of this queſtion, by diſcovering the lymphatic ſyſtem in birds, fiſh, and amphibious animals. See *Phil. Tranſ.* vol. lviii. and lxix.—And latterly, Mr Cruikſhank has traced the ramifications of that ſyſtem in almoſt every part of the body; and from his diſſections, figures have been made and lately publiſhed to the world. To Mr Sheldon alſo we are much indebted for his illuſtration of this ſyſtem, which promiſes to give great ſatisfaction, but of which only a part has been yet publiſhed.

The gravid uterus is a ſubject likewiſe which has received conſiderable improvements, particularly relating to one very important diſcovery; viz. that the internal membrane of the uterus, which Dr Hunter has named *decidua*, conſtitutes the exterior part of the ſecundines or after-birth, and ſeparates from the reſt of the uterus every time that a woman either bears a child or ſuffers a miſcarriage. This diſcovery includes another, to wit, that the placenta is partly made up of an exereſcence or efflореſcence from the uterus itſelf.

Theſe diſcoveries are of the utmoſt conſequence, both in the phyſiological queſtion about the connexion between the mother and child, and likewiſe in explaining the phenomena of births and abortions, as well as in regulating obſtetrical practice.

The anatomiſts of this century have improved anatomy, and have made the ſtudy of it much more eaſy, by giving us more correct as well as more numerous figures. It is amazing to think of what has been done in that time. We have had four large folio books of figures of the bones, viz. Cheſelden's, Albinus's, Sue's and Trew's. Of the muſcles, we have had two large folios; one from Cowper, which is elegant; and one from Albinus, which, from the accuracy and labour of the work, we may ſuppoſe will never be outdone. Of the blood veſſels we have a large folio from Dr Haller. We have had one upon the nerves from Dr Meckel, and another by Dr Monro junior. We have had Albinus's, Roederer's, Jenty's, and Hunter's works upon the pregnant uterus; Weitbrecht and Leber on the joints and freſh bones; Soemerring on the brain; Zinn on the eye; Cotunnius, Meckel junior, &c. on the ear; Walter on the nerves of the thorax and abdomen; Dr Monro on the burſæ mucoſæ, &c.

It would be endleſs to mention the anatomical figures that have been publiſhed in this century of particular and ſmaller parts of the body, by Morgagni, Ruyſch, Valſalva, Sanctorini, Heiſter, Vater, Cant, Zimmerman, Walterus, and others.

Thoſe elegant plates of the brain, however, juſt publiſhed by M. Vicq. d'Azyr, muſt not paſs without notice, eſpecially as they form part of an univerſal ſyſtem of anatomy and phyſiology, both human and comparative, propoſed to be executed in the ſame ſplendid ſtyle. Upon the brain alone 19 folio plates are employed; of which ſeveral are coloured. The figures are delineated with accuracy and clearneſs; but the colouring is rather beautiful than correct. Such parts of this work as may be publiſhed, cannot fail to be equally acceptable to the anatomiſt and the philoſopher: but the entire deſign is apparently too extenſive to be accompliſhed within the period of a ſingle life. In our own country, alſo, a very great anatomical work is carrying on by Andrew Bell, F. S. A. S. engraver to his Royal Highneſs the Prince of Wales, with the approbation of Dr Monro, and under the inſpection of his very ingenious aſſiſtant Mr Fyfe. It is to compoſe a complete illuſtration, both general and particular, of the human body, by a ſelection from the beſt plates of all the greateſt anatomiſts, as well foreign as of this country, exhibiting the lateſt diſcoveries in the ſcience, and accompanied with copious explanations. The whole number of plates mentioned in the Proſpectus is 240, of which 152 are already done; all in royal folio. Hiſtory.

To the foreign treatiſes already mentioned may be added thoſe recently publiſhed by Sabbatier and Plenck on anatomy in general. Among ourſelves, the writings of Keil, Douglas, Cheſelden, the firſt Monro, Winſlow, &c. are too well known to need deſcription. The laſt of theſe uſed to be recommended as a ſtandard for the ſtudents of anatomy; but it has of late given place to a more accurate and comprehenſive ſyſtem, in three volumes, publiſhed by Mr Elliot of Edinburgh upon a plan approved of by Dr Monro, and executed by Mr Fyfe. Dr Simmons of London has alſo obliged the world with an excellent ſyſtem of anatomy; and another work, under the title of "Elements of Anatomy and the Animal Economy:" in which the ſubjects are treated with uncommon elegance and perſpicuity.

In the latter part of the laſt century, anatomy made two great ſteps, by the invention of injections, and the method of making what we commonly call *preparations*. Theſe two modern arts have really been of infinite uſe to anatomy; and beſides have introduced an elegance into our adminiſtrations, which in former times could not have been ſuppoſed to be poſſible. They aroſe in Holland under Swammerdam and Ruyſch, and afterwards in England under Cowper, St André, and others, where they have been greatly improved.

The anatomiſts of former ages had no other knowledge of the blood veſſels than what they were able to collect from laborious diſſections, and from examining the ſmaller branches of them, upon ſome lucky occaſion, when they were found more than commonly loaded with red blood. But filling the vaſcular ſyſtem with a bright coloured wax, enables us to trace the large veſſels with great eaſe, renders the ſmaller much more conſpicuous, and makes thouſands of the very minute ones viſible, which from their delicacy, and the tranſparency of their natural contents, are otherwiſe imperceptible.

The modern art of corroding the fleſhy parts with a menſtruum, and of leaving the moulded wax entire, is ſo exceedingly uſeful, and at the ſame time ſo ornamental, that it does great honour to the ingenious inventor Dr Nicholls.

The wax-work art of the moderns might deſerve notice in any hiſtory of anatomy, if the maſters in that way had not been ſo careleſs in their imitation. Many of the wax figures are ſo tawdry, with a ſhow of unnatural colours, and ſo very incorrect in the circumſtances of

General view of the ſubject.

of figure, ſituation, and the like, that though they ſtrike a vulgar eye with admiration, they muſt appear ridiculous to an anatomiſt. But thoſe figures which are caſt in wax, plaſter, or lead, from the real ſubject, and which of late years have been frequently made here, are, of courſe, very correct in all the principal parts, and may be conſidered as no inſignificant acquiſition to modern anatomy. The proper, or principal, uſe of this art is, to preſerve a very perfect likeneſs of ſuch ſubjects as we but ſeldom can meet with, or cannot well preſerve in a natural ſtate; a ſubject in pregnancy, for example.

The modern improved methods of preſerving animal bodies, or parts of them, has been of the greateſt ſervice to anatomy; eſpecially in ſaving the time and labour of the anatomiſt in the nicer diſſections of the ſmall parts of the body. For now, whatever he has prepared with care, he can preſerve; and the object is ready to be ſeen at any time. And in the ſame manner he can preſerve anatomical curioſities, or rarities of every kind; ſuch as, parts that are uncommonly formed; parts that are diſeaſed; the parts of the pregnant uterus and its contents. Large collections of ſuch curioſities, which modern anatomiſts are ſtriving almoſt everywhere to procure, are of infinite ſervice to the art, eſpecially in the hands of teachers. They give ſtudents clear ideas about many things which it is very eſſential to know, and yet which it is impoſſible that a teacher ſhould be able to ſhow otherwiſe, were he ever ſo well ſupplied with freſh ſubjects.

§ 2. *View of the Subject in general, and Plan of the following Treatiſe.*

The etymology of the word *anatomy*, as above given, implies ſimply *diſſection;* but by this term ſomething more is uſually underſtood.

It is every day made uſe of to expreſs a knowledge of the human body; and a perſon who is ſaid to underſtand anatomy, is ſuppoſed to be converſant with the ſtructure and arrangement of the different ſolid parts of the body.

It is commonly divided into *Anatomy*, properly ſo called; and *Comparative* Anatomy: the firſt of theſe is confined ſolely to the human body; the latter includes all animals, ſo far as a knowledge of their ſtructure may tend to perfect our ideas of the human body.

The term *anatomy* may alſo have another and more extenſive ſignification: it may be employed to expreſs not only a knowledge of the ſtructure and diſpoſition of the parts, but likewiſe of their economy and uſe. Conſidered in this light, it will ſeldom fail to excite the curioſity of people of taſte, as a branch of philoſophy; ſince, if it is pleaſing to be acquainted with the ſtructure of the body, it is certainly more ſo to diſcover all the ſprings which give life and motion to the machine, and to obſerve the admirable mechaniſm by which ſo many different functions are executed.

Aſtronomy and anatomy, as Dr Hunter, after Fontenelle, obſerves, are the ſtudies which preſent us with the moſt ſtriking view of the two greateſt attributes of the Supreme Being. The firſt of theſe fills the mind with the idea of his immenſity, in the largeneſs, diſtances, and number of the heavenly bodies; the laſt aſtoniſhes with his intelligence and art in the variety and delicacy of animal mechaniſm.

The human body has been commonly enough known by the name of *microcoſmus*, or the little world; as if it did not differ ſo much from the univerſal ſyſtem of nature in the ſymmetry and number of its parts as in their ſize.

General view of the ſubject.

Galen's excellent treatiſe *De Uſu Partium*, was compoſed as a proſe hymn to the Creator; and abounds with as irreſiſtible proofs of a ſupreme Cauſe and governing Providence, as we find in modern phyſico-theology. And Cicero dwells more on the ſtructure and economy of animals than on all the productions of nature beſides, when he wants to prove the exiſtence of the gods from the order and beauty of the univerſe. He there takes a ſurvey of the body of man in a moſt elegant ſynopſis of anatomy, and concludes thus: "Quibus rebus expoſitis, ſatis docuiſſe videor, hominis natura, quanto omnes anteiret animantes. Ex quo debet intelligi, nec figuram ſitumque membrorum, nec ingenii mentiſque vim talem effici potuiſſe fortuna."

The ſatisfaction of mind which ariſes from the ſtudy of anatomy, and the influence which it muſt naturally have upon our minds as philoſophers, cannot be better conveyed than by the following paſſage from the ſame author: "Quæ contuens animus, accepit ab his cognitionem deorum, ex qua oritur pietas: cui conjuncta juſtitia eſt, reliquæque virtutes: ex quibus vita beata exſiſtit, par et ſimilis deorum, nulla alia re niſi immortalitate, quæ nihil ad bene vivendum pertinet, cedens cæleſtibus."

It would be endleſs to quote the animated paſſages of this ſort which are to be found in the phyſicians, philoſophers, and theologiſts, who have conſidered the ſtructure and functions of animals with a view towards the Creator. It is a view which muſt ſtrike one with a moſt awful conviction. Who can know and conſider the thouſand evident proofs of the aſtoniſhing art of the Creator, in forming and ſuſtaining an animal body ſuch as ours, without feeling the moſt pleaſant enthuſiaſm? Can we ſeriouſly reflect upon this awful ſubject, without being almoſt loſt in adoration? without longing for another life after this, in which we may be gratified with the higheſt enjoyment which our faculties and nature ſeem capable of, the ſeeing and comprehending the whole plan of the Creator, in forming the univerſe, and in directing all its operations?

But the more immediate purpoſes of anatomy concern thoſe who are to be the guardians of health, as this ſtudy is neceſſary to lay a foundation for all the branches of medicine. The more we know of our fabric, the more reaſon we have to believe, that if our ſenſes were more acute, and our judgment more enlarged, we ſhould be able to trace many ſprings of life which are now hidden from us: by the ſame ſagacity we ſhould diſcover the true cauſes and nature of diſeaſes; and thereby be enabled to reſtore the health of many, who are now, from our more confined knowledge, ſaid to labour under incurable diſorders. By ſuch an intimate acquaintance with the economy of our bodies, we ſhould diſcover even the ſeeds of diſeaſes, and deſtroy them before they had taken root in the conſtitution.

That anatomy is the very baſis of ſurgery every body allows. It is diſſection alone that can teach us, where we may cut the living body with freedom and deſpatch; and where we may venture with great circumſpection

and

General view of the subject.

and delicacy; and where we muſt not upon any account attempt it. This informs the *head*, gives dexterity to the *hand*, and familiarizes the *heart* with a ſort of neceſſary inhumanity, the uſe of cutting inſtruments upon our fellow-creatures.

Beſides the knowledge of our body, through all the variety of its *ſtructure* and *operations* in a *ſound* ſtate, it is by anatomy only that we can arrive at the knowledge of the true nature of moſt of the diſeaſes which afflict humanity. The ſymptoms of many diſorders are often equivocal; and diſeaſes themſelves are thence frequently miſtaken, even by ſenſible, experienced, and attentive phyſicians. But by anatomical examination after death, we can with certainty find out the miſtake, and learn to avoid it in any ſimilar caſe.

This uſe of anatomy has been ſo generally adopted by the moderns, that the caſes already publiſhed are almoſt innumerable: Mangetus, Morgagni, indeed many of the beſt modern writings in phyſic, are full of them. And if we look among the phyſicians of the beſt character, and obſerve thoſe who have the *art* itſelf, rather than the *craft* of the profeſſion at heart; we ſhall find them conſtantly taking pains to procure leave to examine the bodies of their patients after death.

After having conſidered the riſe and progreſs of anatomy; the various diſcoveries that have been made in it, from time to time; the great number of diligent obſervers who have applied themſelves to this art; and the importance of the ſtudy, not only for the prevention and cure of diſeaſes, but in furniſhing the livelieſt proofs of divine wiſdom; the following queſtions ſeem naturally to ariſe: For what purpoſe is there ſuch a variety of parts in the human body? Why ſuch a complication of nice and tender machinery? Why was there not rather a more ſimple, leſs delicate, and leſs expenſive frame (A)?

In order to acquire a ſatisfactory general idea of this ſubject, and find a ſolution of all ſuch queſtions, let us, in our imagination, *make* a man: in other words, let us ſuppoſe that the *mind*, or immaterial part, is to be placed in a corporeal fabric, in order to hold a correſpondence with other material beings by the intervention of the body; and then conſider, *à priori*, what will be wanted for her accommodation. In this inquiry, we ſhall plainly ſee the neceſſity or advantage, and therefore the final cauſe, of moſt of the parts which we actually find in the human body. And if we conſider that, in order to anſwer ſome of the requiſites, human wit and invention would be very inſufficient; we need not be ſurpriſed if we meet with ſome parts of the body whoſe uſe we cannot yet perceive, and with ſome operations or functions which we cannot explain. We can ſee that the whole bears the moſt ſtriking characters of excelling wiſdom and ingenuity: but the imperfect ſenſes and capacity of *man* cannot pretend to reach every part of a machine, which nothing leſs than the intelligence and power of the *Supreme Being* could contrive and execute.

Firſt, then, The *mind*, the thinking immaterial agent, muſt be provided with a place of immediate reſidence, which ſhall have all the requiſites for the union of ſpirit and body; accordingly ſhe is provided with the *brain*, where ſhe dwells as governor and ſuperintendant of the whole fabric.

General view of the subject.

In the next place, As ſhe is to hold a correſpondence with all the material beings around her, ſhe muſt be ſupplied with organs fitted to receive the different kinds of impreſſions which they will make. In fact, therefore, we ſee that ſhe is provided with the organs of ſenſe, as we call them; the eye is adapted to light; the ear to ſound; the noſe to ſmell; the mouth to taſte; and the ſkin to touch.

Further: She muſt be furniſhed with organs of communication between herſelf in the brain and thoſe organs of ſenſe, to give her information of all the impreſſions that are made upon them: and ſhe muſt have organs between herſelf in the brain and every other part of the body, fitted to convey her commands and influence over the whole. For theſe purpoſes the nerves are actually given. They are chords, which riſe from the brain, the immediate reſidence of the mind, and diſperſe themſelves in branches through all parts of the body. They convey all the different kinds of ſenſations to the mind, in the brain; and likewiſe carry out from thence all her commands or influence to the other parts of the body. They are intended to be occaſional monitors againſt all ſuch impreſſions as might endanger the wellbeing of the whole, or of any particular part; which vindicates the Creator of all things, in having actually ſubjected us to thoſe many diſagreeable and painful ſenſations which we are expoſed to from a thouſand accidents in life.

Moreover, the mind, in this corporeal ſyſtem, muſt be endued with the power of moving from place to place, that ſhe may have intercourſe with a variety of objects; that ſhe may fly from ſuch as are diſagreeable, dangerous, or hurtful, and purſue ſuch as are pleaſant or uſeful to her. And accordingly ſhe is furniſhed with limbs, and with muſcles and tendons, the inſtruments of motion, which are found in every part of the fabric where motion is neceſſary.

But to ſupport, to give firmneſs and ſhape to the fabric; to keep the ſofter parts in their proper places; to give fixed points for, and the proper direction to its motions, as well as to protect ſome of the more important and tender organs from external injuries; there muſt be ſome firm prop-work interwoven through the whole. And in fact, for ſuch purpoſes the bones are given.

The prop-work muſt not be made into one rigid fabric, for that would prevent motion. Therefore there are a number of bones.

Theſe pieces muſt all be firmly bound together, to prevent their diſlocation. And this end is perfectly well anſwered by the ligaments.

The extremities of theſe bony pieces, where they move and rub upon one another, muſt have ſmooth and ſlippery ſurfaces for eaſy motion. This is moſt happily provided for by the cartilages and mucus of the joints.

The

(A) The following beautiful repreſentation is taken from the late Dr Hunter's *Introductory Lecture in Anatomy*.

General view of the ſubject.

The interſtices of all theſe parts muſt be filled up with ſome ſoft and ductile matter, which ſhall keep them in their places, unite them, and at the ſame time allow them to move a little upon one another. And theſe purpoſes are anſwered by the cellular membrane or adipoſe ſubſtance.

There muſt be an outward covering over the whole apparatus, both to give it compactneſs and to defend it from a thouſand injuries; which, in fact, are the very purpoſes of the ſkin and other integuments.

Laſtly, The mind being formed for ſociety and intercourſe with beings of her own kind, ſhe muſt be endued with powers of expreſſing and communicating her thoughts by ſome ſenſible marks or ſigns; which ſhall be both eaſy to herſelf, and admit of great variety: and accordingly ſhe is provided with the organs and faculty of ſpeech, by which ſhe can throw out ſigns with amazing facility, and vary them without end.

Thus we have built up an animal body which would ſeem to be pretty complete: but as it is the nature of matter to be altered and worked upon by matter; ſo in a very little time ſuch a living creature muſt be deſtroyed, if there is no proviſion for repairing the injuries which ſhe muſt commit upon herſelf, and thoſe which ſhe muſt be expoſed to from without. Therefore a treaſure of blood is actually provided in the heart and vaſcular ſyſtem, full of nutritious and healing particles, fluid enough to penetrate into the minuteſt parts of the animal; impelled by the heart, and conveyed by the arteries, it waſhes every part, builds up what was broken down, and ſweeps away the old and uſeleſs materials. Hence we ſee the neceſſity or advantage of the heart and arterial ſyſtem.

What more there was of this blood than enough to repair the preſent damages of the machine, muſt not be loſt, but ſhould be returned again to the heart; and for this purpoſe the venous ſyſtem is actually provided.

Theſe requiſites in the animal explain, *à priori*, the circulation of the blood.

The old materials which were become uſeleſs, and are ſwept off by the current of blood, muſt be ſeparated and thrown out of the ſyſtem. Therefore glands, the organs of ſecretion, are given for ſtraining whatever is redundant, vapid, or noxious, from the maſs of blood; and when ſtrained, they are thrown out by emunctories, called organs of excretion.

But now, as the machine muſt be conſtantly wearing, the reparation muſt be carried on without intermiſſion, and the ſtrainers muſt always be employed. Therefore there is actually a perpetual circulation of the blood, and the ſecretions are always going on.

Even all this proviſion, however, would not be ſufficient; for that ſtore of blood would ſoon be conſumed, and the fabric would break down, if there were not a proviſion made for freſh ſupplies. Theſe we obſerve, in fact, are profuſely ſcattered round her in the animal and vegetable kingdoms; and ſhe is furniſhed with hands, the fitteſt inſtruments that could have been contrived, for gathering them, and for preparing them in a variety of ways for the mouth.

But theſe ſupplies, which we call food, muſt be conſiderably changed; they muſt be converted into blood. Therefore ſhe is provided with teeth for cutting and bruiſing the food, and with a ſtomach for melting it down: In ſhort, with all the organs ſubſervient to digeſtion. The finer parts of the aliments only can be uſeful in the conſtitution: theſe muſt be taken up and conveyed into the blood, and the dregs muſt be thrown off. With this view the inteſtinal canal is actually given. It ſeparates the nutritious part, which we call *chyle*, to be conveyed into the blood by the ſyſtem of abſorbent veſſels; and the fæces paſs downwards, to be conducted out of the body.

General view of the ſubject.

Now we have got our animal not only furniſhed with what is wanted for its immediate exiſtence, but alſo with the powers of protracting that exiſtence to an indefinite length of time. But its duration, we may preſume, muſt neceſſarily be limited: for as it is nouriſhed, grows, and is raiſed up to its full ſtrength and utmoſt perfection; ſo it muſt in time, in common with all material beings, begin to decay, and then hurry on to final ruin. Hence we ſee the neceſſity of a ſcheme for renovation. Accordingly wiſe Providence, to perpetuate as well as preſerve his work, beſides giving a ſtrong appetite for life and ſelf-preſervation, has made animals male and female, and given them ſuch organs and paſſions as will ſecure the propagation of the ſpecies to the end of time.

Thus we ſee, that by the very imperfect ſurvey which human reaſon is able to take of this ſubject, the animal man muſt neceſſarily be complex in his corporeal ſyſtem, and in its operations.

He muſt have one great and general ſyſtem, the vaſcular, branching through the whole for circulation: Another, the nervous, with its appendages the organs of ſenſe, for every kind of feeling: And a third, for the union and connexion of all thoſe parts.

Beſides theſe primary and general ſyſtems, he requires others which may be more local or confined: One for ſtrength, ſupport, and protection; the bony compages: Another for the requiſite motions of the parts among themſelves, as well as for moving from place to place; the muſcular part of the body: Another to prepare nouriſhment for the daily recruit of the body; the digeſtive organs: And one for propagating the ſpecies; the organs of generation.

And in taking this general ſurvey of what would appear, *à priori*, to be neceſſary for adapting an animal to the ſituations of life, we obſerve, with great ſatisfaction, that man is accordingly made of ſuch ſyſtems, and for ſuch purpoſes. He has them all; and he has nothing more except the organs of reſpiration. Breathing it ſeemed difficult to account for *à priori*: we only knew it to be in fact eſſential and neceſſary to life. Notwithſtanding this, when we ſaw all the other parts of the body, and their functions, ſo well accounted for, and ſo wiſely adapted to their ſeveral purpoſes, there could be no doubt that reſpiration was ſo likewiſe: And accordingly, the diſcoveries of Dr Prieſtley have lately thrown light upon this function alſo, as will be ſhown in its proper place.

Of all the different ſyſtems in the human body, the uſe and neceſſity are not more apparent, than the wiſdom and contrivance which has been exerted in putting them all into the moſt compact and convenient form: in diſpoſing them ſo, that they ſhall mutually receive and give helps to one another; and that all, or many of the parts, ſhall not only anſwer their principal end or purpoſe, but operate ſucceſsfully and uſefully in a a variety of ſecondary ways.

General view of the ſubject.

If we conſider the whole animal machine in this light, and compare it with any machine in which human art has exerted its utmoſt; ſuppoſe the beſt conſtructed ſhip that ever was built, we ſhall be convinced beyond the poſſibility of doubt, that there are intelligence and power far ſurpaſſing what humanity can boaſt of.

One ſuperiority in the natural machine is peculiarly ſtriking. In machines of human contrivance or art, there is no internal power, no principle in the machine itſelf, by which it can alter and accommodate itſelf to any injury which it may ſuffer, or make up any injury which admits of repair. But in the natural machine, the animal body, this is moſt wonderfully provided for, by internal powers in the machine itſelf; many of which are not more certain and obvious in their effects, than they are above all human comprehenſion as to the manner and means of their operation. Thus, a wound heals up of itſelf; a broken bone is made firm again by a callus; a dead part is ſeparated and thrown off; noxious juices are driven out by ſome of the emunctories; a redundancy is removed by ſome ſpontaneous bleeding; a bleeding naturally ſtops of itſelf; and a great loſs of blood, from any cauſe, is in ſome meaſure compenſated by a contracting power in the vaſcular ſyſtem, which accommodates the capacity of the veſſels to the quantity contained. The ſtomach gives information when the ſupplies have been expended; repreſents, with great exactneſs, the quantity and the quality of what is wanted in the preſent ſtate of the machine; and in proportion as ſhe meets with neglect, riſes in her demand, urges her petition in a louder tone, and with more forcible arguments. For its protection, an animal body reſiſts heat and cold in a very wonderful manner, and preſerves an equal temperature in a burning and in a freezing atmoſphere.

General view of the ſubject.

A further excellence and ſuperiority in the natural machine, if poſſible, ſtill more aſtoniſhing, more beyond all human comprehenſion, than what we have been ſpeaking of, is the following: Beſides thoſe internal powers of ſelf-preſervation in each individual, when two of them co-operate, or act in concert, they are endued with powers of making other animals, or machines, like themſelves, which again are poſſeſſed of the ſame powers of producing others, and ſo of multiplying the ſpecies without end.

Theſe are powers which mock all human invention or imitation. They are characteriſtics of the divine Architect.

Having premiſed this general account of the ſubject, we ſhall next conſider the method to be obſerved in treating it.

Anatomy, it has been already obſerved is divided into two parts; Anatomy, properly ſo called, or the anatomy of the human body, and Comparative Anatomy. In the following treatiſe we ſhall adopt the ſame arrangement. In the firſt part we ſhall treat of the Anatomy of the Human Body, and in the ſecond of Comparative Anatomy.

PART I.

ANATOMY OF THE HUMAN BODY.

THE ſtudy of the *human* body, as already noticed, is commonly divided into two parts. The firſt, which is called *Anatomy*, relates to the matter and ſtructure of its parts; the ſecond, called *Phyſiology* and *animal œconomy*, relates to the principles and laws of its internal operations and functions.

As the body is a compound of ſolids and fluids, *Anatomy* is divided into,

1. The Anatomy of the ſolids, and
2. The Anatomy of the fluids.

I. The SOLIDS, by which we mean all parts of our body which are not fluid, are generally divided into two claſſes, viz.

1. The hard ſolids or bones. This part of anatomy is called *Oſteology;* which ſignifies the doctrine of the bones.

2. The ſofter ſolids; which part is called *Sarcology*, viz. the doctrine of fleſh.

This diviſion of the ſolids, we may obſerve, has probably taken its origin from the vulgar obſervation, that the body is made of bone and fleſh. And as there are many different kinds of what are called ſoft or fleſhy parts, Sarcology is ſubdivided into,

(1.) *Angeiology*, or the doctrine of veſſels; by which is commonly underſtood *blood veſſels:*

(2.) *Adenology*, of glands:

(3.) *Neurology*, of nerves:

(4.) *Myology*, of muſcles: and,

(5.) *Splanchnology*, of the viſcera or bowels. There is, beſides, that part which treats of the organs of ſenſe and of the integuments.

This diviſion of the ſolids has been here mentioned, rather for the ſake of explaining ſo many words, which are conſtantly uſed by anatomiſts, than for its importance or accuracy. For beſides many other objections that might be urged, there are in the body three ſpecies of ſolids, viz. griſtle or cartilage, hair, and nails; which are of an intermediate nature between bone and fleſh; and therefore cannot ſo properly be brought into the oſteology or the ſarcology. The cartilages were claſſed with the bones: becauſe the greateſt number of them are appendages to bones: and for the like reaſon the hair and the nails were claſſed with the integuments.

II. The FLUIDS of the human body may be divided into *three* kinds, which Dr Hunter calls the *crude*, the *general* or *perfect*, and the *local* or *ſecreted fluid*.

1. By the *crude* fluid is meant the chyle, and whatever is abſorbed at the ſurfaces of the body; in other words, what is recently taken into the body, and is not yet mixed with or converted into blood.

2. The *general* or *perfect* fluid is the blood itſelf; viz. what is contained in the heart, arteries, and veins, and is going on in the round of the circulation.

3. The

Osteology.

3. The *local* or *secreted*, are those fluids peculiar to particular parts of the body, which are strained off from the blood, and yet are very different in their properties from the blood. They are commonly called *secretions;* and some are useful, others excrementitious.

In treating of the *Physiology*, it is very difficult to say what plan should be followed; for every method which has been yet proposed is attended with manifest inconvenience. The powers and operations of the machine have such a dependence upon one another, such connexions and reciprocal influence, that they cannot well be understood or explained separately. In this sense our body may be compared to a circular chain of powers, in which nothing is first or last, nothing solitary or independent; so that wherever we begin, we find that there is something preceding which we ought to have known. If we begin with the brain and the nerves, for example, we shall find that these cannot exist, even in idea, without the heart: if we set out with the heart and vascular system, we shall presently be sensible that the brain and nerves must be supposed: or, should we take up the mouth, and follow the course of the aliment, we should see that the very first organ which presented itself, supposed the existence both of the heart and brain: Wherefore we shall incorporate the Physiology with the Anatomy, by attempting to explain the functions after we have demonstrated the organs.

Osteology.

CHAP. I. OSTEOLOGY.

WE begin with the bones, which may be considered as the great support of the body, tending to give it shape and firmness.—But before we enter into the detail of each particular bone, it will be necessary to describe their composition and connexions, and to explain the nature of the different parts which have an immediate relation to them: as the cartilages, ligaments, periosteum, marrow, and synovial glands.

SECT. I. *Of the Bones in general, with their Appendages,* &c.

1

Of the composition of the bones.

THE bones are of a firm and hard (B) substance, of a white colour, and perfectly insensible. They are the most compact and solid parts of the body, and serve for the attachment or support of all the other parts.

Three different substances are usually distinguished in them; their exterior or bony part, properly so called: their spongy cells; and their reticular substance. The first of these is formed of many laminæ or plates, composing a firm hard substance.—The spongy or cellular part is so called on account of its resemblance to a sponge, from the little cells which compose it. This substance forms almost the whole of the extremities of cylindrical bones. The reticular part is composed of fibres, which cross each other in different directions. This net-work forms the internal surface of those bones which have cavities.

The flat bones, as those of the head, are composed only of the laminæ and the cellular substance. This last is usually found in the middle of the bone, dividing it into two plates, and is there called *diploë*.

Gagliardi, who pretended to have discovered an infinite number of claviculi (C) or bony processes, which he describes as traversing the laminæ to unite them together, has endeavoured to support this pretended discovery by the analogy of bones to the bark of trees, in which certain woody nails have been remarked; but this opinion seems to be altogether fanciful.

Some writers have supposed, that the bones are formed by layers of the periosteum, which gradually ossify in the same manner as the timber is formed in trees by the hardening of the white substance that is found between the inner bark and the wood. M. Duhamel, who has adopted this opinion, fed different animals with madder and their ordinary food alternately during a certain time; and he asserts, that in dissecting their bones, he constantly observed distinct layers of red and white, which corresponded with the length of time they had lived on madder or their usual aliment. But it has since been proved by Detleff, that M. Duhamel's experiments were inaccurate, and that neither the periosteum nor the cartilages are tinged by the use of madder, which is known to affect the bones only.

We usually consider in a bone, its body and its extremities. The ancients gave the name of diaphysis to the body or middle part, and divided the extremities into apophysis and epiphysis. An apophysis, or process, as it is more commonly called, is an eminence continued from the body of the bone, whereas an epiphysis is at first a sort of an appendage to the bone, by means of an intermediate cartilage. Many epiphyses, which appear as distinct bones in the fœtus, afterwards become apophyses; for they are at length so completely united to the body of the bone as not to be distinguishable from it in the adult state. It is not unusual, however, at the age of 18 and even 20 years, to find the extremities of bones still in the state of epiphyses.

The names given to the processes of bones are expressive of their shape, size, or use; thus if a process is large and of a spherical form, it is called *caput*, or *head;* if the head is flatted, it is termed *condyle*. Some processes, from their resemblance to a stiletto, a breast, or the beak of a crow, are called *styloid*, *mastoid*, or *coracoid;* others are styled *ridges* or *spines*. The two processes of the os femoris derive their name of *trochanters* from their use.

A bone has its cavities as well as processes. These

(B) Mr Scheele discovered that bones contain the phosphoric acid united with calcareous earth; and that to this combination they owe their firmness.

(C) In his *Anat. ossium nov. invent. illustrat.* he describes four kinds of these claviculi or nails, *viz.* the perpendicular, oblique, headed, and crooked.

Osteology. cavities either extend quite through its substance, or appear only as depressions. The former are called *foramina* or holes, and these foramina are sometimes termed *canals* or *conduits*, according to their form and extent. Of the depressions some are useful in articulation. These are called *cotyloid* when they are deep, as is the case with the os innominatum, where it receives the head of the os femoris; or *glenoid* when they are superficial, as in the scapula, where it receives the os humeri. Of the depressions that are not designed for articulation, those which have small apertures are called *sinuses;* others that are large, and not equally surrounded by high brims, are styled *fossæ;* such as are long and narrow, *furrows;* or if broad and superficial without brims, *sinuosities*. Some are called *digital impressions*, from their resemblance to the traces of a finger on soft bodies.

2 Connexion of the bones.

We shall abridge this article, which is exceedingly diffuse in the generality of anatomical books, and will endeavour to describe it with all the clearness it will allow.

The bones composing the skeleton are so constructed, that the end of every bone is perfectly adapted to the extremity of that with which it is connected, and this connexion forms what is called their *articulation*.

Articulation is divided into *diarthrosis*, *synarthrosis*, and *amphiarthrosis*, or moveable, immoveable, and mixed articulation. Each of the two first has its subdivisions. Thus the *diarthrosis*, or moveable articulation, includes, 1. The enarthrosis, as it is called, when a large head is admitted into a deep cavity, as in the articulation of the os femoris with the os innominatum. 2. Arthrodia, when a round head is articulated with a superficial cavity, as is the case of the os humeri and scapula. 3. Ginglimus, or hinge-like articulation, as in the connexion of the thigh-bone with the tibia. The enarthrosis and arthrodia allow of motion to all sides; the ginglimus only of flexion and extension.

The *synarthrosis*, or immoveable articulation, includes, 1. The suture, when the two bones are indented into each other, as is the case with the parietal bones. 2. Gomphosis, when one bone is fixed into another, in the manner the teeth are placed in their sockets.

The term *amphiarthrosis* is applied to those articulations which partake both of the synarthrosis and diarthrosis, as is the case with the bones of the vertebræ, which are capable of motion in a certain degree, although they are firmly connected together by intermediate cartilages.

What is called *symphysis* is the union of two bones into one; as in the lower jaw, for instance, which in the fœtus consists of two distinct bones, but becomes one in a more advanced age, by the ossification of the uniting cartilage.

When bones are thus joined by the means of cartilages, the union is styled *synchondrosis;* when by ligaments, *syneurosis*.

3 Of the cartilages.

Cartilages are white, solid, smooth, and elastic substances, between the hardness of bones, and ligaments, and seemingly of a fibrous texture. We are not able to trace any vessels into their substance by injection, nor are they ever found tinged in animals that have been fed with madder.

They may be distinguished into, 1st, Those which are connected with the bones; and 2dly, Those which belong to other parts of the body. The first serve either to cover the ends and cavities of bones intended for motion, as in the articulations, where by their smoothness they facilitate motions, which the bones alone could not execute with so much freedom; or, they serve to unite bones together, as in the symphysis pubis, or to lengthen them as in the ribs. Osteology.

Many of them ossifying as we advance in life, their number is less in the adult than in the fœtus, and of course there are fewer bones in the old than in the young subject,

Of the second class of cartilages, or those belonging to the soft parts, we have instances in the larynx, where we find them useful in the formation of the voice, and for the attachment of muscles.

4 Of the periosteum.

The periosteum is a fine membrane of a compact cellular texture, reflected from one joint to another, and serving as a common covering to the bones. It has sanguiferous and lymphatic vessels, and is supplied with nerves from the neighbouring parts. It adheres very firmly to their surface, and by its smoothness facilitates the motion of muscles. It likewise supports the vessels that go to be distributed through the substance of the bones, and may serve to strengthen the articulations. At the extremities of bones, where it is found covering a cartilage, it has by some been improperly considered as a distinct membrane, and named *perichondrium*. This, in its use and structure, resembles the periosteum. Where it covers the bones of the skull, it has gotten the name of *pericranium*.

The periosteum is not a production of the dura mater, as the ancients, and after them Havers, imagined; nor are the bones formed by the ossification of this membrane, at least when it is in a sound state, as some late writers have supposed.

The periosteum is deficient in the teeth above the sockets, and in those parts of bones to which ligaments or tendons are attached.

5 Of the marrow.

The marrow is a fat oily substance, filling the cavities of bones. In the great cavities of long bones it is of a much firmer consistence than in the cells of their spongy part. In the former it inclines somewhat to a yellowish tinge, and is of the consistence of fat; in the latter it is more fluid, and of a red colour. This difference in colour and consistence is owing to accidental causes; both kinds are of the same nature, and may both be described under the common name of marrow, though some writers give this name only to the fat-like substance, and call the other the medullary juice.

The marrow is contained in a very fine and transparent membrane, which is supplied with a great number of blood vessels, chiefly from the periosteum. This membrana medullaris adheres to the inner surface of the bones, and furnishes an infinite number of minute bags or vesicles for enclosing the marrow, which is likewise supported in the cavities of the bones by the long filaments of their reticular substance.

Besides the vessels from the periosteum, the membrana medullaris is finished with others, which in the long bones may be seen passing in near the extremities of the bone, and sending off numerous branches that ramify through all the vesicles of this membrane.

The bones, and the cells containing the marrow, are

Osteology.

are likewiſe furniſhed with lymphatics. By their means, the marrow, like the fat, may be taken up in a greater quantity than it is ſecreted; and hence it is that ſo little is found in the bones of thoſe who die of lingering diſeaſes.

It is ſtill a matter of controverſy, Whether the marrow is ſenſible or not? We are certainly not able to trace any nerves to it; and from this circumſtance, and its analogy to fat, Haller has ventured to conſider it as inſenſible. On the other hand, Duverney aſſerts, that an injury done to this ſubſtance in a living animal was attended with great pain. In this diſpute phyſiologiſts do not ſeem to have ſufficiently diſcriminated between the marrow itſelf and the membranous cells in which it is contained. The former, like the fat, being nothing more than a ſecreted, and of courſe an inorganized matter, may with propriety be ranked among the inſenſible parts, as much as inſpiſſated mucus or any other ſecreted matter in the body; whereas the membrana medullaris being vaſcular, though it poſſeſſes but an obſcure degree of feeling in a ſound ſtate, is not perfectly inſenſible.

The marrow was formerly ſuppoſed to be intended for the nouriſhment and renewal of the bones; but this doctrine is now pretty generally and deſervedly exploded. It ſeems probable that the marrow is to the bones what fat is to the ſoft parts. They both ſerve for ſome important purpoſes in the animal economy; but their particular uſe has never yet been clearly aſcertained. The marrow, from the tranſudation of the oil through the bones of a ſkeleton, is ſuppoſed to diminiſh their brittleneſs; and Havers, who has written profeſſedly on the bones, deſcribes the canals by which the marrow is conveyed through every part of their ſubſtance, and divides them into longitudinal and tranſverſe ones. He ſpeaks of the firſt as extending through the whole length of the bone; and of the latter, as the paſſages by which the longitudinal ones communicate with each other. The ſimilarity of theſe to the large cancelli in burnt bones, and the tranſudation of the oil through the bones of the ſkeleton, ſeems to prove that ſome ſuch paſſages do actually exiſt.

6 Synovial glands.

The ſynovial glands are ſmall bodies (D), ſuppoſed to be of a glandular ſtructure, and exceedingly vaſcular, ſecreting a fluid of a clear mucilaginous nature, which ſerves to lubricate the joints. They are placed in ſmall cavities in the articulations, ſo as to be capable of being gently compreſſed by the motion of the joint, which expreſſes their juice in proportion to the degree of friction. When the ſynovia is wanting, or is of too thick a conſiſtence, the joint becomes ſtiff and incapable of flexion or extenſion. This is what is termed *anchyloſis*.

7 Of the ligaments.

Ligaments are white, gliſtening, inelaſtic bands, of a compact ſubſtance, more or leſs broad or thick, and ſerving to connect the bones together. They are diſtinguiſhed by different names adapted to their different forms and uſes. Thoſe of the joints are called either round or burſal. The round ligaments are white, tendinous, and inelaſtic. They are ſtrong and flexible, and are found only in the joint of the knee, and in the articulation of the os femoris with the os innominatum. The burſal, or capſular ligaments, ſurround the whole joint like a purſe, and are to be found in the articulations which allow motion every way, as in the articulation of the arm with the ſcapula.

Osteology.

8 Of the burſæ mucoſæ.

Of thoſe ſacs called *Burſæ Mucoſæ*, a few were known to former anatomiſts, but by much the greater number have been ſince diſcovered by Dr Munro (E), who obſerves, that they are to be met with in the extremities of the body only; that many of them are placed entirely on the inner ſides of the tendons, between theſe and the bones. Many others cover not only the inner, but the outer ſides of the tendons, or are interpoſed between the tendons and external parts, as well as between thoſe and the bones.

Some are ſituated between the tendons and external parts only or chiefly, ſome between contiguous tendons, or between the tendons or the ligaments and the joints. A few ſuch ſacs are obſerved where the proceſſes of bones play upon the ligaments, or where one bone plays upon another. Where two or more tendons are contiguous, and afterwards ſeparate from each other, we generally find a common burſa divided into branches, with which it communicates; and a few burſæ of contiguous tendons communicate with each other.—Some, in healthy children, communicate with the cavities of the joints; and in many old people he has ſeen ſuch communications formed by uſe or worn by friction, independent of diſeaſe.

Their proper membrane is thin and tranſparent, but very denſe, and capable of confining air or any other fluid. It is joined to the neighbouring parts by the common cellular ſubſtance. Between the burſa and the hard ſubſtance of bone a thin layer of cartilage or of tough membrane is very generally interpoſed. To the cellular ſubſtance on the outſide of the burſa, the adipoſe ſubſtance is connected: except where the burſa covers a tendon, cartilage, or bone, much expoſed to preſſure or friction.

In ſeveral places a maſs of fat, covered with the continuation of the membrane of the burſa, projects into its cavity. The edges of this are divided into fringes.

9 Their ſtructure compared with that of the capſular ligaments of the joints.

The inner ſide of the membrane is ſmooth, and is extremely ſlippery from the liquor ſecreted in it.

The ſtructure of the burſæ bears a ſtrong reſemblance to the capſular ligaments of the joints. 1. The inner layer of the ligament, like that of the burſæ, is thin and denſe. 2. It is connected to the external ligaments by the common cellular ſubſtance. 3. Between it and the bones, layers of cartilage, or the articular cartilages, are interpoſed. 4. At the ſides of the joints, where it is not ſubject to violent preſſure and friction, the adipoſe ſubſtance is connected with the cellular membrane. 5. Within the cavities of the joints we obſerve maſſes of fat projecting, covered with ſimilar

(D) It is now much doubted, however, whether the appearances in the joints, which are uſually called *glands*, are any thing more than aſſemblages of fat.

(E) See *Deſcription of the Burſæ Mucoſæ*, &c.

Osteology

blood veſſels, and with ſimilar fimbriæ hanging from their edges. 6. In the knee the upper part of ſuch a maſs of fat forms what has been called the *mucilaginous gland of the joint*, and the under part projects into the burſa behind the ligament which ties the patella to the tibia. 7. The liquor which lubricates the burſæ has the ſame colour, conſiſtence, and properties, as that of the joints, and both are affected in the ſame manner by heat, mineral acids, and ardent ſpirits. 8. In ſome places the burſæ conſtantly communicate with the cavities of the joints, in others they generally do ſo; from which we may infer a ſameneſs of ſtructure.

When we examine the fimbriæ common to the fatty bodies of the joints and burſæ, and which have been ſuppoſed to be the ducts of glands lodged within the maſſes of fat, we are not able to diſcover any glandular appearance within them. And although we obſerve many veſſels diſperſed upon the membranes of the fatty bodies and fimbriæ; and that we cannot doubt that theſe fimbriæ conſiſt of ducts which contain a lubricating liquor, and can even preſs ſuch a liquor from them; yet their cavities and orifices are ſo minute, that they are not diſcoverable even by the aſſiſtance of magnifying glaſſes. Theſe fimbriæ appear, therefore, to be ducts like thoſe of the urethra, which prepare a mucilaginous liquor without the aſſiſtance of any knotty or glandular organ.

Upon the whole, the ſynovia ſeems to be furniſhed by inviſible exhalent arteries by the ducts of the fimbriæ, and by oil exuding from the adipoſe follicles by paſſages not yet diſcovered.

10 Of the ſkeleton.

The word *ſkeleton*, which by its etymology implies ſimply a dry preparation, is uſually applied to an aſſemblage of all the bones of an animal united together in their natural order. It is ſaid to be a natural ſkeleton, when the bones are connected together by their own proper ligaments; and an artificial one, when they are joined by any other ſubſtance, as wire, &c.

The ſkeleton is generally divided into the head, trunk, and extremities. The firſt diviſion includes the bones of the cranium and face. The bones of the trunk are the ſpine, ribs, ſternum, and bones of the pelvis.

The upper extremity on each ſide conſiſts of the two bones of the ſhoulder, viz. the ſcapula and clavicle; the bone of the arm or os humeri; the bones of the fore-arm, and thoſe of the hand.

The lower extremity on each ſide of the trunk conſiſts of the thigh-bone and the bones of the leg and foot.

Sect. II. *Of the Bones of the Head.*

The head is of a roundiſh figure, and ſomewhat oval (F). Its greateſt diameter is from the forehead to the occiput; its upper part is called *vertex*, or crown of the head; its anterior or fore part the face; and the upper part of this *ſinciput*, or forehead; its ſides the temples; its poſterior, or hind part, the *occiput*; and its inferior part the *baſis*. Osteology.

The bones of the head may be divided into thoſe of the cranium and face.

§ 1. *Bones of the Cranium and Face.*

There are eight bones of the cranium, viz. the coronal bone, or os frontis; the two parietal bones or oſſa bregmatis; the os occipitis; the two temporal bones; the ſphenoid bone; and the os ethmoides or cribriforme.

Of theſe, only the os occipitis and oſſa bregmatis are conſidered as proper to the cranium; the reſt being common both to the cranium and face. 11

Theſe bones are all harder at their ſurface than in their middle: and on this account they are divided into two tables, and a middle ſpongy ſubſtance called *diploë*.

In this, as in all the other bones, we ſhall conſider its figure, ſtructure, proceſſes, depreſſions, and cavities; and the manner in which it is articulated with the other bones. 12 Of the os frontis.

The os frontis has ſome reſemblance in ſhape to the ſhell of the cockle. Externally it is convex, its concave ſide being turned towards the brain. This bone, in the places where it is united to the temporal bones, is very thin, and has there no diploë. It is likewiſe exceedingly thin in that part of the orbit of the eye which is neareſt to the noſe. Hence it is, that a wound in the eye, by a ſword, or any other pointed inſtrument, is ſometimes productive of immediate death. In theſe caſes, the ſword paſſing through the weak part of the bone, penetrates the brain, and divides the nerves at their origin; or perhaps opens ſome blood-veſſel, the conſequences of which are ſoon fatal.

We obſerve on the exterior ſurface of this bone five apophyſes or proceſſes, which are eaſily to be diſtinguiſhed. One of theſe is placed at the bottom and narroweſt part of the bone, and is called the naſal proceſs, from its ſupporting the upper end of the bones of the noſe. The four others are called angular or orbitar proceſſes. They aſſiſt to form the orbits, which are the cavities on which the eyes are placed. In each of theſe orbits there are two proceſſes, one at the interior or great angle, and the other at the exterior or little angle of the orbit. They are called the angular proceſſes. Between theſe a ridge is extended in form of an arch, and on this the eyebrows are placed. It is called the orbitar or ſuperciliary ridge, and in ſome meaſure covers and defends the globe of the eye. There is a hole in this for the paſſage of the frontal veſſels and nerves. This arch is interrupted near the noſe by a ſmall pit, in which the tendon of the muſculus obliquus major of the eye is fixed. From the under part of each ſuperciliary ridge a thin plate runs a conſiderable way backwards, and has the name of *orbitar*; the external and fore part of this plate forms

(F) The bones of the fœtus being perfectly diſtinct, and the muſcles in young perſons not acting much, the ſhape of the head has been ſuppoſed to depend much on the management of children when very young. Veſalius, who has remarked the difference in people of different nations, obſerves for inſtance, that the head of a Turk is conical, from the early uſe of the turban; whilſt that of an Engliſhman is flattened by the chin-ſtay. Some of the lateſt phyſiologiſts ſuppoſe, with good reaſon, that this difference is chiefly owing to certain natural cauſes with which we are as yet unacquainted.

Osteology. forms a sinuosity for lodging the lachrymal gland. Between the orbitar plates there is a large discontinuation of the bone, which is filled up by the cribriform part of the os ethmoides.

On examining the inner surface of this bone at its under and middle part, we observe an elevation in form of a ridge, which has been called the *spinous process*; it ascends for some way, dividing the bone into two considerable fossæ, in which the anterior lobes of the brain are placed. To a narrow furrow in this ridge is attached the extremity of the falx, as the membrane is called, which divides the brain into two hemispheres. The furrow becoming gradually wider, is continued to the upper and back part of the bone. It has the falx fixed to it, and part of the longitudinal sinus lodged in it. Besides the two fossæ, there are many depressions, which appear like digital impressions, and owe their formation to the prominent circumvolutions of the brain.

In the fœtus, the forehead is composed of two distinct bones; so that in them the sagittal suture reaches from the os occipitis to the nose. This bone is almost everywhere composed of two tables and a diploë. These two tables separating from each other under the eyes, form two cavities, one on each side of the face, called the frontal sinuses. These sinuses are lined with a soft membrane, called *membrana pituitaria*. In these sinuses a mucus is secreted, which is constantly passing through two small holes into the nostrils, which it serves to moisten.

The os frontis is joined by sutures to many of the bones of the head, viz. to the parietal, maxillary, and temporal bones; to the os ethmoides; os sphenoides; os unguis; and ossa nasi. The suture which connects it with the parietal bones is called the *coronal suture*.

13 Of the parietal bones. The parietal bones are two in number; they are very thin, and even transparent in some places. The particular figure of each of these bones is that of an irregular square, bordered with indentations through its whole circumference, except at its lower part. It will be easily conceived, that these bones which compose the superior and lateral parts of the cranium, and cover the greatest part of the brain, form a kind of vault. On their inner surface we observe the marks of the vessels of the dura mater; and at their upper edge the groove for the superior longitudinal sinus.

The ossa parietalia are joined to each other by the sagittal suture; to the os sphenoides and ossa temporum by the squamous suture; to the os occipitis by the lambdoidal suture (G), so called from its resemblance to the Greek letter lambda; and to the os frontis by the coronal suture.

In the fœtus, the parietal bones are separated from the middle of the divided os frontis by a portion of the cranium then unossified.

14 Of the occipital bone. The occipital bone forms the posterior and inferior parts of the skull; it approaches nearly to the shape of a lozenge, and is indented throughout three parts of its circumference.

There is a considerable hole in the inferior portion of this bone, called the *foramen magnum*, through which the medulla oblongata passes into the spine.—The nervi accessorii, and vertebral arteries, likewise pass through it. Behind the condyles are two holes for the passage of cervical veins into the lateral sinuses; and above them are two others for the passage of the eighth pair and accessory nerves out of the head. At the sides, and a little on the anterior part of the foramen magnum, are two processes, called the condyles, one on each side; they are of an oval figure, and are covered with cartilage. Osteology.

The external surface of this bone has a large transverse arched ridge, under which the bone is very irregular, where it affords attachment to several muscles. On examining its inner surface, we may observe two ridges in form of a cross; one ascending from near the foramen magnum to the top of the bone; the upper end of this, in which the falx is fixed, is hollow, for lodging the superior longitudinal sinus; and the under end has the third process of the dura mater fixed to it. The other ridge, which runs horizontally, is likewise hollow for containing the lateral sinuses. Four fossæ are formed by the cross, two above and two below. In the former are placed the posterior lobes of the brain, and in the latter the lobes of the cerebellum.

At the basis of the cranium, we observe the cuneiform process, (which is the name given to the great apophysis at the fore part of this bone); it serves for the reception of the medulla oblongata.

The os occipitis is of greater strength and thickness than either of the other bones of the head, though irregularly so; at its inferior part, where it is thinnest, it is covered by a great number of muscles.

This bone, from its situation, being more liable to be injured by falls than any other bone of the head, nature has wisely given it the greatest strength at its upper part, where it is most exposed to danger.

It is joined to the parietal bones by the lambdoidal suture, and to the ossa temporum by the additamentum of the temporal suture. It is likewise connected to the os sphenoides by the cuneiform process. It is by means of the os occipitis that the head is united to the trunk, the two condyles of this bone being connected to the superior oblique processes of the first vertebra of the neck.

15 Of the temporal bones. There are two temporal bones, one on each side.—We may distinguish in them two parts; one of which is called the *squamous* or *scaly part*, and other *pars petrosa* from its hardness. This last is shaped like a pyramid.

Each of these divisions affords processes and cavities: externally there are three processes; one anterior, called the *zygomatic process*; one posterior, called the *mastoid mamillary process*, from its resemblance to a nipple; and one inferior, called the *styloid process*, because it is shaped like a stiletto, or dagger.

The cavities are, 1. The meatus auditorius externus. 2. A large fossa which serves for the articulation of the lower jaw; it is before the meatus auditorius, and immediately under the zygomatic process. 3. The stylo-mastoid

(G) The lambdoidal suture is sometimes very irregular, being composed of many small sutures, which surround so many little bones called *ossa triquetra*, though perhaps improperly, as they are not always triangular.

Osteology. ſtylo-maſtoid hole, ſo called from its ſituation between the ſtyloid and maſtoid proceſſes; it is likewiſe ſtyled the aqueduct of Fallopius, and affords a paſſage to the portio dura of the auditory, or ſeventh part of nerves. 4. Below, and on the fore part of the laſt foramen, we obſerve part of the jugular foſſa, in which the beginning of the internal jugular vein is lodged. Anterior and ſuperior to this foſſa is the orifice of a foramen, through which paſſes the carotid artery. This foramen runs firſt upwards and then forwards, forming a kind of elbow, and terminates at the end of the os petroſum. At this part of each temporal bone, we may obſerve the opening of the Euſtachian tube, a canal which paſſes from the ear to the back part of the noſe.

In examining the internal ſurface of theſe bones, we may remark the triangular figure of their petrous part which ſeparates two foſſæ; one ſuperior and anterior; the other inferior and poſterior: the latter of theſe compoſes part of the foſſa, in which the cerebellum is placed; and the former, a portion of the leaſt foſſa for the baſis of the brain. On the poſterior ſide of the pars petroſa, we obſerve the meatus auditorius internus, into which enters the double nerve of the ſeventh pair. On the under ſide of this proceſs, part of a hole appears, which is common to the temporal and occipital bones; through it the lateral ſinus, the eighth pair, and acceſſory nerves, paſs out of the head.

The pars petroſa contains ſeveral little bones called the bones of the ear; which, as they do not enter into the formation of the cranium, ſhall be deſcribed when we are treating of the organs of hearing,

The oſſa temporum are joined to the oſſa malarum, by the zygomatic ſutures; to the parietal bones by the ſquamous ſutures; to the os occipitis, by the lambdoidal ſuture; and to the ſphenoid bone, by the ſuture of that name.

16 Of the os ſphenoides.

This bone, from its ſituation amidſt the other bones of the head, has been ſometimes called *cuneiforme*. It is of a very irregular figure, and has been compared to a bat with its wings extended.

It is commonly divided into its middle part or body, and its ſides or wings.

The fore part of the body has a ſpine or ridge, which makes part of the ſeptum narium. The upper part of each wing forms a ſhare of the temple. The fore part of this belongs to the orbit; while the under and back part, termed *ſpinous proceſs*, is lodged in the baſe of the ſkull at the point of the pars petroſa. But two of the moſt remarkable proceſſes are the pterygoid or aliform, one on each ſide of the body of the bone, and at no great diſtance from it. Each of theſe proceſſes is divided into two wings, and of theſe the exterior one is the wideſt. The other terminates in a hook-like proceſs.

The internal ſurface of this bone affords three foſſæ. Two of theſe are formed by the wings of the bone, and make part of the leſſer foſſæ of the baſis of the cranium. The third, which is ſmaller, is on the top of the body of the bone; and is called *ſella turcica*, from its reſemblance to a Turkiſh ſaddle. This foſſa, in which the pituitary gland is placed, has poſteriorly and anteriorly proceſſes called the *clinoid proceſſes*.

There are twelve holes in this bone, viz. ſix on each ſide. The firſt is the paſſage of the optic nerve and ocular artery; the ſecond, or large ſlit, tranſmits the third, fourth, ſixth, and firſt part of the fifth pair of nerves with the ocular vein; the third hole gives paſſage to the ſecond branch of the fifth pair; and the fourth hole to the third branch of the fifth pair of nerves. The fifth hole is the paſſage of the artery of the dura mater. The ſixth hole is ſituated above the pterygoid proceſs of the ſphenoid bone: through it a reflected branch of the ſecond part of the fifth pair paſſes. Osteology.

Within the ſubſtance of the os ſphenoides there are two ſinuſes ſeparated by a bony plate. They are lined with the pituitary membrane; and, like the frontal ſinuſes, ſeparate a mucus which paſſes into the noſtrils.

The os ſphenoides is joined to all the bones of the cranium; and likewiſe to the oſſa maxillaria, oſſa malarum, oſſa palati, and vomer.

This bone makes part of the baſis of the ſkull, aſſiſts in forming the orbits, and affords attachment to ſeveral muſcles.

The os ethmoides is ſituated at the fore part of the baſis of the cranium, and is of a very irregular figure. From the great number of holes with which it is pierced, it is ſometimes called *os cribriforme*, or ſieve-like bone.

17 Of the os ethmoides or cribriforme.

It conſiſts of a middle part and two ſides. The middle part is formed of a thin bony plate, in which are an infinite number of holes that afford a paſſage to filaments of the olfactory nerve. From the middle of this plate, both on the outſide, and from within, there riſes up a proceſs, which may be eaſily diſtinguiſhed. The inner one is called *criſta galli*, from its ſuppoſed reſemblance to a cock's comb. To this proceſs the falx of the dura mater is attached. The exterior proceſs, which has the ſame common baſis as the criſta galli, is a fine lamella which is united to the vomer; and divides the cavity of the noſtrils, though unequally, it being generally a little inclined to one ſide.

The lateral parts of this bone are compoſed of a cellular ſubſtance; and theſe cells are ſo very intricate, that their figure or number cannot be deſcribed. Many writers have on this account called this part of the bone the *labyrinth*. Theſe cells are externally covered with a very thin bony lamella. This part of the bone is called the *os planum*, and forms part of the orbit.

The different cells of this bone, which are numerous, and which are everywhere lined with the pituitary membrane, evidently ſerve to enlarge the cavity of the noſe, in which the organ of ſmelling reſides.

This bone is joined to the os ſphenoides, os frontis, oſſa maxillaria, oſſa palati, oſſa naſi, oſſa unguis, and vomer.

The ancients, who conſidered the brain as the ſeat of all the humours, imagined that this viſcus diſcharged its redundant moiſture through the holes of the ethmoid bone. And the vulgar ſtill think, that abſceſſes of the brain diſcharge themſelves through the mouth and ears, and that ſnuff is liable to get into the head; but neither ſnuff nor the matter of an abſceſs are more capable of paſſing through the cribriform bone, than the ſeroſity which they ſuppoſed was diſcharged through it in a common cold. All the holes of the ethmoid bone are filled up with the branches of the olfactory nerve. Its inner part is likewiſe covered with the dura mater, and its cells are everywhere lined with

Osteology. with the pituitary membrane; ſo that neither matter nor any other fluid can poſſibly paſs through this bone either externally or internally. Matter is indeed ſometimes diſcharged through the noſtrils; but the ſeat of the diſeaſe is in the ſinuſes of the noſe, and not in the brain; and impoſthumations are obſerved to take place in the ear, which ſuppurate and diſcharge themſelves externally.

Before we leave the bones of the head, we wiſh to make ſome general obſervations on its ſtructure and figure. As the cranium might have been compoſed of a ſingle bone, the articulation of its ſeveral bones being abſolutely without motion, it may be aſked perhaps, Why ſuch a multiplicity of bones, and ſo great a number of futures? Many advantages may poſſibly ariſe from this plurality of bones and futures, which may not yet have been obſerved. We are able, however, to point out many uſeful ends, which could only be accompliſhed by this peculiarity of ſtructure. In this, as in all the other works of nature, the great wiſdom of the Creator is evinced, and cannot fail to excite our admiration and gratitude.

The cranium, by being divided into ſeveral bones, grows much faſter and with greater facility, than if it was compoſed of one piece only. In the fœtus, the bones, as we have before obſerved, are perfectly diſtinct from each other. The oſſification begins in the middle of each bone, and proceeds gradually to the circumference. Hence the oſſification, and of courſe the increaſe of the head, is carried on from an infinite number of points at the ſame time, and the bones conſequently approach each other in the ſame proportion. To illuſtrate this doctrine more clearly, if it can want further illuſtration, ſuppoſe it neceſſary for the parietal bones which compoſe the upper part of the head, to extend their oſſification, and form the fore part of the head likewiſe.—Is it not evident, that this proceſs would be much more tedious than it is now, when the os frontis and the parietal bones are both growing at the ſame time? Hence it happens, that the heads of young people, in which the bones begin to touch each other, increaſe ſlowly; and that the proportionate increaſe of the volume of the head is greater in three months in the fœtus, than it is perhaps in twenty-four months at the age of fourteen or fifteen years.

The futures, excluſive of their advantages in ſuſpending the proceſſes of the dura mater, are evidently of great utility in preventing the too great extent of fractures of the ſkull.—Suppoſe, for inſtance, that by a fall or blow, one of the bones of the cranium becomes fractured. The fiſſure, which in a head compoſed of only one bone, would be liable to extend itſelf through the whole of it, is checked and ſometimes perhaps ſtopped by the firſt future it meets, and the effects of the injury are confined to the bone on which the blow was received. Ruyſch indeed, and ſome others, will not allow the futures to be of any ſuch uſe; but caſes have been met with where they ſeemed to have had this effect, and in young ſubjects their utility in this reſpect muſt be ſtill more obvious.

The ſpherical ſhape of the head ſeems likewiſe to render it more capable of reſiſting external violence than any other ſhape would do. In a vault, the parts mutually ſupport and ſtrengthen each other, and this happens in the cranium.

§ 2. *Proper Bones of the Face.*

Osteology.

18 Of the bones of the face.

The face, which conſiſts of a great number of bones, is commonly divided into the upper and lower jaws. The upper jaw conſiſts of thirteen bones, excluſive of the teeth. Of theſe, ſix are placed on each ſide of the maxilla ſuperior, and one in the middle.

The bones, which are in pairs, are the oſſa malarum, oſſa maxillaria, oſſa naſi, oſſa unguis, oſſa palati, and oſſa ſpongioſa inferiora. The ſingle bone is the vomer.

19 Of the oſſa malarum.

Theſe are the prominent ſquare bones which are placed under the eyes, forming part of the orbits and the upper part of the cheeks. Each of them affords three ſurfaces; one exterior and a little convex; a ſecond ſuperior and concave, forming the inferior part and ſides of the orbit; and a third poſterior, irregular, and hollowed for the lodgment of the lower part of the temporal muſcle.

The angles of each bone form four proceſſes, two of which may be called *orbitar proceſſes;* of theſe the upper one is joined by future to the os frontis, and that below to the maxillary bone. The third is connected with the os ſphenoides by means of the tranſverſe future; and the fourth is joined to the zygomatic proceſs of the temporal bone, with which it forms the zygoma.

20 Of the oſſa maxillaria ſuperiora.

Theſe bones, which are of a very irregular figure, are ſo called becauſe they form the moſt conſiderable portion of the upper jaw. They are two in number, and generally remain diſtinct through life.

Of the many proceſſes which are to be ſeen on theſe bones, and which are connected with the bones of the face and ſkull, we ſhall deſcribe only the moſt remarkable.

One of theſe proceſſes is at the upper and fore part of the bone, making part of the ſide of the noſe, and called the *naſal proceſs*. Another forms a kind of circular ſweep at the inferior part of the bone, in which are the alveoli or ſockets for the teeth: this is called the *alveolar proceſs*. A third proceſs is united to the os malæ on each ſide. Between this and the naſal proceſs there is a thin plate, which forms a ſhare of the orbit, and lies over a paſſage for the ſuperior maxillary veſſels and nerves.—The alveolar proceſs has poſteriorly a conſiderable tuberoſity on its internal ſurface, called the *maxillary tuberoſity*.

Behind the alveolar proceſs we obſerve two horizontal lamellæ, which uniting together, form part of the roof of the mouth, and divide it from the noſe. The hollowneſs of the roof of the mouth is owing to this partition's being ſeated ſomewhat higher than the alveolar proceſs.—At the fore part of the horizontal lamellæ there is a hole called *foramen inciſivum*, through which ſmall blood veſſels and nerves go between the mouth and noſe.

In viewing theſe bones internally, we obſerve a foſſa in the inferior portion of the naſal proceſs, which, with the os unguis and os ſpongioſum inferius, forms a paſſage for the lachrymal duct.

Where theſe two bones are united to each other, they project ſomewhat upwards and forwards, leaving between them a furrow, into which the lower portion of the ſeptum naſi is admitted.

Each of theſe bones being hollow, a conſiderable ſi-

nus

Oſteology.

nus is formed under its orbitar part. This cavity, which is uſually named after Highmore, though it was deſcribed by Fallopius and others before his time, is lined with the pituitary membrane. It is intended for the ſame purpoſes as the other ſinuſes of the noſe, and opens into the noſtrils.

The oſſa maxillaria are connected with the greater part of the bones of the face and cranium, and aſſiſt in forming not only the cheeks, but likewiſe the palate, noſe, and orbits.

21 Of the oſſa naſi.

The oſſa naſi form two irregular ſquares. They are thicker and narrower above than below. Externally they are ſomewhat convex, and internally ſlightly concave. Theſe bones conſtitute the upper part of the noſe. At their fore part they are united to each other, above to the os frontis, by their ſides to the oſſa maxillaria ſuperiora, poſteriorly and interiorly to the ſeptum narium, and below to the cartilages that compoſe the reſt of the noſtrils.

22 Of the oſſa unguis.

Theſe little tranſparent bones owe their name to their ſuppoſed reſemblance to a finger nail. Sometimes they are called *oſſa lachrymalia*, from their concurring with the naſal proceſs of each maxillary bone in forming a lodgment for the lachrymal ſac and duct.

The oſſa unguis are of an irregular figure. Their external ſurface conſiſts of two ſmooth parts, divided by a middle ridge. One of theſe parts, which is concave and neareſt to the noſe, ſerves to ſupport the lachrymal ſac and part of the lachrymal duct. The other, which is flat, forms a ſmall part of the orbit.

Each of theſe bones is connected with the os frontis, os ethmoides, and os maxillare ſuperius.

23 Of the oſſa palati.

Theſe bones, which are ſituated at the back part of the roof of the mouth, between the os ſphenoides and the oſſa maxillaria ſuperiora, are of a very irregular ſhape, and ſerve to form the naſal and maxillary foſſa, and a ſmall portion of the orbit. Where they are united to each other, they riſe up into a ſpine on their internal ſurface. This ſpine appears to be a continuation of that of the ſuperior maxillary bones, and helps to form the ſeptum narium.

Theſe bones are joined to the oſſa maxillaria ſuperiora, os ethmoides, os ſphenoides, and vomer.

24 Of the vomer.

This bone derives its name from its reſemblance to a ploughſhare. It is a long and flat bone, ſomewhat thicker at its back than at its fore part. At its upper part we obſerve a furrow extending through its whole length. The poſterior and largeſt part of this furrow receives a proceſs of the ſphenoid bone. From this the furrow advances forwards, and becoming narrower and ſhallower, receives ſome part of the naſal lamella ethmoidea; the reſt ſerves to ſupport the middle cartilage of the noſe.

The inferior portion of this bone is placed on the naſal ſpine of the maxillary and palate bones, which we mentioned in our deſcription of the oſſa palati.

The vomer is united to the os ſphenoides, os ethmoides, oſſa maxillaria ſuperiora, and oſſa palati. It forms part of the ſeptum narium, by dividing the back part of the noſe into two noſtrils.

25 Of the oſſa ſpongioſa inferiora.

The parts which are uſually deſcribed by this name, do not ſeem to deſerve to be diſtinguiſhed as diſtinct bones, except in young ſubjects. They conſiſt of a ſpongy lamella in each noſtril, which is united to the ſpongy lamina of the ethmoid bone, of which they are by ſome conſidered as a part.

Oſteology.

Each of theſe lamellæ is longeſt from behind forwards; with its convex ſurface turned towards the ſeptum narium, and its concave part towards the maxillary bone, covering the opening of the lachrymal duct into the noſe.

Theſe bones are covered with the pituitary membrane; and beſides their connexion with the ethmoid bone, are joined to the oſſa maxillaria ſuperiora, oſſa palati, and oſſa unguis.

26 Of the maxilla inferior.

The maxilla inferior, or lower jaw, which in its ſhape reſembles a horſe ſhoe, conſiſts of two diſtinct bones in the fœtus; but theſe unite together ſoon after birth, ſo as to form only one bone. The upper edge of this bone, like the os maxillare ſuperius, has an alveolar proceſs, furniſhed with ſockets for the teeth.

On each ſide the poſterior part of the bone riſes almoſt perpendicularly into two proceſſes. The higheſt of theſe, called the coronoid proceſs, is pointed and thin, and ſerves for the inſertion of the temporal muſcle. The other, or condyloid proceſs, as it is called, is ſhorter and thicker, and ends in an oblong rounded head, which is received into a foſſa of the temporal bone, and is formed for a moveable articulation with the cranium. This joint is furniſhed with a moveable cartilage. At the bottom of each coronoid proceſs, on its inner part, we obſerve a foramen extending under the roots of all the teeth, and terminating at the outer ſurface of the bone near the chin. Each of theſe canals tranſmits an artery, vein, and nerve, from which branches are ſent off to the teeth.

The lower jaw is capable of a great variety of motion. By ſliding the condyles from the cavity towards the eminences on each ſide, we bring it horizontally forwards, as in biting; or we may bring the condyles only forward, and tilt the reſt of the jaw backward, as in opening the mouth. We are likewiſe able to ſlide the condyles alternately backwards and forwards from the cavity to the eminence, and *vice verſa*, as in grinding the teeth. The cartilages, by adapting themſelves to the different inequalities in theſe ſeveral motions of the jaw, ſerve to ſecure the articulation, and to prevent any injuries from friction.

The alveolar proceſſes are compoſed of an outer and inner bony plate, united together by thin partitions, which at the fore part of the jaw divide the proceſſes into as many ſockets as there are teeth. But at the back part of the jaw, where the teeth have more than one root, we find a diſtinct cell for each root. In both jaws theſe proceſſes begin to be formed with the teeth; they likewiſe accompany them in their growth, and gradually diſappear when the teeth are removed.

§ 3. *Of the Teeth.*

27 Of the teeth.

The teeth are bones of a particular ſtructure, formed for the purpoſes of maſtication and the articulation of the voice. It will be neceſſary to conſider their compoſition and figure, their number and arrangement, and the time and order in which they appear.

In each tooth we may diſtinguiſh a body, a neck, and a root or fangs.

The body of the tooth is that part which appears above

Oſteology. above the gums. The root is fixed into the ſocket, and the neck is the middle part between the two.

The teeth are compoſed of two ſubſtances, viz. enamel and bone. The enamel, or the vitreous or cortical part of the tooth, is a white and very hard and compact ſubſtance peculiar to the teeth, and appears fibrous or ſtriated when broken. This ſubſtance is thickeſt on the grinding ſurface, and becoming gradually thinner, terminates inſenſibly at the neck of the tooth. Ruyſch * affirmed, that he could trace the arteries into the hardeſt part of the teeth; Leeuwenhoek † ſuſpected the fibres of the enamel to be ſo many veſſels; and Monro ‡ ſays, he has frequently injected the veſſels of the teeth in children, ſo as to make the inſide of the cortex appear perfectly red. But it is certain, that it is not tinged by a madder diet, and that no injection will ever reach it, ſo that it has no appearance of being vaſcular ||.

* *Theſaur.* 10. N° 27.
† *Arcan. Natur. continuat. Epiſtol.*
‡ *Anat. of the Human Bones.*
|| *Hunter on the Teeth.*

The bony part, which compoſes the inner ſubſtance of the body, neck, and root of the tooth, reſembles other bones in its ſtructure, but it is much harder than the moſt compact part of bones in general. As a tooth when once formed receives no tinge from a madder diet, and as the minuteſt injections do not penetrate into its ſubſtance, this part of a tooth has, like the enamel, been ſuppoſed not to be vaſcular. But when we conſider that the fangs of a tooth are inveſted by a perioſteum, and that the ſwellings of theſe fangs are analogous to the ſwellings of other bones, we may reaſonably conclude, that there is a ſimilarity of ſtructure; and that this bony part has a circulation through its ſubſtance, although from its hardneſs we are unable to demonſtrate its veſſels.

In each tooth we find an inner cavity, into which enter an artery, vein, and nerve. This cavity begins by a ſmall opening, and becoming larger, terminates in the body of the tooth. In advanced life this hole ſometimes cloſes, and the tooth is of courſe rendered inſenſible.

The perioſteum ſurrounds the teeth from their fangs to a little beyond their bony ſockets, where we find it adhering to the gums. This membrane, while it encloſes the teeth, ſerves at the ſame time to line the ſockets; ſo that it may be conſidered as common to both.

The teeth are likewiſe ſecured in their ſockets by means of the gums; a red, vaſcular, firm, and elaſtic ſubſtance, that poſſeſſes but little ſenſibility. In the gums of infants we find a hard ridge extending through their whole length, but no ſuch ridge is to be ſeen in old people who have loſt their teeth.

The number of the teeth in both jaws at full maturity, uſually varies from twenty-eight to thirty-two. They are commonly divided into three claſſes, viz. inciſores, canini, and grinders or molares (H). The inciſores are the four teeth in the fore part of each jaw. They have each of them two ſurfaces; one anterior and convex, the other poſterior and ſlightly concave, both of which terminate in a ſharp edge. They are called *inciſores* from their uſe in dividing the food. They are uſually broader and thicker in the upper than in the under jaw; and, by being placed ſomewhat obliquely, generally fall over the latter. Oſteology.

The canini derive their name from their reſemblance to a dog's tuſks, being the longeſt of all the teeth. We find one on each ſide of the inciſores, ſo that there are two canini in each jaw. Their fang reſembles that of the inciſores, but is much larger; and in their ſhape they appear like an inciſor with its edge worn off, ſo as to terminate in a narrow point.

Theſe teeth not being calculated for cutting and dividing the food like the inciſores, or for grinding it like the molares, ſeem to be intended for laying hold of ſubſtances (1).

The molares or grinders, of which there are ten in each jaw, are ſo called, becauſe from their ſhape and ſize they are fitted for grinding the food. Each of the inciſores and canini is furniſhed only with one fang; but in the molares of the under jaw we conſtantly find two fangs, and in thoſe of the upper jaw three fangs. Theſe fangs are ſometimes ſeparated into two points, and each of theſe points has ſometimes been deſcribed as a diſtinct fang.

The two firſt of the molares, or thoſe neareſt to the canine teeth on each ſide, differ from the other three, and are with great propriety named *bicuſpides* by Mr Hunter. They have ſometimes only one root, and ſeem to be of a middle nature between the inciſores and the larger molares. The two next are much larger. The fifth or laſt grinder on each ſide is ſmaller and ſhorter than the reſt; and from its not cutting the gum till after the age of twenty, and ſometimes not till much later in life, it is called *dens ſapientiæ*.

There is in the ſtructure and arrangement of all theſe teeth an art which cannot be ſufficiently admired. To underſtand it properly, it will be neceſſary to conſider the under jaw as a kind of lever, with its fixed points at its articulations with the temporal bones: it will be right to obſerve, too, that its powers ariſe from its different muſcles, but in elevation chiefly from the temporalis and maſſeter; and that the aliment conſtitutes the object of reſiſtance. It will appear, then, that the molares, by being placed neareſt the centre of motion, are calculated to preſs with a much greater force than the other teeth, independent of their grinding powers which they poſſeſs by means of the pterygoid muſcles; and that it is for this reaſon we put between them any hard body we wiſh to break.

The canini and inciſores are placed farther from this point, and of courſe cannot exert ſo much force; but they

(H) Mr Hunter has thought proper to vary this diviſion. He retains the old name of *inciſores* to the four fore teeth, but he diſtinguiſhes the canine teeth by the name of the *cuſpidati*. The two teeth which are next to theſe, and which have been uſually ranked with the molares, he calls the *bicuſpides*; and he gives the name of *grinders* only to the three laſt teeth on each ſide.

(1) Mr Hunter remarks of theſe teeth, that we may trace in them a ſimilarity in ſhape, ſituation, and uſe, from the moſt imperfectly carnivorous animal, which we believe to be the human ſpecies, to the lion, which is the moſt perfectly carnivorous.

Osteology. they are made for cutting and tearing the food, and this form ſeems to make amends for their deficiency in ſtrength.

There are examples of children who have come into the world with two, three, and even four teeth: but theſe examples are very rare; and it is ſeldom before the ſeventh, eighth, or ninth month after birth, that the inciſores, which are the firſt formed, begin to paſs through the gum. The ſymptoms of dentition, however, in conſequence of irritation from the teeth, frequently take place in the fourth or fifth month. About the twentieth or twenty-fourth month, the canini and two molares make their appearance.

The dangerous ſymptoms that ſometimes accompany dentition, are owing to the preſſure of the teeth on the gum, which they irritate ſo as to excite pain and inflammation. This irritation ſeems to occaſion a gradual waſting of the gum at the part, till at length the tooth makes its appearance.

The ſymptoms are more or leſs alarming, in proportion to the reſiſtance which the gum affords to the teeth, and according to the number of teeth which may chance to ſeek a paſſage at the ſame time. Were they all to appear at once, children would fall victims to the pain and exceſſive irritation; but Nature has ſo very wiſely diſpoſed them, that they uſually appear one after the other, with ſome diſtance of time between each. The firſt inciſor that appears is generally in the lower jaw, and is followed by one in the upper jaw. Sometimes the canini, but more commonly one of the molares, begins to paſs through the gum firſt.

Theſe 20 teeth, viz. eight inciſores, four canini, and eight molares, are called *temporary* or *milk teeth*, becauſe they are all ſhed between the age of ſeven and 14, and are ſucceeded by what are called the *permanent* or *adult teeth*. The latter are of a firmer texture, and have larger fangs.

Theſe adult teeth being placed in a diſtinct ſet of alveoli, the upper ſockets gradually diſappear, as the under ones increaſe in ſize, till at length the temporary, or upper teeth, having no longer any ſupport, conſequently fall out.

To theſe 20 teeth which ſucceed the temporary ones, 12 others are afterwards added, viz, three molares on each ſide in both jaws: and in order to make room for this addition, we find that the jaws gradually lengthen in proportion to the growth of the teeth; ſo that with 20 teeth, they ſeem to be as completely filled as they are afterwards with 32. This is the reaſon why the face is rounder and flatter in children than in adults.

With regard to the formation of the teeth, we may obſerve, that in a fœtus of four months, the alveolar proceſs appears only as a ſhallow longitudinal groove, divided by minute ridges into a number of intermediate depreſſions; in each of which we find a ſmall pulpy ſubſtance, ſurrounded by a vaſcular membrane. This pulp gradually oſſifies, and its lower part is lengthened out to form the fang. When the bony part of the tooth is formed, its ſurface begins to be incruſted with the enamel. How the latter is formed and depoſited, we are not yet able to determine. Osteology.

The rudiments of ſome of the adult teeth begin to be formed at a very early period, for the pulp of one of the inciſores may generally be perceived in a fœtus of eight months, and the oſſification begins in it ſoon after birth. The firſt bicuſpis begins to oſſify about the fifth or ſixth, and the ſecond about the ſeventh year. The firſt adult grinder cuts the gum about the 12th, the ſecond about the 18th, and the third, or *dens ſapientiæ*, uſually between the 20th and 30th year.

The teeth, like other bones, are liable to be affected by diſeaſe. Their removal is likewiſe the natural conſequence of old age; for as we advance in life, the alveoli fill up, and the teeth, eſpecially the inciſores, fall out. When this happens, the chin projects forward, and the face is much ſhortened.

§ 4. *Of the Os Hyoides* (K).

The os hyoides, which is placed at the root of the tongue, was ſo called by the ancients on account of its ſuppoſed reſemblance to the Greek letter *υ*. 28

It will be neceſſary to diſtinguiſh in it, its body, horns, and appendices.

The body, which is the middle and broadeſt part of the bone, is ſo placed that it may be eaſily felt at the fore part of the throat. Anteriorly it is irregularly convex, and its inner ſurface is unequally concave. Its cornua, or horns, which are flat and a little bent, being much longer than the body part, may be deſcribed as forming the ſides of the *υ*. The appendices, or little horns, as they are called by M. Winſlow and ſome other writers, are two proceſſes which riſe up from the articulations of the cornua with the body, and are uſually connected with the ſtyloid proceſs on each ſide by means of a ligament.

The uſes of this bone are to ſupport the tongue, and afford attachment to a great number of muſcles; ſome of which perform the motions of the tongue, while others act on the larynx and fauces.

Sect. III. *Of the Bones of the Trunk.*

The trunk of the ſkeleton conſiſts of the ſpine, the thorax, and the pelvis. 29

§ 1. *Of the Spine.*

The ſpine is compoſed of a great number of bones called *vertebræ*, forming a long bony column, in figure not much unlike the letter *ſ*. This column, which extends from the head to the lower part of the body, may be ſaid to conſiſt of two irregular and unequal pyramids, united to each other in that part of the loins where the laſt lumbar vertebra joins the os ſacrum. 30

The vertebræ of the upper and longeſt pyramid are called

(K) This bone is very ſeldom preſerved with the ſkeleton, and cannot be included amongſt the bones of the head or in any other diviſion of the ſkeleton. Thomas Bartholin has perhaps very properly deſcribed it among the parts contained in the mouth; but the generality of anatomical writers have placed it, as it is here, after the bones of the face.

Osteology. called *true vetebræ*, in contradiſtinction to thoſe of the lowermoſt pyramid, which, from their being immoveable in the adult, are ſtyled *falſe vertebræ*. It is upon the bones of the ſpine that the body turns; and it is to this circumſtance they owe their name, which is derived from the Latin verb *vertere*, to turn.

The true vertebræ are divided into three claſſes of cervical, dorſal, and lumbar vertebræ.—The falſe vertebræ conſiſt of the os ſacrum and os coccygis.

In each vertebra, as in other bones, it will be neceſſary to remark the body of the bone, its proceſſes, and cavities.

The body, which is convex before, and concave behind, where it aſſiſts in forming the cavity of the ſpine, may be compared to part of a cylinder cut off tranſverſely.

Each vertebra affords ſeven proceſſes. The firſt is at the back part of the vertebra, and from its ſhape and direction is named the *ſpinous proceſs*. On each ſide of this are two others, which, from their ſituation with reſpect to the ſpine, are called *tranſverſe proceſſes*. The four others are ſtyled *oblique* or *articular proceſſes*. They are much ſmaller than the ſpinous or tranſverſe ones. Two of them are placed on the upper, and two on the lower part of each vertebra, riſing from near the baſis of each tranſverſe proceſs. They have gotten the name of *oblique proceſſes*, from their ſituation with reſpect to the proceſſes with which they are articulated; and they are ſometimes ſtyled *articular proceſſes*, from the manner in which they are articulated with each other; the two ſuperior proceſſes of one vertebra being articulated with the two inferior proceſſes of the vertebra above it. Each of theſe proceſſes is covered with cartilage at its articulation, and their articulations with each other are by a ſpecies of ginglimus.

In each vertebra, between its body and its proceſſes, we find a hole large enough to admit a finger. Theſe holes are foramina, correſpond with each other through all the vertebræ, and form the long bony channel in which the ſpinal marrow is placed. We may likewiſe obſerve four notches in each vertebra. Two of theſe notches are at the upper, and two at the lower part of the bone, between the oblique proceſſes and the body of the vertebra. Each of theſe notches meeting with a ſimilar opening in the vertebra above or below it, forms a foramen for the paſſage of blood veſſels, and of the nerves out of the ſpine.

The bones of the ſpine are united together by means of a ſubſtance, which in young ſubjects appears to be of a ligamentous, but in adults more of a cartilaginous nature. This intervertebral ſubſtance, which forms a kind of partition between the ſeveral vertebræ, is thicker and more flexible between the lumbar vertebræ than in the other parts of the ſpine, the moſt conſiderable motions of the trunk being performed on thoſe vertebræ. This ſubſtance being very elaſtic, the extenſion and flexion of the body, and its motion backwards and forwards, or to either ſide, are performed with great facility. This elaſticity ſeems to be the reaſon why people who have been long ſtanding, or have carried a conſiderable weight, are found to be ſhorter than when they have been long in bed. In the two firſt inſtances the intervertebral cartilages (as they are uſually called) are evidently more expoſed to compreſſion than when we are in bed in a horizontal poſture.

In advanced life theſe cartilages become ſhrivelled, and of courſe loſe much of their elaſticity. This may ſerve to account for the decreaſe in ſtature and the ſtooping forward which are uſually to be obſerved in old people. Osteology.

Beſides the connexion of the ſeveral vertebræ by means of this intervertebral ſubſtance, there are likewiſe many ſtrong ligaments, both external and internal, which unite the bones of the ſpine to each other. Their union is alſo ſtrengthened by a variety of ſtrong muſcles that cover and ſurround the ſpine.

The bones of the ſpine are found to diminiſh in denſity, and to be leſs firm in their texture in proportion as they increaſe in bulk; ſo that the lowermoſt vertebræ, though the largeſt, are not ſo heavy in proportion as the upper ones. By this means the ſize of theſe bones is increaſed without adding to their weight; a circumſtance of no little importance in a part like the ſpine, which, beſides flexibility and ſuppleneſs, ſeems to require lightneſs as one of its eſſential properties.

In very young children, each vertebra conſiſts of three bony pieces united by cartilages which afterwards oſſify.

31 Vertebræ of the neck.

There are ſeven vertebræ of the neck—they are of a firmer texture than the other bones of the ſpine. Their tranſverſe proceſſes are forked for the lodgment of muſcles, and at the bottom of each we obſerve a foramen, through which paſs the cervical artery and vein. The firſt and ſecond of theſe vertebræ muſt be deſcribed more particularly. The firſt approaches almoſt to an oval ſhape.—On its ſuperior ſurface it has two cavities which admit the condyles of the occipital bone with which it is articulated. This vertebra, which is called *atlas* from its ſupporting the head, cannot well be deſcribed as having either body or ſpinous proceſs, being a kind of bony ring. Anteriorly, where it is articulated to the odontoid proceſs of the ſecond vertebra, it is very thin. On its upper ſurface it has two cavities which admit the condyles of the occipital bone. By this connexion the head is allowed to move forwards and backwards, but has very little motion in any other direction.

The ſecond vertebra has gotten the name of *dentata*, from its having, at its upper and anterior part, a proceſs called the *odontoid* or *tooth-like proceſs*, which is articulated with the atlas, to which this ſecond vertebra may be ſaid to ſerve as an axis. This odontoid proceſs is of a cylindrical ſhape, ſomewhat flattened, however, anteriorly and poſteriorly. At its fore part where it is received by the atlas, we may obſerve a ſmooth, convex, articulating ſurface. It is by means of this articulation that the head performs its rotatory motion, the atlas in that caſe moving upon this odontoid proceſs as upon a pivot. But when this motion is in any conſiderable degree, or, in other words, when the head moves much either to the right or left, all the cervical vertebræ ſeem to aſſiſt, otherwiſe the ſpinal marrow would be in danger of being divided tranſverſely by the firſt vertebra.

32 Vertebræ of the back.

The ſpinous proceſs of each of the cervical vertebræ is ſhorter, and their articular proceſſes more oblique, than in the other bones of the ſpine.

Theſe 12 vertebræ are of a middle ſize between thoſe of the neck and loins. At their ſides we may obſerve two depreſſions, one at the upper and the other at the

Osteology. lower part of the body of each vertebra; which uniting with ſimilar depreſſions in the vertebræ above and below, form articulating ſurfaces, covered with cartilages, for receiving the heads of the ribs; and at the fore part of their tranſverſe proceſs (excepting the two laſt) we find an articulating ſurface for receiving the tuberoſity of the ribs.

33 Lumbar vertebræ. Theſe five vertebræ differ only from thoſe of the back in their being larger, and in having their ſpinous proceſſes at a greater diſtance from each other. The moſt conſiderable motions of the trunk are made on theſe vertebræ; and theſe motions could not be performed with ſo much eaſe, were the proceſſes placed nearer to each other.

34 Os ſacrum. The os ſacrum, which is compoſed of five or ſix pieces in young ſubjects, becomes one bone in more advanced age.

It is nearly of a triangular figure, its inferior portion being bent a little forwards. Its ſuperior part has two oblique proceſſes, which are articulated with the laſt of the lumbar vertebræ; and it has likewiſe commonly three ſmall ſpinous proceſſes, which gradually become ſhorter, ſo that the lowermoſt is not ſo long as the ſecond, nor the ſecond as the uppermoſt. Its tranſverſe proceſſes are formed into one oblong proceſs, which becomes gradually ſmaller as it deſcends. Its concave or anterior ſide is uſually ſmooth, but its poſterior convex ſide has many prominences (the moſt remarkable of which are the ſpinous proceſſes juſt now mentioned), which are filled up and covered with the muſcular and tendinous parts behind.

This bone has five pair of holes, which afford a paſſage to blood veſſels, and likewiſe to the nerves that are derived from the ſpinal marrow, which is continued even here, being lodged in a triangular cavity, that becomes ſmaller as it deſcends, and at length terminates obliquely at the lower part of this bone. Below the third diviſion of the os ſacrum, this canal is not completely bony as the reſt of the ſpine, being ſecured at its back part only by a very ſtrong membrane, ſo that a wound at this part muſt be extremely dangerous.

The os ſacrum is united laterally to the oſſa innominata or hip-bones, and below to the coccyx.

35 Os coccyx. The coccyx, which, like the os ſacrum, is in young people made up of three or four diſtinct parts, uſually becomes one bone in the adult ſtate.

It ſerves to ſupport the inteſtinum rectum; and, by its being capable of ſome degree of motion at its articulation with the ſacrum, and being like that bone bent forwards, we are enabled to ſit with eaſe.

This bone is nearly of a triangular ſhape, being broadeſt as its upper part, and from thence growing narrower to its apex, where it is not bigger than the little finger.

It has got its name from its ſuppoſed reſemblance to a cuckow's beak. It differs greatly from the vertebræ, being commonly without any proceſſes, and having no cavity for the ſpinal marrow, or foramina for the tranſmiſſion of nerves.

The ſpine, of which we have now finiſhed the anatomical deſcription, is deſtined for many great and important uſes. The medulla ſpinalis is lodged in its bony canal ſecure from external injury. It ſerves as a defence to the abdominal and thoracic viſcera, and at the ſame time ſupports the head, and gives a general firmneſs to the whole trunk. Osteology.

We have before compared it to the letter *ſ*, and its different turns will be found to render it not very unlike the figure of that letter.—In the neck we ſee it projecting ſomewhat forward to ſupport the head, which, without this aſſiſtance, would require a greater number of muſcles. Lower down, in the thorax, we find it taking a curved direction backwards, and of courſe increaſing the cavity of the cheſt. After this, in the loins, it again projects forwards in a direction with the centre of gravity, by which means we are eaſily enabled to keep the body in an erect poſture, for otherwiſe we ſhould be liable to fall forwards. Towards its inferior extremity, however, it again recedes backward, and thus aſſiſts in forming the pelvis, the name given to the cavity in which the urinary bladder, inteſtinum rectum, and other viſcera are placed.

If this bony column had been formed only of one piece, it would have been much more eaſily fractured than it is now: and by confining the trunk to a ſtiff ſituation, a variety of motions would have been altogether prevented, which are now performed with eaſe by the great number of bones of which it is compoſed.

It is firm, and yet to this firmneſs there is added a perfect flexibility. If it be required to carry a load upon the head, the neck becomes ſtiff with the aſſiſtance of its muſcles, and accommodates itſelf to the load, as if it was compoſed only of one bone.—In ſtooping likewiſe, or in turning to either ſide, the ſpine turns itſelf in every direction, as if all its bones were ſeparated from each other.

In a part of the body like the ſpine, that is made up of ſo great a number of bones, and intended for ſuch a variety of motion, there muſt be a greater danger of diſlocation than fracture; but we ſhall find, that this is very wiſely guarded againſt in every direction by the proceſſes belonging to each vertebra, and by the ligaments, cartilages, &c. by which theſe bones are connected with each other.

§ 2. *Of the Bones of the Thorax.*

The thorax, or cheſt, is compoſed of many bones, viz. the ſternum which is placed at its anterior part, twelve ribs on each ſide which make up its lateral parts, and the dorſal vertebræ which conſtitute its poſterior part. Theſe laſt have been already deſcribed. 36

37 Of the ſternum. The ſternum is the long bone which extends itſelf from the upper to the lower part of the breaſt anteriorly, and to which the ribs and the clavicles are articulated.

In children it is compoſed of ſeveral bones united by cartilages; but as we advance in life, moſt of theſe cartilages oſſify, and the ſternum in the adult ſtate is found to conſiſt only of three pieces, and ſometimes becomes one bone. It is however generally deſcribed as being compoſed of three parts—one ſuperior, which is broad, thick, and ſhort; and one in the middle, which is thinner, narrower, and longer than the other.

It terminates at its lower part by a third piece, which is called the *xyphoid*, or *ſword-like cartilage*, from its ſuppoſed reſemblance to the blade of a ſword, and becauſe in young ſubjects it is commonly in a cartilaginous ſtate.

We

Osteology. We have already obſerved, that this bone is articulated with the clavicle on each ſide. It is likewiſe joined to the fourteen true ribs, viz. ſeven on its right and ſeven on its left ſide.

38 Of the ribs. The ribs are bones ſhaped like a bow, forming the ſides of the cheſt. There are twelve on each ſide. They are diſtinguiſhed into true and falſe ribs: The ſeven upper ribs which are articulated to the ſternum are called *true ribs*, and the five lower ones that are not immediately attached to that bone are called *falſe ribs*.

On the inferior and interior ſurface of each rib, we obſerve a ſinuoſity for the lodgment of an artery, vein, and nerve.

The ribs are not bony through their whole length, their anterior part being cartilaginous. They are articulated with the vertebræ and ſternum. Every rib (or at leaſt the greater number of them) has at its poſterior part two proceſſes; one at its extremity, called the *head of the rib*, by means of which it is articulated with the body of two vertebræ; and another, called its tuberoſity, by which it is articulated with the tranſverſe proceſs of the loweſt of theſe two vertebræ. The firſt rib is not articulated by its extremity to two vertebræ, being ſimply attached to the upper part of the firſt vertebra of the back. The ſeven ſuperior or true ribs are articulated anteriorly with the ſternum by their cartilages; but the falſe ribs are ſupported in a different manner—the eighth, which is the firſt of theſe ribs, being attached by its cartilages to the ſeventh; the ninth to the eighth, &c.

The two lowermoſt ribs differ likewiſe from all the reſt in the following particulars: They are articulated only with the body of a vertebra, and not with a tranſverſe proceſs; and anteriorly, their cartilage is looſe, not being attached to the cartilages of the other ribs; and this ſeems to be, becauſe the moſt conſiderable motions of the trunk are not performed on the lumbar vertebræ alone, but likewiſe on the two laſt vertebræ of the back: ſo that if theſe two ribs had been confined at the fore part like the other ribs, and had been likewiſe articulated with the bodies of two vertebræ, and with the tranſverſe proceſſes, the motion of the two laſt vertebræ, and conſequently of the whole trunk, would have been impeded.

The ribs help to form the cavity of the thorax; they afford attachment to different muſcles; they are uſeful in reſpiration; and they ſerve as a ſecurity to the heart and lungs.

§ 3. *Of the Bones of the Pelvis.*

39 The pelvis is compoſed of the os ſacrum, os coccygis, and two oſſa innominata. The two firſt of theſe bones were included in the account of the ſpine, to which they more properly belong.

In children, each os innominatum is compoſed of three diſtinct bones; but as we advance in life the intermediate cartilages gradually oſſify, and the marks of the original ſeparation diſappear, ſo that they become one irregular bone; ſtill, however, continuing to retain the names of ilium, iſchium, and pubis, by which their diviſions were originally diſtinguiſhed, and to be deſcribed as three different bones by the generality of anatomiſts. The os ilium forms the upper and moſt conſiderable part of the bone, the os iſchium its lower and poſterior portion, and the os pubis its fore part. Osteology.

40 Os ilium. The os ilium or haunch-bone, is articulated poſteriorly to the os ſacrum by a firm cartilaginous ſubſtance, and is united to the os pubis before and to the os iſchium below. Its ſuperior portion is thin, and terminates in a ridge called the criſta or ſpine of the ilium, and more commonly known by the name of the haunch. This criſta riſes up like an arch, being turned ſomewhat outwards, ſo as to reſemble the wings of a phaeton.

Externally this bone is unequally prominent and hollowed for the lodgment of muſcles; internally we find it ſmooth and concave. At its lower part there is a conſiderable ridge on its inner ſurface. This ridge extends from the os ſacrum, and correſponds with a ſimilar prominence both on that bone and the iſchium; forms with the inner part of the oſſa pubis what in midwifery is termed the brim of the pelvis.

The criſta, or ſpine, which at firſt is an epiphyſis, has two conſiderable tuberoſities; one anteriorly, and the other poſteriorly, which is the largeſt of the two: Theſe, from their projecting more than the parts of the bone below them, have gotten the name of ſpinal proceſſes. From the anterior ſpinous proceſs, the ſartorius and tenſor vaginæ femoris muſcles have their origin; and below the poſterior proceſs we obſerve a conſiderable niche in the bone, which, in the recent ſubject, is formed into a large foramen, by means of a ſtrong ligament that is ſtretched over its lower part from the os ſacrum to the ſharp-pointed proceſs of the iſchium. This hole affords a paſſage to the great ſciatic nerve, and to the poſterior crural veſſels under the pyriform muſcle, part of which likewiſe paſſes out here.

41 Os iſchium. The os iſchium, or hip-bone, which is of a very irregular figure, conſtitutes the lower lateral parts of the pelvis, and is commonly divided into its body, tuberoſity, and ramus. The body forms the lower and moſt conſiderable portion of the acetabulum, and ſends a ſharp-pointed proceſs backwards, called the ſpine of the iſchium. To this proceſs the ligament adheres, which was juſt now ſpoken of, as forming a foramen for the paſſage of the ſciatic nerve. The tuberoſity, which is the loweſt part of the trunk, and ſupports us when we ſit, is large and irregular, affording origin to ſeveral muſcles. From this tuberoſity we find the bone becoming thinner and narrower. This part, which has the name of ramus or branch, paſſes forwards and upwards, and concurs with the ramus of the os pubis, to form a large hole called the *foramen magnum iſchii*, or *thyroideum*, as it is ſometimes named from its reſemblance to a door or ſhield. This hole, which in the recent ſubject is cloſed by a ſtrong membrane called the obturator ligament, affords through its whole circumference attachment to muſcles. At its upper part where we obſerve a niche in the bone, it gives paſſage to the obturator veſſels and nerves, which go to the inner part of the thigh. Nature ſeems everywhere to avoid an unneceſſary weight of bone, and this foramen, no doubt, ſerves to lighten the bones of the pelvis.

42 Os pubis. The os pubis or ſhare-bone, which with its fellow forms the fore part of the pelvis, is the ſmalleſt diviſion of the os innominatum. It is united to its fellow by

Osteology. by means of a ſtrong cartilage, which forms what is called the ſymphyſis pubis.

In each os pubis we may diſtinguiſh the body of the bone, its angle, and ramus. The body or outer part is united to the os ilium. The angle comes forwards to form the ſymphyſis, and the ramus is a thin proceſs which unites with the ramus of the iſchium, to form the foramen thyroideum.

The three bones we have deſcribed as compoſing each os innominatum, all aſſiſt in forming the acetabulum, in which the head of the os femoris is received.

This cavity is everywhere lined with a ſmooth cartilage, excepting at its inner part, were we may obſerve a little foſſa, in which are lodged the mucilaginous glands of the joint. We may likewiſe notice the pit or depreſſion made by the round ligament, as it is improperly called, which, by adhering to this cavity and to the head of the thigh-bone, helps to ſecure the latter in the ſocket.

Theſe bones, which are united to each other and to the ſpine, by many very ſtrong ligaments, ſerve to ſupport the trunk, and to connect it with the lower extremities; and at the ſame time to form the pelvis or baſon, in which are lodged the inteſtines and urinary bladder, and in women the uterus; ſo that the ſtudy of this part of oſteology is of the utmoſt importance in midwifery.

It is worthy of obſervation, that in women the os ſacrum is uſually ſhorter, broader, and more hollowed, the oſſa ilia more expanded, and the inferior opening of the pelvis larger, than in men.

Sect. IV. *Of the Extremities.*

43 The parts of the ſkeleton conſiſt of the upper extremity and the lower.

§ 1. *Of the Upper Extremities.*

44 This conſiſts of the ſhoulder, the arm, and the hand.

45 #### 1. Of the Shoulder.

The ſhoulder conſiſt of two bones, the clavicula and the ſcapula.

46 Of the clavicula. The former, which is ſo named from its reſemblance to the key in uſe among the ancients, is a little curved at both its extremities like an Italic *f*. It is likewiſe called *jugulum*, or collar bone, from its ſituation. It is about the ſize of the little finger, but longer, and being of a very ſpongy ſubſtance, is very liable to be fractured. In this, as in other long bones, we may diſtinguiſh a body and two extremities. The body is rather flattened than rounded. The anterior extremity is formed into a ſlightly convex head, which is nearly of a triangular ſhape. The inferior ſurface of the head is articulated with the ſternum. The poſterior extremity, which is flatter and broader than the other, is connected to a proceſs of the ſcapula, called *acromion*. Both theſe articulations are ſecured by ligaments, and in that with the ſternum we meet with a moveable cartilage, to prevent any injury from friction.

The clavicle ſerves to regulate the motions of the ſcapula, by preventing it from being brought too much forwards, or carried too far backwards. It affords origin to ſeveral muſcles, and helps to cover and protect the ſubclavian veſſels, which derive their name from their ſituation under this bone. Osteology.

47 Of the ſcapula. The ſcapula, or ſhoulder-blade, which is nearly of a triangular ſhape, is fixed to the poſterior part of the true ribs, ſomewhat in the manner of a buckler. It is of a very unequal thickneſs, and like all other broad flat bones, is ſomewhat cellular. Exteriorly it is convex, and interiorly concave, to accommodate itſelf to the convexity of the ribs. We obſerve in this bone three unequal ſides, which are thicker and ſtronger than the body of the bone, and are therefore termed its *coſtæ*. The largeſt of the three, called alſo the baſis, is turned towards the vertebræ. Another, which is leſs than the former, is below this; and the third, which is the leaſt of the three, is at the upper part of the bone. Externally the bone is elevated into a conſiderable ſpine, which riſing ſmall at the baſis of the ſcapula, becomes gradually higher and broader, and divides the outer ſurface of the bone into two foſſæ. The ſuperior of theſe, which is the ſmalleſt, ſerves to lodge the ſupra ſpinatus muſcle; and the inferior foſſa, which is much larger than the other, gives origin to the infra ſpinatus. This ſpine terminates in a broad and flat proceſs at the top of the ſhoulder, called the *proceſſus acromion*, to which the clavicle is articulated. This proceſs is hollowed at its lower part to allow a paſſage to the ſupra and infra ſpinati muſcles. The ſcapula has likewiſe another conſiderable proceſs at its upper part, which, from its reſemblance to the beak of a bird, is called the *coracoid proceſs*. From the outer ſide of this coracoid proceſs, a ſtrong ligament paſſes to the proceſſus acromion, which prevents a luxation of the os humeri upwards. A third proceſs begins by a narrow neck, and ends in a cavity called *glenoid*, for the connexion of the os humeri.

The ſcapula is articulated with the clavicle and os humeri, to which laſt it ſerves as a fulcrum; and by varying its poſition it affords a greater ſcope to the bones of the arm in their different motions. It likewiſe gives origin to ſeveral muſcles, and poſteriorly ſerves as a defence to the trunk.

2. Bones of the Arm.

48 The arm is commonly divided into two parts, which are articulated to each other at the elbow. The upper part retains the name of arm, properly ſo called, and the lower part is uſually called the fore-arm.

49 The arm is compoſed of a ſingle bone called *os humeri*. This bone, which is almoſt of a cylindrical ſhape, may be divided into its body and its extremities.

The upper extremity begins by a large, round ſmooth head, which is admitted into the glenoid cavity of the ſcapula. On the upper and fore part of the bone there is a groove for lodging the long head of the biceps muſcle of the arm; and on each ſide of the groove, at the upper end of the bone, there is a tubercle to which the ſpinati muſcles are fixed.

The lower extremity has ſeveral proceſſes and cavities. The principal proceſſes are its two condyles, one exterior and the other interior, and of theſe the laſt is the largeſt. Between theſe two we obſerve two lateral protuberances, which, together with a middle cavity,

Osteology.

vity, form as it were a kind of pulley upon which the motions of the fore-arm are chiefly performed. At each side of the condyles, as well exteriorly as interiorly, there is another eminence which gives origin to several muscles of the hand and fingers. Posteriorly and superiorly, speaking with respect to the condyles, we observe a deep fossa which receives a considerable process of the ulna; and anteriorly and opposite to this fossa, we observe another, which is much less, and receives another process of the same bone.

The body of the bone has at its upper and anterior part a furrow which begins from behind the head of the bone, and serves to lodge the tendon of a muscle. The body of the os humeri is hollow through its whole length, and like all other long bones has its marrow.

This bone is articulated at its upper part to the scapula. This articulation, which allows motion every way, is surrounded by a capsular ligament that is sometimes torn in luxation, and becomes an obstacle to the easy reduction of the bone. Its lower extremity is articulated with the bones of the fore-arm.

50 Of the fore-arm. The fore-arm is composed of two bones, the ulna and radius.

51 Of the ulna. The ulna or elbow bone is much less than the os humeri, and becomes gradually smaller as it descends to the wrist. At its upper part it has two processes and two cavities. Of the two processes, the largest, which is situated posteriorly, and called the *olecranon*, is admitted into the posterior fossa of the os humeri. The other process is placed anteriorly, and is called the *coronoid process*. In bending the arm it enters into the anterior fossa of the os humeri. This process being much smaller than the other, permits the fore-arm to bend inwards; whereas the olecranon, which is shaped like a hook, reaches the bottom of its fossa in the os humeri as soon as the arm becomes straight, and will not permit the fore-arm to be bent backwards. The ligaments likewise oppose this motion.

Between the two processes we have described, there is a considerable cavity called the sigmoid cavity, divided into two fossæ by a small eminence, which passes from one process to the other; it is by means of this cavity and the two processes, that the ulna is articulated with the os humeri by ginglimus.

At the bottom of the coronoid process interiorly, there is a small sigmoid cavity, which serves for the articulation of the ulna with the radius.

The body of the ulna is of a triangular shape: Its lower extremity terminates by a small head and a little styloid process. The ulna is articulated above to the os humeri—both above and below to the radius, and to the wrist at its lower extremity. All these articulations are secured by means of ligaments. The chief use of this bone seems to be to support and regulate the motions of the radius.

52 Of the radius. The radius, which is so named from its supposed resemblance to the spoke of a wheel, is placed at the inside of the fore-arm. It is somewhat larger than the ulna, but not quite so long as that bone. Its upper part is cylindrical, hollowed superiorly to receive the outer condyle of the os humeri. Laterally it is admitted into the little sigmoid cavity of the ulna, and the cylindrical part of the bone turns in this cavity in the motions of pronation and supination (L). This bone follows the ulna in flexion and extension, and may likewise be moved round its axis in any direction. The lower extremity of the radius is much larger and stronger than its upper part; the ulna, on the contrary, is smaller and weaker below than above; so that they serve to supply each other's deficiencies in both those parts.

Osteology.

On the external side of this bone, we observe a small cavity which is destined to receive the lower end of the ulna; and its lower extremity is formed into a large cavity, by means of which it is articulated with the bones of the wrist, and on this account it is sometimes called *manubrium manus*. It supports the two first bones of the wrist on the side of the thumb, whereas the ulna is articulated with that bone of the wrist which corresponds with the little finger.

Through the whole length both of this bone and the ulna, a ridge is observed which affords attachment to an interosseous ligament. This ligament fills up the space between the two bones.

3. Bones of the Hand.

53 54 Of the carpus. The carpus or wrist consists of eight small bones of an irregular shape, and disposed in two unequal rows. Those of the upper row are articulated with the bones of the fore-arm, and those of the lower one with the metacarpus.

The ancient anatomists described these bones numerically; Lyserus seems to have been the first who gave to each of them a particular name. The names he adopted are found on the figure of the bones, and are now pretty generally received, except the first, which instead of κοτυλοειδες (the name given to it by Lyserus, on account of its sinus, that admits a part of the os magnum), has by later writers been named *Scaphoides* or *Naviculare*. This, which is the outermost of the upper row (considering the thumb as the outer side of the hand), is articulated with the radius; on its inner side it is connected with the os lunare, and below to the trapezium and trapezoides. Next to this is a smaller bone, called the *os lunare;* because its outer side, which is connected with the scaphoides, is shaped like a crescent. This is likewise articulated with the radius. On its inner side it joins the os cuneiforme; and anteriorly, the os magnum and os unciforme.

The os cuneiforme, which is the third bone in the upper row, is compared to a wedge, from its being broader above, at the back of the hand, than it is below. Posteriorly it is articulated with the ulna, and anteriorly with the os unciforme.

These three bones form an oblong articulating surface, covered by cartilage, by which the hand is connected with the fore-arm.

The os pisiforme, or pea-like bone, which is smaller than

(L) The motions of pronation and supination may be easily described. If the palm of the hand, for instance, is placed on the surface of a table, the hand may be said to be in a state of pronation; but if the back part of the hand is turned towards the table, the hand will be then in a state of supination.

Osteology. than the three juſt now deſcribed, though generally claſſed with the bones of the upper row, does not properly belong to either ſeries, being placed on the under ſurface of the os cuneiforme, ſo as to project into the palm of the hand. The four bones of the ſecond row correſpond with the bones of the thumb and fingers; the firſt, ſecond, and fourth, are from their ſhapes named *trapezium*, *trapezoides*, and *unciforme;* the third, from its being the largeſt bone of the carpus, is ſtyled *os magnum*.

All theſe bones are convex towards the back, and ſlightly concave towards the palm of the hand; their articulating ſurfaces are covered with cartilages, and ſecured by many ſtrong ligaments, particularly by two ligamentous expanſions, called the external and internal annular ligaments of the wriſt. The former extends in an oblique direction from the os piſiforme to the ſtyloid proceſs of the radius, and is an inch and a half in breadth; the latter or internal annular ligament is ſtretched from the os piſiforme and os unciforme, to the os ſcaphoides and trapezium. Theſe annular ligaments likewiſe ſerve to bend down the tendons of the wriſt and fingers.

55 Of the metacarpus. The metacarpus conſiſts of four bones, which ſupport the fingers; externally they are a little convex, and internally ſomewhat concave, where they form the palm of the hand. They are hollow, and of a cylindrical ſhape.

At each extremity they are a little hollowed for their articulation; ſuperiorly with the bones of the carpus, and inferiorly with the firſt phalanx of the fingers, in the ſame manner as the ſeveral phalanges of the fingers are articulated with each other.

56 Of the fingers. The five fingers of each hand are compoſed of fifteen bones, diſpoſed in three ranks called phalanges: The bones of the firſt phalanx, which are articulated with the metacarpus, are the largeſt, and thoſe of the laſt phalanx the ſmalleſt. All theſe bones are larger at their extremities than in their middle part.

We obſerve at the extremities of the bones of the carpus, metacarpus, and fingers, ſeveral inequalities that ſerve for their articulation with each other; and theſe articulations are ſtrengthened by means of the ligaments which ſurround them.

It will be eaſily underſtood that this multiplicity of bones in the hand (for there are 27 in each hand) is eſſential to the different motions we wiſh to perform. If each finger was compoſed only of one bone inſtead of three, it would be impoſſible for us to graſp any thing.

§ 2. *Of the Lower Extremities.*

57 Each lower extremity is divided into four parts, viz. the os femoris, or thigh-bone; the rotula, or knee-pan; the leg; and the foot.

1. Of the Thigh.

58 Of the os femoris. The thigh is compoſed only of this bone, which is the largeſt and ſtrongeſt we have. It will be neceſſary to diſtinguiſh its body and extremities: Its body, which is of a cylindrical ſhape, is convex before and concave behind, where it ſerves to lodge ſeveral muſcles. Throughout two-thirds of its length we obſerve a ridge called *linea aſpera*, which originates from the trochanters, and after running for ſome way downwards, divides into two branches, that terminate in the tuberoſities at the lower extremity of the bone. Osteology.

At its upper extremity we muſt deſcribe the neck and ſmooth head of the bone, and likewiſe two conſiderable proceſſes: The head, which forms the greater portion of a ſphere unequally divided, is turned inwards, and received into the great cotyloid cavity of the os innominatum. At this part of the bone there is a little foſſa to be obſerved, to which the round ligament is attached, and which we have already deſcribed as tending to ſecure the head of this bone in the great acetabulum. The neck is almoſt horizontal, conſidered with reſpect to its ſituation with the body of the bone. Of the two proceſſes, the external one, which is the largeſt, is called trochanter major; and the other, which is placed on the inſide of the bone, trochanter minor. They both afford attachment to muſcles. The articulation of the os femoris with the trunk is ſtrengthened by means of a capſular ligament, which adheres everywhere round the edge of the great cotyloid cavity of the os innominatum, and ſurrounds the head of the bone.

The os femoris moves upon the trunk in every direction.

At the lower extremity of the bone are two proceſſes called the condyles, and an intermediate ſmooth cavity, by means of which it is articulated with the leg by ginglimus.

All round the under end of the bone there is an irregular ſurface where the capſular ligament of the joint has its origin, and where blood veſſels go into the ſubſtance of the bone.

Between the condyles there is a cavity poſteriorly, in which the blood veſſels and nerves are placed, ſecure from the compreſſion to which they would otherwiſe be expoſed in the action of bending the leg, and which would not fail to be hurtful.

At the ſide of each condyle externally, there is a tuberoſity, from whence the lateral ligaments originate, which are extended down to the tibia.

A ligament likewiſe ariſes from each condyle poſteriorly. One of theſe ligaments paſſes from the right to the left, and the other from the left to the right, ſo that they interſect each other, and for that reaſon are called the *croſs ligaments*.

The lateral ligaments prevent the motion of the leg upon the thigh to the right or left; and the croſs ligaments, which are alſo attached to the tibia, prevent the latter from being brought forwards.

In new born children all the proceſſes of this bone are cartilaginous.

2. The Rotula, or Knee-pan.

59 Of the rotula. The rotula, patella, or knee-pan, as it is differently called, is a flat bone about four or five inches in circumference, and is placed at the fore part of the joint of the knee. In its ſhape it is ſomewhat like the common figure of the heart, with its point downwards.

It is thinner at its edge than in its middle part; at its fore part it is ſmooth and ſomewhat convex; its poſterior ſurface, which is more unequal, affords an elevation in the middle which is admitted between the two condyles of the os femoris.

This bone is retained in its proper ſituation by a ſtrong ligament which everywhere ſurrounds it, and adheres

Osteology.

adheres both to the tibia and os femoris; it is likewiſe firmly connected with the tibia by means of a ſtrong tendinous ligament of an inch in breadth, and upwards of two inches in length, which adheres to the lower part of the patella, and to the tuberoſity at the upper end of the tibia. On account of this connexion, it is very properly conſidered as an appendage to the tibia, which it follows in all its motions, ſo as to be to it what the olecranon is to the ulna. There is this difference, however, that the olecranon is a fixed proceſs; whereas the patella is moveable, being capable of ſliding from above downwards and from below upwards. This mobility is eſſential to the rotatory motion of the leg.

In very young children this bone is entirely cartilaginous.

The principal uſe of the patella ſeems to be to defend the articulation of the knee from external injury; it likewiſe tends to increaſe the power of the extenſor muſcles of the leg, by removing their direction farther from the centre of motion in the manner of a pulley.

60

3. Of the Leg.

The leg is compoſed of two bones: Of theſe the inner one, which is the largeſt, is called tibia; the other is much ſmaller, and named fibula.

61 Of the tibia.

The tibia, which is ſo called from its reſemblance to the muſical pipe of the ancients, has three ſurfaces, and is not very unlike a triangular priſm. Its poſterior ſurface is the broadeſt; anteriorly it has a conſiderable ridge called the ſhin, between which and the ſkin there are no muſcles. At the upper extremity of this bone are two ſurfaces, a little concave, and ſeparated from each other by an intermediate elevation. The two little cavities receive the condyles of the os femoris, and the eminence between them is admitted into the cavity which we ſpoke of as being between the two condyles; ſo that this articulation affords a ſpecimen of the complete ginglimus. Under the external edge of the upper end of this bone is a circular flat ſurface, which receives the head of the fibula.

At the lower and inner portion of the tibia, we obſerve a conſiderable proceſs called *malleolus internus*. The baſis of the bone terminates in a large tranſverſe cavity, by which it is articulated with the uppermoſt bone of the foot. It has likewiſe another cavity at its lower end and outer ſide, which is ſomewhat oblong, and receives the lower end of the fibula.

The tibia is hollow through its whole length.

62 Of the fibula.

The fibula is a ſmall long bone ſituated on the outſide of the tibia. Its ſuperior extremity does not reach quite ſo high as the upper part of the tibia, but its lower end deſcends ſomewhat lower. Both above and below, it is articulated with the tibia by means of the lateral cavities we noticed in our deſcription of that bone.

Its lower extremity is ſtretched out into a coronoid proceſs, which is flattened at its inſide, and is convex externally, forming what is called the *malleolus externus*, or *outer ankle*. This is rather lower than the malleolus internus of the tibia.

Osteology.

The body of this bone, which is irregularly triangular, is a little hollow at its internal ſurface, which is turned towards the tibia; and it affords like that bone, through its whole length, attachment to a ligament, which from its ſituation is called the interoſſeous ligament.

4. Of the Foot.

63

The foot conſiſts of the tarſus, metatarſus, and toes.

64 Of the tarſus.

The tarſus is compoſed of ſeven bones, viz. the aſtragalus, os calcis, os naviculare, os cuboides, and three others called cuneiform bones.

65 Of the aſtragalus.

The aſtragalus is a large bone with which both the tibia and fibula are articulated. It is the uppermoſt bone of the foot; it has ſeveral ſurfaces to be conſidered; its upper, and ſomewhat poſterior part, which is ſmooth and convex, is admitted into the cavity of the tibia. Its lateral parts are connected with the malleoli of the two bones of the leg; below, it is articulated with the os calcis, and its anterior ſurface is received by the os naviculare. All theſe articulations are ſecured by means of ligaments.

66 Of the os calcis.

The os calcis, or calcaneum, which is of a very irregular figure, is the largeſt bone of the foot. Behind, it is formed into a conſiderable tuberoſity called the heel; without this tuberoſity, which ſupports us in an erect poſture, and when we walk, we ſhould be liable to fall backwards.

On the internal ſurface of this bone, we obſerve a conſiderable ſinuoſity, which affords a paſſage to the tendon of a muſcle: and to the poſterior part of the os calcis, a ſtrong tendinous cord called *tendo achillis* (M), is attached, which is formed by the tendons of ſeveral muſcles united together. The articulation of this with the other bones is ſecured by means of ligaments.

67 Of the os naviculare.

The os naviculare, or ſcaphoides (for theſe two terms have the ſame ſignification), is ſo called on account of its reſemblance to a little bark. At its poſterior part, which is concave, it receives the aſtragalus; anteriorly it is articulated with the cuneiform bones, and laterally it is connected with the os cuboides.

68 Of the os cuboides.

The os cuboides forms an irregular cube. Poſteriorly it is articulated with the os calcis; anteriorly it ſupports the two laſt bones of the metatarſus, and laterally it joins the third cuneiform bone and the os naviculare.

69 Of the oſſa cuneiformia.

Each of the oſſa cuneiformia, which are three in number, reſembles a wedge, and from this ſimilitude their name is derived. They are placed next to the metatarſus by the ſides of each other, and are uſually diſtinguiſhed into *os cuneiforme externum*, *medium* or *minimum*, and *internum* or *maximum*. The ſuperior ſurface of theſe bones, from their wedge-like ſhape, is broader than that which is below, where they help to form the ſole of the foot; poſteriorly they are united to the os naviculare, and anteriorly they ſupport the three firſt metatarſal bones.

When theſe ſeven bones compoſing the tarſus are viewed together in the ſkeleton, they appear convex above, where they help to form the upper part of the foot; and concave underneath, where they form the

(M) This tendon is ſometimes ruptured by jumping, dancing, or other violent efforts.

Osteology. hollow of the foot, in which the veſſels, tendons, and nerves of the foot, are placed ſecure from preſſure.

They are united to each other by very ſtrong ligaments, and their articulation with the foot is ſecured by a capſular and two lateral ligaments; each of the latter is covered by an annular ligament of conſiderable breadth and thickneſs, which ſerves to bind down the tendons of the foot, and at the ſame time to ſtrengthen the articulation.

The os cuneiforme externum is joined laterally to the os cuboides.

Theſe bones complete our account of the tarſus. Though what we have ſaid of this part of the oſteology has been very ſimple and conciſe, yet many readers may not clearly underſtand it: but if they will be pleaſed to view theſe bones in their proper ſituation in the ſkeleton, all that we have ſaid of them will be eaſily underſtood.

70 Of the metatarſus. The metatarſus is made up of five bones, whereas the metacarpus conſiſts only of four. The cauſe of this difference is, that in the hand the laſt bone of the thumb is not included among the metacarpal bones; whereas in the foot the great toe has only two bones. The firſt of theſe bones ſupports the great toe, and is much larger than the reſt, which nearly reſemble each other in ſize.

Theſe bones are articulated by one extremity with the cuneiform bones and the os cuboides, and by their other end with the toes.

71 Of the toes. Each of the toes, like the fingers, conſiſts of three bones, except the great toe, which is formed of two bones. Thoſe of the other four are diſtinguiſhed into three phalanges. Although the toes are more confined in their motion than the fingers, yet they appear to be perfectly fitted for the purpoſes they are deſigned for. In walking, the toes bring the centre of gravity perpendicular to the advanced foot; and as the ſoles of the foot are naturally concave, we can at pleaſure increaſe this concavity, and form a kind of vault, which adjuſts itſelf to the different inequalities that occur to us in walking; and which, without this mode of arrangement, would incommode us exceedingly, eſpecially when bare-footed. Osteology.

§ 4. *Of the Oſſa* Sesamoidea. 72

Beſides the bones we have already deſcribed, there are ſeveral ſmall ones that are met with only in the adult ſkeleton, and in perſons who are advanced in life; which, from their ſuppoſed general reſemblance to the ſeeds of the ſeſamum, are called *oſſa ſeſamoidea*. They are commonly to be ſeen at the firſt joint of the great toe, and ſometimes at the joints of the thumb; they are likewiſe now and then to be found at the lower extremity of the fibula, upon the condyles of the thigh-bone, under the os cuboides of the tarſus, and in other parts of the body. Their ſize and number ſeem conſtantly to be increaſed by age and hard labour; and as they are generally found in ſituations where tendons and ligaments are moſt expoſed to the action of muſcles, they are now generally conſidered as oſſified portions of ligaments or tendons.

The upper ſurface of theſe bones is uſually convex, and adherent to the tendon that covers it; the ſide which is next to the joint is ſmooth and flat. Though their formation is accidental, yet they ſeem to be of ſome uſe, by raiſing the tendons farther from the centre of motion, and conſequently increaſing the power of the muſcles. In the great toe and thumb they are likewiſe uſeful, by forming a groove for the flexor tendons.

EXPLANATION of the PLATES of OSTEOLOGY.

Plate XXI.

Fig. I. A Front View of the Male Skeleton.

A, The os frontis. B, The os parietale. C, The coronal ſuture. D, The ſquamous part of the temporal bones. E, The ſquamous ſuture. F, The zygoma. G, The maſtoid proceſs. H, The temporal proceſs of the ſphenoid bone. I, The orbit. K, The os malæ. L, The os maxillare ſuperius. M, Its naſal proceſs. N, The oſſa naſi. O, The os unguis. P, the maxilla inferior. Q, The teeth, which are ſixteen in number in each jaw. R, The ſeven cervical vertebræ, with their intermediate cartilages. S, Their tranſverſe proceſſes. T, The twelve dorſal vertebræ, with their intermediate cartilages. U, The five lumbar vertebræ. V, Their tranſverſe proceſſes. W, The upper part of the os ſacrum. X, Its lateral parts. The holes ſeen on its fore part are the paſſages of the undermoſt ſpinal nerves and ſmall veſſels. Oppoſite to the holes, the marks of the original diviſions of the bone are ſeen. Y, The os ilium. Z, Its creſt or ſpine. a, The anterior ſpinous proceſſes. b, The brim of the pelvis. c, The iſchiatic niche. d, The os iſchium. e, Its tuberoſity. f, Its ſpinous proceſs. g, Its crus. h, The foramen thyroideum. i, the os pubis. k, The ſymphyſis pubis. l, The crus pubis. m, The acetabulum. n, The ſeventh or laſt true rib. o, The twelfth or laſt falſe rib. p, The upper end of the ſternum. q, The middle piece. r, The under end, or cartilage enſiformis. s, The clavicle. t, The internal ſurface of the ſcapula. u, Its acromion. v, Its coracoid proceſs. w, Its cervix. x, The glenoid cavity. y, The os humeri. z, Its head, which is connected to the glenoid cavity. 1, Its external tubercle. 2, Its internal tubercle. 3, The groove for lodging the long head of the biceps muſcle of the arm. 4, The internal condyle. 5, The external condyle. Between 4 and 5, the trochlea. 6, The radius. 7, Its head. 8, Its tubercle. 9. The ulna. 10, Its coronoid proceſs. 11, 12, 13, 14, 15, 16, 17, 18, The carpus; compoſed of os naviculare, os lunare, os cuneiforme, os piſiforme, os trapezium, os trapezoides, os magnum, os unciforme. 19, The five bones of the metacarpus. 20, The two bones of the thumb. 21, The three bones of each of the fingers. 22, The os femoris. 23, Its head. 24, Its cervix. 25, The trochanter major. 26, The trochanter minor. 27, The internal condyle. 28, The external condyle. 29, The rotula. 30, The tibia. 31, Its head. 32, Its tubercle. 33, Its ſpine. 34, The malleolus internus. 35, The fibula. 36, Its head. 37, The malleolus externus. The tarſus is compoſed of, 38, The aſtragalus;

Osteology.

lus; 39, the os calcis; 40, the os naviculare; 41, three offa cuneiformia, and the os cuboides, which is not ſeen in this figure. 42, The five bones of the metatarſus. 43, The two bones of the great toe. 44, The three bones of each of the ſmall toes.

FIG. 2. A Front View of the SKULL.

A, The os frontis. B, The lateral part of the os frontis, which gives origin to part of the temporal muſcle. C, The ſuperciliary ridge. D, The ſuperciliary hole through which the frontal veſſels and nerves paſs. EE, the orbitar proceſſes. F, The middle of the tranſverſe ſuture. G, The upper part of the orbit. H, The foramen opticum. I, The foramen lacerum. K, The inferior orbitar fiſſure. L, The os unguis. M, The offa naſi. N, The os maxillare ſuperius. O, Its naſal proceſs. P, The external orbitar hole through which the ſuperior maxillary veſſels and nerves paſs. Q, The os malæ. R, A paſſage for ſmall veſſels into, or out of, the orbit. S, The under part of the left noſtril. T, The ſeptum narium. U, The os ſpongioſum ſuperius. V, The os ſpongioſum inferius. W, The edge of the alveoli, or ſpongy ſockets, for the teeth. X, The maxilla inferior. Y, The paſſage for the inferior maxillary veſſels and nerves.

FIG. 3. A Side View of the SKULL.

A, The os frontis. B, The coronal ſuture. C, The os parietale. D, An arched ridge which gives origin to the temporal muſcle. E, The ſquamous ſuture. F, The ſquamous part of the temporal bone; and, farther forward, the temporal proceſs of the ſphenoid bone. G, The zygomatic proceſs of the temporal bone. H, The zygomatic ſuture. I, The maſtoid proceſs of the temporal bone. K, The meatus auditorius externus. L, The orbitar plate of the frontal bone, under which is ſeen the tranſverſe ſuture. M, The pars plana of the ethmoid bone. N, The os unguis. O, The right os naſi. P, The ſuperior maxillary bone. Q, Its naſal proceſs. R, The two dentes inciſores. S, The dens caninus. T, The two ſmall molares, U, the three large molares. V, The os malæ. W, The lower jaw. X, Its angle. Y, The coronoid proceſs. Z, The condyloid proceſs, by which the jaw is articulated with the temporal bone.

FIG. 4. The Poſterior and Right ſide of the SKULL.

A, The os frontis. BB, The offa parietalia. C, The ſagittal ſuture. D, The parietal hole, through which a ſmall vein runs to the ſuperior longitudinal ſinus. E, The lambdoid ſuture. FF, Offa triquetra, G, The os occipitis. H, The ſquamous part of the temporal bone. I, The maſtoid proceſs. K, The zygoma. L, The os malæ. M, The temporal part of the ſphenoid bone. N, The ſuperior maxillary bone and teeth.

FIG. 5. The External ſurface of the Os FRONTIS.

A, The convex part. B, Part of the temporal foſſa. C, The external angular proceſs. D, The internal angular proceſs. E, The naſal proceſs. F, The ſuperciliary arch. G, The ſuperciliary hole. H, The orbitar plate.

FIG. 6. The Internal Surface of the Os FRONTIS.

AA, The ſerrated edge which aſſiſts to form the coronal ſuture. B, The external angular proceſs. C, The internal angular proceſs. D, The naſal proceſs. E, The orbitar plate. F, The cells which correſpond with thoſe of the ethmoid bone. G, The paſſage from the frontal ſinus. H, the opening which receives the cribriform plate of the ethmoid bone. I, The cavity which lodges the fore part of the brain. K, The ſpine to which the falx is fixed. L, The groove which lodges the ſuperior longitudinal ſinus.

Osteology.

PLATE XXII.

FIG. 1. A Back View of the SKELETON.

AA, The offa parietalia. B, The ſagittal ſuture. C, The lambdoid ſuture. D, The occipital bone. E, The ſquamous ſuture. F, the maſtoid proceſs of the temporal bone. G, The os malæ. H, The palate plates of the ſuperior maxillary bones. I, The maxilla inferior. K, The teeth of both jaws. L, The ſeven cervical vertebræ. M, Their ſpinous proceſſes. N, Their tranſverſe and oblique proceſſes. O, The laſt of the twelve dorſal vertebræ. P, The fifth or laſt lumbar vertebra. Q, The tranſverſe proceſſes. R, The oblique proceſſes. S, The ſpinous proceſſes. T, The upper part of the os ſacrum. U, The poſterior holes which tranſmit ſmall blood veſſels and nerves. V, The under part of the os ſacrum which is covered by a membrane. W, The os coccygis. X, The os ilium. Y, Its ſpine or creſt. Z, The iſchiatic niche. a, The os iſchium. b, Its tuberoſity. c, Its ſpine. d, The os pubis. e, The foramen hydroideum. f, The ſeventh or laſt true rib. g, The twelfth or laſt falſe rib. h, The clavicle. i, The ſcapula. k, Its ſpine. l, Its acromion. m, Its cervix. n, Its ſuperior coſta. o, Its poſterior coſta. p, Its inferior coſta. q, The os humeri. r, The radius. s, The ulna. t, Its oleeranon. u, All the bones of the carpus, excepting the os piſiforme, which is ſeen in Plate XXI. fig. 1. v, The five bones of the metacarpus. w, The two bones of the thumb. x, The three bones of each of the fingers. y, The two ſeſamoid bones at the root of the left thumb. z, The os femoris. 1, The trochanter major. 2, The trochanter minor. 3, The linea aſpera. 4, The internal condyle. 5, The external condyle. 6 6, The ſemilunar cartilages. 7, The tibia. 8, The malleolus internus. 9, The fibula. 10, The malleolus externus. 11, The tarſus. 12, The metatarſus. 13, The toes.

FIG. 2. The External Surface of the Left Os PARIETALE.

A, The convex ſmooth ſurface. B, The parietal hole. C, An arch made by the beginning of the temporal muſcle.

FIG. 3. The Internal Surface of the ſame Bone.

A, Its ſuperior edge, which, joined with the other, forms the ſagittal ſuture. B, the anterior edge, which aſſiſts in the formation of the coronal ſuture. C, The inferior edge for the ſquamous ſuture. D, The poſterior edge for the lambdoid ſuture. E, A depreſſion made by the lateral ſinus. FF, The prints of the arteries of the dura mater.

FIG. 4. The External Surface of the Left Os TEMPORUM.

A, The ſquamous part. B, The maſtoid proceſs. C, The zygomatic proceſs. D, The ſtyloid proceſs. E, The petroſal proceſs. F, The meatus auditorius externus.

Osteology. externus. G, The glenoid cavity for the articulation of the lower jaw. H, The foramen ſtylo-maſtoideum for the portio dura of the ſeventh pair of nerves. I, Paſſages for blood veſſels into the bone. K, The foramen maſtoideum through which a vein goes to the lateral ſinus.

Fig. 5. The Internal Surface of the Left Os Temporum.

A, The ſquamous part; the upper edge of which aſſiſts in forming the ſquamous future. B, The maſtoid proceſs. C, The ſtyloid proceſs. D, The pars petroſa. E, The entry of the ſeventh pair, or auditory nerve. F, The foſſa, which lodges a part of the lateral ſinus. G, The foramen maſtoideum.

Fig. 6. The External Surface of the Osseous Circle, which terminates the meatus auditorius externus.

A, The anterior part. B, A ſmall part of the groove in which the membrana tympani is fixed.

N. B. This, with the ſubſequent bones of the ear, are here delineated as large as the life.

Fig. 7. The Internal Surface of the Osseous Circle.

A, The anterior part. B, The groove in which the membrana tympani is fixed.

Fig. 8. The Situation and Connexion of the Small Bones of the Ear.

A, The malleus. B, The incus. C, The os orbiculare. D, The ſtapes.

Fig. 9. The Malleus, with its Head, Handle, and Small Proceſſes.

Fig. 10. The Incus, with its Body, Superior and Inferior Branches.

Fig. 11. The Os Orbiculare.

Fig. 12. The Stapes, with its Head, Baſe, and two Crura.

Fig. 13. An Internal View of the Labyrinth of the Ear.

A, The hollow part of the cochlea, which forms a ſhare of the meatus auditorius internus. B, The veſtibulum. CCC, The ſemicircular canals.

Fig. 14. An External View of the Labyrinth.

A, The ſemicircular canals. B, The feneſtra ovalis which leads into the veſtibulum. C, The feneſtra rotunda which opens into the cochlea. D, The different turns of the cochlea.

Fig. 15. The Internal Surface of the Os Sphenoides.

AA, The temporal proceſſes. BB, The pterygoid proceſſes. CC, The ſpinous proceſſes. DD, The anterior clinoid proceſſes. E, The poſterior clinoid proceſs. F, The anterior proceſs which joins the ethmoid bone. G, the ſella turcica for lodging the glandula pituitaria. H, The foramen opticum. K, The foramen lacerum. L, The foramen rotundum. M, The foramen ovale. N, The foramen ſpinale.

Fig. 16. The External Surface of the Os Sphenoides.

AA, The temporal proceſſes. BB, The pterygoid proceſſes. CC, The ſpinous proceſſes. D, The proceſſus azygos. E, The ſmall triangular proceſſes which grow from the body of the bone. FF, The orifices of the ſphenoidal ſinuſes. G, The foramen lacerum. Osteology. H, The foramen rotundum. I, The foramen ovale. K, The foramen pterygoideum.

Fig. 17. The External View of the Os Ethmoides.

A, The naſal lamella. BB, The grooves between the naſal lamella and oſſa ſpongioſa ſuperiora. CC, The oſſa ſpongioſa ſuperiora. DD, The ſphenoidal cornua. See Fig. 16. E.

Fig. 18. The Internal View of the Os Ethmoides.

A, The criſta galli. B, The cribriform plate, with the different paſſages of the olfactory nerves. CC, Some of the ethmoidal cells. D, The right os planum. EE, The ſphenoidal cornua.

Fig. 19. The Right Sphenoidal Cornu.

Fig. 20. The Left Sphenoidal Cornu.

Fig. 21. The External Surface of the Os Occipitis.

A, The upper part of the bone. B, The ſuperior arched ridge. C, The inferior arched ridge. Under the arches are prints made by muſcles of the neck. DD, The two condyloid proceſſes which articulate the head with the ſpine. E, The cuneiform proceſs. F, The foramen magnum through which the ſpinal marrow paſſes. GG, The poſterior condyloid foramina which tranſmit veins into the lateral ſinuſes. HH, The foramina lingualia for the paſſage of the ninth pair of nerves.

Fig. 22. The Internal Surface of the Os Occipitis.

AA, The two ſides which aſſiſt to form the lambdoid future. B, The point of the cuneiform proceſs where it joins the ſphenoid bone. CC, The prints made by the poſterior lobes of the brain. DD, Prints made by the lobes of the cerebellum. E, The cruciform ridge for the attachment of the proceſſes of the dura mater. F, The courſe of the ſuperior longitudinal ſinuſes. GG, The courſe of the two lateral ſinuſes. N, The foramen magnum. II, The poſterior condyloid foramina.

Plate XXIII.

Fig. 1. A Side View of the Skeleton.

AA, The oſſa parietalia. B, The ſagittal future. C, The os occipitis. DD, The lambdoid future. E, The ſquamous part of the temporal bone. F, The maſtoid proceſs. G, The meatus auditorius externus. H, The os frontis. I, The os malæ. K, The os maxillare ſuperius. L, The maxilla inferior. M, The teeth of both jaws. N, The ſeventh or laſt cervical vertebra. O, The ſpinous proceſſes. P, Their tranſverſe and oblique proceſſes. Q, The twelfth or laſt dorſal vertebra. R, The fifth or laſt lumbar vertebra. S, The ſpinous proceſſes. T, Openings between the vertebræ for the paſſage of the ſpinal nerves. U, The under end of the os ſacrum. V, The os coccygis. W, The os ilium. X, The anterior ſpinous proceſſes. Y, The poſterior ſpinous proceſſes. Z, The iſchiatic niche. a, The right os ilium. b, The oſſa pubis. c, The tuberoſity of the left os iſchium. d, The ſcapula. e, Its ſpine. f, The os humeri. g, The radius. h, The ulna. i, The carpus. k, The metacarpal bone of the thumb. l, The metacarpal bones of the fingers. m, The two bones of the thumb. n, The three bones of each of the fingers. o, The os femoris.

Osteology. femoris. p, Its head. q, The trochanter major. r, The external condyle. s, The rotula. t, The tibia. u, The fibula. v, The malleolus externus. w, The aſtragalus. x, The os calcis. y, The os naviculare. z, The three oſſa cuneiformia. 1, The os cuboides. 2, The five metatarſal bones. 3, The two bones of the great toe. 4, The three bones of each of the ſmall toes.

Fig. 2. A View of the Internal Surface of the Baſe of the Skull.

AAA, The two tables of the ſkull with the diploë. BB, The orbitar plates of the frontal bone. C, The criſta galli, with cribriform plate of the ethmoidal bone on each ſide of it, through which the firſt pair of nerves paſs. D, The cuneiform proceſs of the occipital bone. E, The cruciform ridge. F, The foramen magnum for the paſſage of the ſpinal marrow. G, The zygoma, made by the joining of the zygomatic proceſſes of the os temporum and os malæ. H, The pars ſquamoſa of the os temporum. I, The pars mammillaris. K, The pars petroſa. L, The temporal proceſs of the ſphenoid bone. MM, The anterior clinoid proceſſes. N, The poſterior clinoid proceſs. O, The ſella turcica. P, The foramen opticum, for the paſſage of the optic nerve and ocular artery of the left ſide. Q, The foramen lacerum, for the third, fourth, ſixth, and firſt of the fifth pair of nerves and ocular vein. R, The foramen rotundum for the ſecond of the fifth pair. S, The foramen ovale, for the third of the fifth pair. T, The foramen ſpinale, for the principal artery of the dura mater. U, The entry of the auditory nerve. V, The paſſage for the lateral ſinus. W, The paſſage of the eighth pair of nerves. X, The paſſage of the ninth pair.

Fig. 3. A View of the External Surface of the Baſe of the Skull.

A, The two dentes inciſores of the right ſide. B, The dens caninus. C, The two ſmall molares. D, The three large molares. E. The foramen inciſivum, which gives paſſage to ſmall blood veſſels and nerves. F, The palate plates of the oſſa maxillaria and palati, joined by the longitudinal and tranſverſe palate ſutures. G, The foramen palatinum poſterius, for the palatine veſſels and nerves. H, The os maxillare ſuperius of the right ſide. I, The os malæ. K, The zygomatic proceſs of the temporal bone. L, The poſterior extremity of the oſſa ſpongioſa. M, The poſterior extremity of the vomer, which forms the back part of the ſeptum naſi. N, The pterygoid proceſs of the right ſide of the ſphenoid bone. OO, The foramina ovalia. PP, The foramina ſpinalia. QQ, The paſſages of the internal carotid arteries. R, A hole between the point of each pars petroſa and cuneiform proceſs of the occipital bone, which is filled up with a ligamentous ſubſtance in the recent ſubject. S, The paſſage of the left lateral ſinus. T, The poſterior condyloid foramen of the left ſide. U, The foramen maſtoideum. V, The foramen magnum. W, The inferior orbitar fiſſure. X, The glenoid cavity, for the articulation of the lower jaw. Y, The ſquamous part of the temporal bone. Z, The maſtoid proceſs, at the inner ſide of which is a foſſa for the poſterior belly of the digaſtric muſcle. a, The ſtyloid proceſs. b, The meatus auditorius externus. c, The left condyle of the occipital bone. d, The perpendicular occipital ſpine. ee, The inferior horizontal ridge of the occipital bone. ff, The ſuperior horizontal ridge, which is oppoſite to the crucial ridge where the longitudinal ſinus divides to form the lateral ſinuſes. ggg, The lambdoid ſuture. h, The left ſquamous ſuture. i, The parietal bone. Osteology.

Fig. 4. The anterior ſurface of the Ossa Nasi.

A, The upper part which joins the os frontis. B, The under end, which joins the cartilage of the noſe C, Their inner edge where they join each other.

Fig. 5. The poſterior ſurface of the Ossa Nasi.

AA, Their cavity, which forms part of the arch of the noſe. BB, Their ridge or ſpine, which projects a little to be fixed to the fore part of the ſeptum narium.

Fig. 6. The external ſurface of the Os Maxillare Superius of the left ſide.

A, the naſal proceſs. B, The orbitar plate. C, The unequal ſurface which joins the os malæ. D, The external orbitar hole. E, The opening into the noſtril. F, The palate plate. G, The maxillary tuberoſity. H, Part of the os palati. I, The two dentes inciſores. K, The dens caninus. L, The two ſmall dentes molares. M, The three large dentes molares.

Fig. 7. The internal ſurface of the Os Maxillare Superius and Os Palati.

A, The naſal proceſs. BB, Eminences for the connexion of the os ſpongioſum inferius. D, The under end of the lachrymal groove. E, The antrum maxillare. F, The naſal ſpine, between which and B is the cavity of the noſtril. G, The palate plate. H, The orbitar part of the os palati. I, The naſal plate. K, The ſuture which unites the maxillary and palate bones. L, The pterygoid proceſs of the palate bone.

Fig. 8. The external ſurface of the right Os Unguis.

A, The orbitar part. B, The lachrymal part. C, The ridge between them.

Fig. 9. The internal ſurface of the right Os Unguis.

This ſide of the bone has a furrow oppoſite to the external ridge; all behind this is irregular, where it covers part of the ethmoidal cells.

Fig. 10. The external ſurface of the left Os Malæ.

A, The ſuperior orbitar proceſs. B, The inferior orbitar proceſs. C, The malar proceſs. D, The zygomatic proceſs. E, The orbitar plate. F, A paſſage for ſmall veſſels into or out of the orbit.

Fig. 11. The internal ſurface of the left Os Malæ.

A, The ſuperior orbitar proceſs. B, The inferior orbitar proceſs. C, The malar proceſs. D, The zygomatic proceſs. E, The internal orbitar plate or proceſs.

Fig. 12. The external ſurface of the right Os Spongiosum Inferius.

A, The anterior part. B, The hook-like proceſs for covering part of the antrum maxillare. C, A ſmall proceſs which covers part of the under end of the lachrymal groove. D, The inferior edge turned a little outwards.

Fig.

FIG. 13. The internal ſurface of the Os SPONGIOSUM INFERIUS.

A, The anterior extremity. B, The upper edge which joins the ſuperior maxillary and palate bones.

FIG. 14. The poſterior and external ſurface of the right Os PALATI.

A, The orbitar proceſs. B, The naſal lamella. C, The pterygoid proceſs. D, The palate proceſs.

FIG. 15. The anterior and external ſurface of the right Os PALATI.

A, The orbitar proceſs. B, An opening through which the lateral naſal veſſels and nerves paſs. C, The naſal lamella. D, The pterygoid proceſs. E, The poſterior edge of the palate proceſs for the connexion of the velum palati. F, The inner edge by which the two oſſa palati are connected.

FIG. 16. The right ſide of the VOMER.

A, The upper edge which joins the naſal lamella of the ethmoid bone and the middle cartilage of the noſe. B, The inferior edge which is connected to the ſuperior maxillary and palate bones. C, The ſuperior and poſterior part which receives the proceſſus azygos of the ſphenoid bone.

FIG. 17. The MAXILLA INFERIOR.

A, The chin. B, The baſe and left ſide. C, The angle. D, The coronoid proceſs. E, The condyloid proceſs. F, The beginning of the inferior maxillary canal of the right ſide, for the entry of the nerve and blood veſſels. G, The termination of the left canal. H, The two dentes inciſores. I, The dens caninus. K, The two ſmall molares. L, The three large molares.

FIG. 18. The different claſſes of the TEETH.

1, 2, A fore and back view of the two anterior dentes inciſores of the lower jaw. 3, 4, Similar teeth of the upper jaw. 5, 6, A fore and back view of the dentes canini. 7, 8, The anterior dentes molares. 9, 10, 11, The poſterior dentes molares. 12, 13, 14, 15, 16, Unuſual appearances in the ſhape and ſize of the teeth.

FIG. 19. The external ſurface of the Os HYOIDES.

A, The body. BB, The cornua. CC, The appendices.

PLATE XXIV.

FIG. 1. A Poſterior View of the STERNUM and CLAVICLES, with the ligament connecting the clavicles to each other.

a, The poſterior ſurface of the ſternum. bb, The broken ends of the clavicles. cccc, The tubercles near the extremity of each clavicle. d, The ligament connecting the clavicles.

FIG. 2. A Fore view of the LEFT SCAPULA, and of a half of the CLAVICLE, with their Ligaments.

a, The ſpine of the ſcapula. b, The acromion. c, The inferior angle. d, Inferior coſta. e, Cervix. f, Glenoid cavity, covered with cartilage for the arm bone. gg, The capſular ligament of the joint. h, Coracoid proceſs. i, The broken end of the clavicle. k, Its extremity joined to the acromion. l, A ligament coming out ſingle from the acromion to the coracoid proceſs. m, A ligament coming out ſingle from the acromion, and dividing into two, which are fixed to the coracoid proceſs.

FIG. 3. The Joint of the Elbow of the LEFT ARM, with the Ligaments.

a, The os humeri. b, Its internal condyle. cc, The two prominent parts of its trochlea appearing through the capſular ligament. d, The ulna. e, The radius. f, The part of the ligament including the head of the radius.

FIG. 4. The Bones of the RIGHT HAND, with the PALM in view.

a, The radius. b, The ulna. c, The ſcaphoid bone of the carpus. d, The os lunare. e, The os cuneiforme. f, The os piſiforme. g, Trapezium. h, Trapezoides. i, Capitatum. k, Unciforme. l, The four metacarpal bones of the fingers. m, The firſt phalanx, n, The ſecond phalanx. o, The third phalanx. p, The metacarpal bone of the thumb. q, The firſt joint, r, The ſecond joint.

FIG. 5. The Poſterior View of the Bones of the LEFT HAND.

The explication of FIG. 4. ſerves for this figure; the ſame letters pointing out the ſame bones, though in a different view.

FIG. 6. The Upper Extremity of the TIBIA, with the Semilunar Cartilages of the Joint of the Knee, and ſome Ligaments.

a, The ſtrong ligament which connects the rotula to the tubercle of the tibia. bb, The parts of the extremity of the tibia, covered with cartilage, which appear within the ſemilunar cartilages. cc, The ſemilunar cartilages. d, The two parts of what is called the croſs ligament.

FIG. 7. The Poſterior View of the Joint of the RIGHT KNEE.

a, The os femoris cut. b, Its internal condyle. c, Its external condyle. d, The back part of the tibia. e, The ſuperior extremity of the fibula. f, The edge of the internal ſemilunar cartilage. g, An oblique ligament. h, A larger perpendicular ligament. i, A ligament connecting the femur and fibula.

FIG. 8. The Anterior View of the Joint of the RIGHT KNEE.

b, The internal condyle. c, Its external condyle. d, The part of the os femoris, on which the patella moves. e, A perpendicular ligament. ff, The two parts of the crucial ligaments. gg, The edges of the two moveable ſemilunar cartilages. h, The tibia. i, The ſtrong ligament of the patella. k, The back part of it where the fat has been diſſected away. l, The external depreſſion. m, The internal one. n, The cut tibia

FIG. 9. A View of the Inferior Part of the Bones of the RIGHT FOOT.

a, The great knob of the os calcis. b, A prominence on its outſide. c, The hollow for the tendons, nerves, and blood veſſels. d, The anterior extremity of the os calcis. e, Part of the aſtragalus. f, Its head covered with cartilage. g, The internal prominence

Osteology. nence of the os naviculare. h, The os cuboides. i, The os cuneiforme internum; k,—Medium; l,—Externum. m, The metatarsal bones of the four leſſer toes. n, The firſt—o, The ſecond—p, The third phalanx of the four leſſer toes. q, The metatarsal bones of the great toe. r, Its firſt—s, Its ſecond joint.

FIG. 10. The Inferior ſurface of the two large SESAMOID BONES at the firſt joint of the Great Toe.

FIG. 11. The Superior View of the Bones of the RIGHT FOOT.

a, b, as in Fig. 9. c, The ſuperior head of the aſtragalus. d, &c. as in fig. 9.

FIG. 12. The View of the SOLE of the FOOT, with its Ligaments.

a, The great knob of the os calcis. b, The hollow for the tendons, nerves, and blood veſſels. c, The ſheaths of the flexores pollicis and digitorum longi opened. d, The ſtrong cartilaginous ligament ſupporting the head of the aſtragalus. e, h, Two ligaments which unite into one, and are fixed to the metatarſal bone of the great toe. f, A ligament from the knob of the os calcis to the metatarſal bone of the little toe. g, A ſtrong triangular ligament, which ſupports the bones of the tarſus. i, The ligaments of the joints of the five metatarſal bones. Osteology.

FIG. 13, a, The head of the thigh bone of a child. b, The ligamentum rotundum connecting it to the acetabulum. c, The capſular ligament of the joint with its arteries injected. d, The numerous veſſels of the mucilaginous gland injected.

FIG. 14. The Back View of the Cartilages of the LARYNX, with the OS HYOIDES.

a, The poſterior part of the baſe of the os hyoides. bb, Its cornua. c, The appendix of the right ſide. d, A ligament ſent out from the appendix of the left ſide, to the ſtyloid proceſs of the temporal bone. e, The union of the baſe with the left cornua. ff, The poſterior ſides of (g) the thyroid cartilage. hh, Its ſuperior cornua. ii, Its inferior cornua. k, the cricoid cartilage. ll, The arytenoid cartilages. m, The entry into the lungs, named *glottis*. n, The epiglottis. oo, The ſuperior cartilages of the trachea. p, Its ligamentous back part.

FIG. 15. The Superior Concave ſurface of the SESAMOID BONES at the firſt joint of the Great Toe, with their Ligaments.

a, Three ſeſamoid bones. b, The ligamentous ſubſtance in which they are formed.

CHAP. II. OF THE SOFT PARTS IN GENERAL.

OF THE COMMON INTEGUMENTS, WITH THEIR APPENDAGES; AND OF THE MUSCLES.

73 ANATOMICAL writers uſually proceed to a deſcription of the muſcles after having finiſhed the oſteology; but we ſhall deviate a little from the common method, with a view to deſcribe every thing clearly and diſtinctly, and to avoid a tautology which would otherwiſe be unavoidable. All the parts of the body are ſo intimately connected with each other, that it ſeems impoſſible to convey a juſt idea of any one of them, without being in ſome meaſure obliged to ſay ſomething of others; and on this account we wiſh to mention in this place the names and ſituation of the principal viſcera of the body, that when mention is hereafter made of any one of them in the courſe of the work, the reader may at leaſt know where they are placed.

After this little digreſſion, the common integuments, and after them the muſcles, will be deſcribed; we then propoſe to enter into an examination of the ſeveral viſcera, and their different functions. In deſcribing the brain, occaſion will be taken to ſpeak of the nerves and animal ſpirits. The circulation of the blood will follow the anatomy of the heart, and the ſecretions and other matters will be introduced in their proper places.

The body is divided into three great cavities. Of theſe the uppermoſt is formed by the bones of the cranium, and encloſes the brain and cerebellum.

The ſecond is compoſed of the vertebræ of the back, the ſternum, and true ribs, with the additional aſſiſtance of muſcles, membranes, and common integuments, and is called the *thorax*.—It contains the heart and lungs.

The third, and inferior cavity, is the abdomen. It is ſeparated from the thorax by means of the diaphragm, and is formed by the lumbar vertebræ, the os ſacrum, the oſſa innominata, and the falſe ribs, to which we may add the peritonæum, and a variety of muſcles. This cavity encloſes the ſtomach, inteſtines, omentum or cawl, liver, pancreas, ſpleen, kidneys, urinary bladder, and parts of generation.

Under the diviſion of common integuments are uſually included the epidermis, or ſcarf-ſkin, the reticulum mucoſum of Malpighi, the cutis, or true ſkin, and the membrana adipoſa. The hair and nails, as well as the ſebaceous glands, may be conſidered as appendages to the ſkin.

SECT. I. *Of the Skin.*

§ 1. *Of the Scarf-ſkin.*

THE epidermis, cuticula, or ſcarf-ſkin, is a fine, tranſparent, and inſenſible pellicle, deſtitute of nerves and blood veſſels, which inveſts the body, and everywhere covers the true ſkin. This ſcarf-ſkin, which ſeems to be very ſimple, appears, when examined with a microſcope, to be compoſed of ſeveral laminæ or ſcales which are increaſed by preſſure, as we may obſerve in the hands and feet, where it is frequently much thickened, and becomes perfectly callous. It ſeems to adhere to the cutis by a number of very minute filaments, but may eaſily be ſeparated from it by heat, or by maceration in water. Some anatomical writers have ſuppoſed that it 74 Cuticula.

is

Of the Integuments, &c.

is formed by a moiſture exhaled from the whole ſurface of the body, which gradually hardens when it comes into contact with the air. They were perhaps induced to adopt this opinion, by obſerving the ſpeedy regeneration of this part of the body when it has been by any means deſtroyed, it appearing to be renewed on all parts of the ſurface at the ſame time; whereas other parts which have been injured, are found to direct their growth from their circumference only towards their centre. But a demonſtrative proof that the epidermis is not a fluid hardened by means of the external air, is, that the fœtus in utero is found to have this covering. Leeuwenhoek ſuppoſed its formation to be owing to the expanſion of the extremities of the excretory veſſels, which are found everywhere upon the ſurface of the true ſkin. Ruyſch attributed its origin to the nervous papillæ of the ſkin; and Heiſter thinks it probable, that it may be owing both to the papillæ and the excretory veſſels. The celebrated Morgagni, on the other hand, contends *, that it is nothing more than the ſurface of the cutis, hardened and rendered inſenſible by the liquor amnii in utero, and by the preſſure of the air. This is a ſubject, however, on which we can advance nothing with certainty.

* *Adverſar. Anat.* II. *Animadver.* 2.

The cuticle is pierced with an infinite number of pores, or little holes, which afford a paſſage to the hairs, ſweat, and inſenſible perſpiration, and likewiſe to warm water, mercury, and whatever elſe is capable of being taken in by the abſorbents of the ſkin. The lines which we obſerve on the epidermis belong to the true ſkin. The cuticle adjuſts itſelf to them, but does not form them.

§ 2. *Of the Rete Mucoſum.*

75 Rete mucoſum.

Between the epidermis and cutis we meet with an appearance to which Malpighi, who firſt deſcribed it, gave the name of *rete mucoſum*, ſuppoſing it to be of a membranous ſtructure, and pierced with an infinite number of pores; but the fact is, that it ſeems to be nothing more than a mucous ſubſtance which may be diſſolved by macerating it in water, while the cuticle and cutis preſerve their texture.

The colour of the body is found to depend on the colour of this rete mucoſum; for in negroes it is obſerved to be perfectly black, whilſt the true ſkin is of the ordinary colour.

The bliſters which raiſe the ſkin when burnt or ſcalded, have been ſuppoſed by ſome to be owing to a rarefaction of this mucus; but they are more probably occaſioned by an increaſed action of the veſſels of the part, together with an afflux and effuſion of the thinner parts of the blood.

§ 3. *Of the* Cutis, *or True Skin.*

76 Cutis.

The cutis is compoſed of fibres cloſely compacted together, as we may obſerve in leather which is the prepared ſkin of animals. Theſe fibres form a thick network, which everywhere admits the filaments of nerves, and an infinite number of blood veſſels and lymphatics.

The cutis, when the epidermis is taken off, is found to have, throughout its whole ſurface, innumerable papillæ, which appear like very minute granulations, and ſeem to be calculated to receive the impreſſions of the touch, being the moſt eaſily obſerved where the ſenſe of feeling is the moſt delicate, as in the palms of the hands and on the fingers.

Of the Integuments, &c.

Theſe papillæ are ſuppoſed by many anatomical writers to be continuations of the pulpy ſubſtance of nerves, whoſe coats have terminated in the cellular texture of the ſkin. The great ſenſibility of theſe papillæ evidently proves them to be exceedingly nervous; but ſurely the nervous fibrillæ of the ſkin are of themſelves ſcarcely equal to the formation of theſe papillæ, and it ſeems to be more probable that they are formed like the reſt of the cutis.

Theſe papillæ being deſcribed, the uſes of the epidermis and the reticulum mucoſum will be more eaſily underſtood; the latter ſerving to keep them conſtantly moiſt, while the former protects them from the external air, and modifies their too great ſenſibility.

§ 4. *Of the* Glands *of the Skin.*

77 The ſebaceous glands.

In different parts of the body we meet, within the ſubſtance of the ſkin, with certain glands or follicles, which diſcharge a fat and oily humour that ſerves to lubricate and ſoften the ſkin. When the fluid they ſecrete has acquired a certain degree of thickneſs, it approaches to the colour and conſiſtence of ſuet; and from this appearance they have derived their name of *ſebaceous glands*. They are found in the greateſt number in the noſe, ear, nipple, axilla, groin, ſcrotum, vagina, and prepuce.

Beſides theſe ſebaceous glands, we read, in anatomical books, of others that are deſcribed as ſmall ſpherical bodies placed in all parts of the ſkin, in much greater abundance than thoſe juſt now mentioned, and named *miliary*, from their ſuppoſed reſemblance to millet ſeed. Steno, who firſt deſcribed theſe glands, and Malpighi, Ruyſch, Verheyen, Winſlow, and others, who have adopted his opinions on this ſubject, ſpeak of them as having excretory ducts, that open on the ſurface of the cuticle, and diſtil the ſweat and matter of inſenſible perſpiration: and yet, notwithſtanding the poſitive manner in which theſe pretended glands have been ſpoken of, we are now ſufficiently convinced that their exiſtence is altogether imaginary.

§ 5. *Of the* Insensible *Perſpiration and* Sweat.

78 Inſenſible perſpiration.

The matter of inſenſible perſpiration, or in other words, the ſubtle vapour that is continually exhaling from the ſurface of the body, is not ſecreted by any particular glands, but ſeems to be derived wholly from the extremities of the minute arteries that are everywhere diſperſed through the ſkin. Theſe exhaling veſſels are eaſily demonſtrated in the dead ſubject, by throwing water into the arteries; for then ſmall drops exude from all parts of the ſkin, and raiſe up the cuticle, the pores of which are cloſed by death; and in the living ſubject, a looking-glaſs placed againſt the ſkin, is ſoon obſcured by the vapour. Bidloo fancied he had diſcovered ducts leading from the cutis to the cuticle, and tranſmitting this fluid; but in this he was miſtaken.

When the perſpiration is by any means increaſed, and ſeveral drops that were inſenſible when ſeparate, are united together and condenſed by the external air, they form upon the ſkin ſmall but viſible drops called

ſweat

Of the Integuments, &c.

ſweat (N). This particularly happens after much exerciſe, or whatever occaſions an increaſed determination of fluids to the ſurface of the body; a greater quantity of perſpirable matter being in ſuch caſes carried through the paſſages that are deſtined to convey it off.

79 Whether theſe are one and the ſame or different excretions.

It has been diſputed, indeed, whether the inſenſible perſpiration and ſweat are to be conſidered as one and the ſame excretion, differing only in degree; or whether they are two diſtinct excretions derived from different ſources. In ſupport of the latter opinion, it has been alleged, that the inſenſible perſpiration is agreeable to nature, and eſſential to health, whereas ſweat may be conſidered as a ſpecies of diſeaſe. But this argument proves nothing; and it ſeems probable, that both the inſenſible vapour and the ſweat are exhaled in a ſimilar manner, though they differ in quantity, and probably in their qualities; the former being more limpid, and ſeemingly leſs impregnated with ſalts than the latter; at any rate we may conſider the ſkin as an emunctory through which the redundant water, and ſometimes the other more ſaline parts of the blood, are carried off. But the inſenſible perſpiration is not confined to the ſkin only—a great part of what we are conſtantly throwing off in this way is from the lungs. The quantity of fluid exhaled from the human body by this inſenſible perſpiration is very conſiderable. Sanctorius (O) an Italian phyſician, who indefatigably paſſed a great many years in a ſeries of ſtatical experiments, demonſtrated long ago what has been confirmed by later obſervations, that the quantity of vapour exhaled from the ſkin and from the ſurface of the lungs, amounts nearly to 5-8ths of the aliment we take in. So that if in the warm climate of Italy a perſon eats and drinks the quantity of eight pounds in the courſe of a day, five pounds of it will paſs off by inſenſible perſpiration, while three pounds only will be evacuated by ſtool, urine, ſaliva, &c. But in countries where the degree of cold is greater than in Italy, the quantity of perſpired matter is leſs: in ſome of the more northern climates, it being found not to equal the diſcharge by urine. It is likewiſe obſerved to vary according to the ſeaſon of the year, and according to the conſtitution, age, ſex, diſeaſes, diet, exerciſe, paſſions, &c. of different people.

80 Their uſes.

From what has been ſaid on this ſubject, it will be eaſily conceived, that this evacuation cannot be either much increaſed or diminiſhed in quantity without affecting the health.

Of the Integuments, &c.

The perſpirable matter and the ſweat are in ſome meaſure analogous to the urine, as appears from their taſte and ſaline nature (P). And it is worthy of obſervation, that when either of theſe ſecretions is increaſed in quantity, the other is diminiſhed; ſo that they who perſpire the leaſt, uſually paſs the greateſt quantity of urine, and *vice verſa*.

§ 6. *Of the* NAILS.

81 The nails.

The nails are of a compact texture, hard and tranſparent like horn. Their origin is ſtill a ſubject of diſpute. Malpighi ſuppoſed them to be formed by a continuation of the papillæ of the ſkin: Ludwig, on the other hand, maintained, that they were compoſed of the extremities of blood veſſels and nerves. Both theſe opinions are now deſervedly rejected.

They ſeem to poſſeſs many properties in common with the cuticle; like it they are neither vaſcular nor ſenſible, and when the cuticle is ſeparated from the true ſkin by maceration or other means, the nails come away with it.

They appear to be compoſed of different layers, of unequal ſize, applied one over the other. Each layer ſeems to be formed of longitudinal fibres.

In each nail we may diſtinguiſh three parts, viz. the root, the body or middle, and the extremity. The root is a ſoft, thin, and white ſubſtance, terminating in the form of a creſcent; the epidermis adheres very ſtrongly to this part; the body of the nail is broader, redder, and thicker, and the extremity is of ſtill greater firmneſs.

The nails increaſe from their roots, and not from their upper extremity.

Their principal uſe is to cover and defend the ends of the fingers and toes from external injury.

§ 7. *Of the* HAIR.

82 The hair.

The hairs, which from their being generally known do not ſeem to require any definition, ariſe from diſtinct capſules or bulbs ſeated in the cellular membrane under the ſkin (Q). Some of theſe bulbs encloſe ſe-

(N) Leeuwenhoek aſſerts, that one drop of ſweat is formed by the conflux of 15 drops of perſpirable vapour.

(O) The inſenſible perſpiration is ſometimes diſtinguiſhed by the name of this phyſician, who was born in the territories of Venice, and was afterwards a profeſſor in the univerſity of Padua. After eſtimating the aliment he took in, and the ſenſible ſecretions and diſcharges, he was enabled to aſcertain with great accuracy the weight or quantity of inſenſible perſpiration by means of a ſtatical chair which he contrived for this purpoſe; and from his experiments, which were conducted with great induſtry and patience, he was led to determine what kinds of ſolid or liquid aliment increaſed or diminiſhed it. From theſe experiments he formed a ſyſtem, which he publiſhed at Venice in 1614, in the form of aphoriſms, under the title of *Ars de Medicina Statica*.

(P) Minute cryſtals have been obſerved to ſhoot upon the clothes of men who work in glaſs-houſes. *Haller. Elem. Phyſ.*

(Q) Malpighi, and after him the celebrated Ruyſch, ſuppoſed the hairs to be continuations of nerves, being of opinion that they originated from the papillæ of the ſkin, which they conſidered as nervous; and as a corroborating proof of what they advanced, they argued the pain we feel in plucking them out; but later anatomiſts ſeem to have rejected this doctrine, and conſider the hairs as particular bodies, not ariſing from the papillæ (for in the parts where the papillæ abound moſt there are no hairs), but from bulbs or capſules, which are peculiar to them.

Of the Integuments, &c.

veral hairs. They may be obſerved at the roots of the hairs which form the beard or whiſkers of a cat.

The hairs, like the nails, grow only from below by a regular propulſion from their root, where they receive their nouriſhment. Their bulbs, when viewed with a microſcope, are found to be of various ſhapes. In the head and ſcrotum they are roundiſh; in the eyebrows they are oval; in the other parts of the body they are nearly of a cylindrical ſhape. Each bulb ſeems to conſiſt of two membranes, between which there is a certain quantity of moiſture. Within the bulb the hair ſeparates into three or four fibrillæ; the bodies of the hairs, which are the parts without the ſkin, vary in ſoftneſs and colour according to the difference of climate, age, or temperament of body (R).

Their general uſe in the body does not ſeem to be abſolutely determined; but hairs in particular parts, as on the eyebrows and eyelids, are deſtined for particular uſes, which will be mentioned when thoſe parts are deſcribed.

§ 8. *Of the* Cellular Membrane *and* Fat.

83 Cellular membrane.

The cellular membrane is found to inveſt the moſt minute fibres we are able to trace; ſo that, by modern phyſiologiſts, it is very properly conſidered as the univerſal connecting medium of every part of the body.

It is compoſed of an infinite number of minute cells united together, and communicating with each other. The two diſeaſes peculiar to this membrane are proofs of ſuch a communication; for in the *emphyſema* all its cells are filled with air, and in the anaſarca they are univerſally diſtended with water. Beſides theſe proofs of communication from diſeaſe, a familiar inſtance of it may be obſerved amongſt butchers, who uſually puncture this membrane, and by inflating it with air add to the good appearance of their meat.

84 Fat.

The cells of this membrane ſerve as reſervoirs to the oily part of the blood or *Fat*, which ſeems to be depoſited in them, either by tranſudation through the coats of the arteries that ramify through theſe cells, or by particular veſſels, continued from the ends of arteries. Theſe cells are not of a glandular ſtructure, as Malpighi and others after him have ſuppoſed. The fat is abſorbed and carried back into the ſyſtem by the lymphatics. The great waſte of it in many diſeaſes, particulary in the conſumption, is a ſufficient proof that ſuch an abſorption takes place.

The fulneſs and ſize of the body are in a great meaſure proportioned to the quantity of fat contained in the cells of this membrane.

In the living body it ſeems to be a fluid oil, which concretes after death. In graminivorous animals, it is found to be of a firmer conſiſtence than in man.

The fat is not confined to the ſkin alone, being met with everywhere in the interſtices of muſcles, in the omentum, about the kidneys, at the baſis of the heart, in the orbits, &c.

The chief uſes of the fat ſeem to be to afford moiſture to all the parts with which it is connected; to facilitate the action of the muſcles; and to add to the beauty of the body, by making it everywhere ſmooth and equal.

Of the Muſcles.

Sect. II. *Of the Muſcles.*

The muſcles are the organs of motion. The parts that are uſually included under this name conſiſt of diſtinct portions of fleſh, ſuſcepticle of contraction and relaxation; the motions of which, in a natural and healthy ſtate, are ſubject to the will, and for this reaſon they are called *voluntary* muſcles. But beſides theſe, there are other parts of the body that owe their power of contraction to their muſcular fibres; thus the heart is of a muſcular texture, forming what is called a hollow muſcle; and the urinary bladder, ſtomach, inteſtines, &c. are enabled to act upon their contents, merely becauſe they are provided with muſcular fibres. Theſe are called *involuntary* muſcles, becauſe their motions are not dependent on the will. The muſcles of reſpiration being in ſome meaſure influenced by the will, are ſaid to have a *mixed* motion. 85

The names by which the voluntary muſcles are diſtinguiſhed, are founded on their ſize, figure, ſituation, uſe, or the arrangement of their fibres, or their origin and inſertion. But beſides theſe particular diſtinctions, there are certain general ones that require to be noticed. Thus, if the fibres of a muſcle are placed parallel to each other in a ſtraight direction, they form what is ſtyled a *rectilinear* muſcle; if the fibres croſs and interſect each other, they conſtitute a *compound* muſcle; a *radiated* one, if the fibres are diſpoſed in the manner of rays; or a *penniform* muſcle, if, like the plume of a pen, they are placed obliquely with reſpect to the tendon.

Muſcles that act in oppoſition to each other, are called *antagoniſtæ*; thus every extenſor or muſcle has a flexor for its antagoniſt, and *vice verſa*. Muſcles that concur in the ſame action are ſtyled *congeneres*.

The muſcles being attached to the bones, the latter may be conſidered as levers that are moved in different directions by the contraction of thoſe organs.

That end of a muſcle which adheres to the moſt fixed part is uſually called the *origin*, and that which adheres to the more moveable part, the *inſertion* of the muſcle.

In every muſcle we may diſtinguiſh two kinds of fibres; the one ſoft, of a red colour, ſenſible, and irritable, called fleſhy fibres; the other of a firmer texture, of a white gliſtening colour, inſenſible, without irritability or the power of contracting, and named tendinous fibres. They are occaſionally intermixed, but the fleſhy fibres generally prevail in the belly or middle part of a muſcle, and the tendinous ones in the extremities. If theſe tendinous fibres are formed into a round

(R) The hairs likewiſe differ from each other, and may not be improperly divided into two claſſes; one of which may include the hair of the head, chin, pubes, and axillæ; and the other, the ſofter hairs, which are to be obſerved almoſt everywhere on the ſurface of the body.

Of the Muſcles.

round ſlender cord, they form what is called the *tendon* of the muſcle; on the other hand, if they are ſpread into a broad flat ſurface, the extremity of the muſcle is ſtyled *aponeuroſis*.

The tendons of many muſcles, eſpecially when they are long and expoſed to preſſure or friction in the grooves formed for them in the bones, are ſurrounded by a tendinous ſheath or *faſcia*, in which we ſometimes find a ſmall mucous ſac or *burſa mucoſa*, which obviates any inconvenience from friction. Sometimes we find whole muſcles, and even ſeveral muſcles, covered by a faſcia of the ſame kind, that affords origin to many of their fibres, dipping down between them, adhering to the ridges of bones, and thus preventing them from ſwelling too much when in action. The moſt remarkable inſtance of ſuch a covering is the *faſcia lata* of the thigh.

Each muſcle is encloſed by a thin covering of cellular membrane, which has been ſometimes improperly conſidered as peculiar to the muſcles, and deſcribed under the name of *propria membrana muſculoſa*. This cellular covering dips down into the ſubſtance of the muſcle, connecting and ſurrounding the moſt minute fibres we are able to demonſtrate, and affording a ſupport to their veſſels and nerves.

Leeuwenhoek fancied he had diſcovered, by means of his microſcope, the ultimate diviſion of a muſcle, and that he could point out the ſimple fibre, which appeared to him to be a hundred times leſs than a hair; but he was afterwards convinced how much he was miſtaken on this ſubject, and candidly acknowledged, that what he had taken for a ſimple fibre was in fact a bundle of fibres.

It is eaſy to obſerve ſeveral of theſe faſciculi or bundles in a piece of beef, in which, from the coarſeneſs of its texture, they are very evident.

The red colour which ſo particularly diſtinguiſhes the muſcular or fleſhy parts of animals, is owing to an infinite number of blood-veſſels, that are diſperſed through their ſubſtance. When we macerate the fibres of a muſcle in water, it becomes of a white colour like all other parts of the body diveſted of their blood. The blood-veſſels are accompanied by nerves, and they are both diſtributed in ſuch abundance to theſe parts, that in endeavouring to trace the courſe of the blood-veſſels in a muſcle, it would appear to be formed altogether by their ramifications; and in an attempt to follow the branches of its nerves, they would be found to be equal in proportion.

If a muſcle is pricked or irritated, it immediately contracts. This is called its irritable principle; and this irritability is to be conſidered as the characteriſtic of muſcular fibres; and may ſerve to prove their exiſtence in parts that are too minute to be examined by the eye. This power, which diſpoſes the muſcles to contract when ſtimulated, independent of the will, is ſuppoſed to be inherent in them; and is therefore named *vis inſita*. This property is not to be confounded with elaſticity, which the membranes and other parts of the body poſſeſs in a greater or leſs degree in common with the muſcles; nor with ſenſibility, for the heart, though the moſt irritable, ſeems to be the leaſt ſenſible of any of the muſcular parts of the body.

86 Of the vis inſita.

After a muſcular fibre has contracted, it ſoon returns to a ſtate of relaxation, till it is excited afreſh, and then it contracts and relaxes again. We may likewiſe produce ſuch a contraction, by irritating the nerve leading to a muſcle, although the nerve itſelf is not affected.

Of the Muſcles.

This principle is found to be greater in ſmall than in large, and in young than in old, animals.

In the voluntary muſcles theſe effects of contraction and relaxation of the fleſhy fibres are produced in obedience to the will, by what may be called the *vis nervoſa*, a property that is not to be confounded with the *vis inſita*. As the exiſtence of a *vis inſita* different from a *vis nervea*, was the doctrine taught by Dr Haller in his *Elem. Phyſ.* but is at preſent called in queſtion by ſeveral, particularly Dr Monro, we think it neceſſary to give a few objections, as ſtated in his Obſervations on the Nervous Syſtem.

87 The vis nervea.

"The chief experiment (ſays the Doctor) which ſeems to have led Dr Haller to this opinion, is the well known one, that the heart and other muſcles, after being detached from the brain, continue to act ſpontaneouſly, or by ſtimuli may be rouſed into action for a conſiderable length of time; and when it cannot be alleged, ſays Dr Haller, that the nervous fluid is by the mind, or otherwiſe, impelled into the muſcle.

"That in this inſtance, we cannot comprehend by what power the nervous fluid or energy can be put in motion, muſt perhaps be granted: But has Dr Haller given a better explanation of the manner in which his ſuppoſed vis inſita becomes active?

"If it be as difficult to point out the cauſe of the action of the vis inſita as that of the action of the vis nervea, the admiſſion of that new power, inſtead of relieving, would add to our perplexity.

"We ſhould then have admitted, that two cauſes of a different nature were capable of producing exactly the ſame effect; which is not in general agreeable to the laws of nature.

"We ſhould find other conſequences ariſe from ſuch a hypotheſis, which tend to weaken the credibility of it. For inſtance, if in a ſound animal the vis nervea alone produces the contraction of the muſcles, we will aſk what purpoſe the vis inſita ſerves? If both operate, are we to ſuppoſe that the vis nervea, impelled by the mind or living principle, gives the order, which the vis inſita executes, and that the nerves are the internuntii; and ſo admit two wiſe agents employed in every the moſt ſimple action? But inſtead of ſpeculating farther, let us learn the effect of experiments, and endeavour from theſe to draw plain concluſions.

"1. When I poured a ſolution of opium in water under the ſkin of the leg of a frog, the muſcles, to the ſurface of which it was applied, were very ſoon deprived of the power of contraction. In like manner, when I poured this ſolution into the cavity of the heart, by opening the vena cava, the heart was almoſt inſtantly deprived of its power of motion, whether the experiment was performed on it fixed in its place, or cut out of the body.

"2. I opened the thorax of a living frog; and then tied or cut its aorta, ſo as to put a ſtop to the circulation of its blood.

Of the Muſcles.

" I then opened the vena cava, and poured the ſolution of opium into the heart; and found, not only that this organ was inſtantly deprived of its powers of action, but that in a few minutes the moſt diſtant muſcles of the limbs were extremely weakened. Yet this weakneſs was not owing to the want of circulation, for the frog could jump about for more than an hour after the heart was cut out.

" In the firſt of theſe two experiments, we obſerve the ſuppoſed vis inſita deſtroyed by the opium; in the latter, the vis nervea: for it is evident that the limbs were affected by the ſympathy of the brain, and of the nervous ſyſtem in general, with the nerves of the heart.

" 3. When the nerve of any muſcle is firſt divided by a tranſverſe ſection, and then burnt with a hot iron, or punctured with a needle, the muſcle in which it terminates contracts violently, exactly in the ſame manner as when the irritation is applied to the fibres of the muſcle. But when the hot iron or needle is confined to the nerve, Dr Haller himſelf muſt have admitted, that the vis nervea, and not the vis inſita, was excited. But here I would aſk two queſtions.

" Firſt, Whether we do not as well underſtand how the vis nervea is excited when irritation is applied to the muſcle as when it is applied to the trunk of the nerve, the impelling power of the mind ſeeming to be equally wanting in both caſes?

" Secondly, If it appears that irritation applied to the trunk of a nerve excites the vis nervea, why ſhould we doubt that it can equally well excite it when applied to the ſmall and very ſenſible branches and terminations of the nerve in the muſcle?

" As, therefore, it appears that the ſuppoſed vis inſita is deſtroyed or excited by the ſame means as the vis nervea; nay, that when, by the application of opium to the heart of a frog, after the aorta is cut and the circulation interrupted, we have deſtroyed the vis inſita, the vis nervea is ſo much extinguiſhed, that the animal cannot act with the diſtant muſcles of the limb; and that theſe afterwards grow very torpid, or loſe much of their ſuppoſed vis inſita; it ſeems clearly to follow, that there is no juſt ground for ſuppoſing that any other principle produces the contraction of a muſcle."

The *vis nervoſa*, or operation of the mind, if we may ſo call it, by which a muſcle is brought into contraction, is not inherent in the muſcle like the *vis inſita*, neither is it perpetual, like this latter property. After long continued or violent exerciſe, for example, the voluntary muſcles become painful, and at length incapable of further action; whereas the heart and other involuntary muſcles, the motions of which depend ſolely on the *vis inſita*, continue through life in a conſtant ſtate of action, without any inconvenience or waſte of this inherent principle.

Of the Muſcles.

The action of the vis nervoſa on the voluntary muſcles conſtitutes what is called muſcular motion; a ſubject that has given riſe to a variety of hypotheſes, many of them ingenious, but none of them ſatisfactory.

Borelli and ſome others have undertaken to explain the cauſe of contraction, by ſuppoſing that every muſcular fibre forms as it were a chain of very minute bladders, while the nerves which are diſtributed through the muſcle, bring with them a ſupply of animal ſpirits, which at our will fill theſe bladders, and by increaſing their diameter in width, ſhorten them, and of courſe the whole fibre.

Borelli ſuppoſes theſe bladders to be of a rhomboidal ſhape; Bernouilli, on the other hand, contends that they are oval. Our countryman, Cowper, fancied he had filled them with mercury; the cauſe of this miſtake was probably owing to the mercury's inſinuating itſelf into ſome of the lymphatic veſſels. The late ingenious Mr Elliot undertook to account for the phenomena of muſcular motion on principles very different from thoſe juſt now mentioned. He ſuppoſed that a dephlogiſticated ſtate of the blood is requiſite for muſcular action, and that a communication of phlogiſton to the blood is a neceſſary effect of ſuch action.

We know that the muſcular fibre is ſhortened, and that the muſcle itſelf ſwells when in action; but how theſe phenomena are produced, we are unable to determine. We likewiſe know that the nerves are eſſential to muſcular motion; for upon dividing or making a ligature round the nerve leading to a muſcle, the latter becomes incapable of motion. A ligature made on the artery of a muſcle produces a ſimilar effect: a proof this, that a regular ſupply of blood is alſo equally neceſſary to muſcular motion. The cauſe of palſy is uſually not to be ſought for in the muſcle affected, but in the nerve leading to that muſcle, or in that part of the brain or ſpinal marrow from which the nerve derives its origin.

Of the particular Muſcles.

As the enumeration and deſcription of the particular muſcles muſt be dry and unentertaining to the generality of readers, yet cannot be altogether omitted in a work of this nature, it appeared eligible to throw this part of the ſubject into the form of a table; in which the name, origin, inſertion, and principal uſe of each muſcle will be found deſcribed in few words, and occaſionally its etymology when it is of Greek derivation or difficult to be underſtood.

A TABLE

A TABLE of the MUSCLES, arranged according to their SITUATION.

[*N. B.* This table does not include all the muſcles of the body; thoſe belonging to the eyes, internal ear, inteſtinum rectum, and the male and female organs of generation, being deſcribed in other parts of the work. The reader will be pleaſed to obſerve likewiſe, that although all the muſcles (a few only excepted) are in pairs, mention is here made only of the muſcles of one ſide.]

MUSCLES ſituated	*Name.*	*Origin.*	*Inſertion.*	*Uſe.*
under the integuments of the cranium, - -	1. Occipito-frontalis.	From the tranſverſe ridge of the os occipitis.	Into the ſkin of the eyebrows.	To pull the ſkin of the head backwards, and to raiſe the eyebrows and ſkin of the forehead.
	2. Corrugator ſupercilii.	From above the joining of the os frontis, os naſi, and os maxillare.	Into the inner part of the occipito-frontalis.	To draw the eyebrows towards each other, and to wrinkle the forehead.
——— of the eyelids, - -	1. Orbicularis palpebrarum.	From around the edge of the orbit.	Into the naſal proceſs of the os maxillare.	To ſhut the eye.
	2. Levator palpebræ ſuperioris.	From the bottom of the orbit, near the optic foramen.	Into the cartilage of the upper eyelid.	To open the eye.
——— of the external ear, -	1. Attollens auriculam.	From the tendon of the occipito-frontalis near the os temporis.	Into the upper part of the ear.	To raiſe the ear.
	2. Anterior auriculæ.	From near the back part of the zygoma.	Into an eminence behind the helix.	To raiſe this eminence, and to pull it forwards.
	3. Retrahentes (s) auriculæ.	From the outer and back part of the root of the maſtoid proceſs.	Into the convex part of the concha.	To ſtretch the concha, and pull the ear backwards.
——— of the cartilages of the ear,	1. Tragicus.	From the outer and middle part of the concha, near the tragus.	Into the upper part of the tragus.	To depreſs the concha, and pull the point of the tragus a little outwards.
	2 Anti-tragicus.	From the root of the inner part of the helix.	Into the upper part of the anti-tragus.	To dilate the mouth of the concha.
	3. Tranſverſus auriculæ.	From the upper part of the concha.	Into the inner part of the helix.	To ſtretch the concha and ſcapha, and likewiſe to pull the parts it is connected with towards each other.
	4. Helicis major.	From the upper, anterior, and acute part of the helix.	Into the cartilage of the helix, a little above the tragus.	To depreſs the upper part of the helix.
	5. Helicis minor.	From the lower and fore part of the helix.	Into the helix, near the fiſſure in its cartilage.	To contract the fiſſure.

MUSCLES

(s) Theſe are three ſmall ſlender muſcles. The inferior one is ſometimes wanting.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
Muſcles of the noſe,	1. Compreſſor naris.	From the outer part of the root of the alæ naſi.	Into the naſal proceſs of the os maxillare, and anterior extremity of the os naſi.	To ſtraighten the noſtrils, and likewiſe to corrugate the ſkin of the noſe.
—— of the mouth and lips,	1. Levator labii ſuperioris, alæque naſi.	From the outer part of the orbitar proceſs of the os maxillare, and from the naſal proceſs of that bone, where it joins the os frontis.	Into the upper lip and alæ of the noſe.	To draw the upper lip and ſkin of the noſe upwards and outwards.
	2. Levator anguli oris.	From the os maxillare ſuperius, between the orbitar foramen and the firſt dens molaris.	Into the orbicularis oris at the angle of the mouth.	To raiſe the corner of the mouth.
	3. Zygomaticus major.	From the os malæ, near the zygomatic ſuture.	Into the angle of the mouth.	To raiſe the angle of the mouth, and make the cheek prominent as in laughing.
	4. Zygomaticus minor.	Immediately above the origin of the zyg. major.	Into the angle of the mouth.	To raiſe the angle of the mouth obliquely outwards.
	5. Buccinator.	From the alveoli of the dentes molares in the upper and lower jaws.	Into the angle of the mouth.	To contract the mouth and draw the angle of it outwards and backwards.
	6. Depreſſor labii ſuperioris, alæque naſi.	From the os maxill. ſuper. immediately above the gums of the dentes inciſores.	Into the root of the alæ naſi and upper lip.	To draw the alæ naſi and upper lip downwards.
	7. Depreſſor anguli oris.	At the ſide of the chin from the lower edge of the maxilla inferior.	Into the angle of the mouth.	To draw the corner of the mouth downwards.
	8. Depreſſor labii inferioris.	From the lower and anterior part of the maxilla inferior.	Into the under lip.	To draw the under lip downwards and ſomewhat outwards.
	9. Levator labii inferioris.	From near the gums of the inciſores and caninus of the maxilla inferior.	Into the under lip and ſkin of the chin.	To raiſe the under lip and ſkin of the chin.
	10. Orbicularis oris (u).			To ſhut the mouth by conſtringing the lips.
—— of the lower jaw,	1. Temporalis.	From part of the os bregmatis and os frontis; ſquamous part of the os temporis; back part of the os malæ, and the temporal proceſs of the os ſphenoides (v).	Into the coronoid proceſs of the lower jaw.	To move the lower jaw upwards.

2. Maſſeter

(t) The noſe is affected by fibres of the occipito-frontalis, and by ſeveral muſcles of the face; but this pair, the compreſſores, is the only one that is proper to it.

(u) This muſcle is in a great meaſure, if not wholly, formed by the buccinator, zygomatici, depreſſores, and other muſcles that move the lips. Its fibres ſurround the mouth like a ring.

(v) Some of its fibres likewiſe have their origin from a ſtrong faſcia that covers the muſcle and adheres to the

bone

	Name.	*Origin.*	*Inſertion*	*Uſe.*
	2. Maſſeter (w).	From the malar proceſs of the os maxillare, and the lower edges of the os malæ, and of the zygomatic proceſs of the os temporis.	Into the baſis of the coronoid proceſs, and that part of the jaw which ſupports that and the condyloid proceſs.	To raiſe and likewiſe to move the jaw a little forwards and backwards.
	3. Pterygoideus internus.	From the inner ſurface of the outer wing of the pterygoid proceſs of the os ſphenoides, and from the proceſs of the os palati that helps to form the pterygoid foſſa.	Into the lower jaw on its inner ſide and near its angle.	To raiſe the lower jaw, and draw it a little to one ſide.
	4. Pterygoideus externus.	From the external ala of the pterygoid proceſs, a ſmall part of the adjacent os maxillare, and a ridge in the temporal proceſs of the os ſphenoides.	Into the fore part of the condyloid proceſs of the lower jaw, and likewiſe of the capſular ligament.	To move the jaw forwards and to the oppoſite ſide (x); and at the ſame time to prevent the ligament of the joint from being pinched.
Muscles ſituated at the fore part of the neck,				
	1. Latiſſimus colli (y).	From the cellular membrane covering the pectoral, deltoid, and trapezius muſcles.	Into the ſide of the chin and integuments of the cheek.	To draw the cheeks and ſkin of the face downwards; and when the mouth is ſhut, to draw all that part of the ſkin to which it is connected below the lower jaw upwards.
	2. Maſtoideus (z)	From the upper part of the ſternum, and from the upper and fore part of the clavicle.	Into the maſtoid proceſs, and as far back as the lambdoidal ſuture.	To move the head to one ſide, or when both muſcles act, to bend it forwards.
——— ſituated between the trunk and the os hyoides,	1. Omo-hyoideus (a).	From the upper coſta of the ſcapula near its niche; from part of a ligament that extends acroſs this niche, and ſometimes by a few fibres, from the coracoid proceſs.	Into the baſis of the os hyoides.	To draw the os hyoides in an oblique direction downwards.

2. Sterno-

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bone round the whole circumference of its origin. When we remove this covering, we find the muſcle of a ſemicircular ſhape with its radiated fibres, converging and forming a ſtrong middle tendon.

(w) So called from its uſe in chewing, its derivation being from μασσαομαι, *manduco*, "to eat."

(x) This happens when the muſcle acts ſingly. When both act, the jaw is brought horizontally forwards.

(y) This broad and thin muſcular expanſion, which is ſituated immediately under the common integuments, is by Winſlow named *muſculus cutaneus*. Galen gave it the name of πλατυσμα μυωδες, (*Platyſma myoides*); the etymology of which is from πλατυσμος, *dilatatio*, and μυς, *muſculus*, and ειδος, *forma*.

(z) This, on account of its two origins, is by Albinus deſcribed as two diſtinct muſcles, which he names *ſterno-maſtoideus* and *cleido-maſtoideus*.

(a) As this muſcle does not always ariſe from the coracoid proceſs, it ſeems to have been improperly named *coraco-*

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	2. Sterno-hyoideus.	From the cartilage of the firſt rib, the inner and upper part of the ſternum, and a ſmall part of the clavicle.	Into the baſis of the os hyoides.	To draw the os hyoides downwards.
	3. Hyo-thyroideus.	From part of the baſis and horn of the os hyoides.	Into a rough oblique line at the ſide of the thyroid cartilage.	To raiſe the thyroid cartilage, or depreſs the os hyoides.
	4. Sterno-thyroideus.	From between the cartilages of the 1ſt and 2d ribs, at the upper and inner part of the ſternum.	Immediately under the hyo-thyroideus.	To pull the thyroid cartilage downwards.
	5. Crico-thyroideus.	From the anterior part and ſide of the cricoid cartilage.	Into the lower part and inferior horn of the thyroid cartilage.	To pull the cricoid cartilage upwards and backwards, or the thyroid forwards and downwards.
Muſcles ſituated between the os hyoides and lower jaw,	1. Digaſtricus (B).	From a foſſa at the root of the maſtoid proceſs, and likewiſe from the os hyoides.	Into the lower and anterior part of the chin.	To draw the lower jaw downwards.
	2. Stylo-hyoideus (C).	From the baſis of the ſtyloid proceſs.	Into the ſide and fore part of the os hyoides near its baſe.	To draw the os hyoides obliquely upwards.
	3. Mylo-hyoideus (D).	From the inſide of the lower jaw, between the laſt dens molaris and the chin.	Into the baſis of the os hyoides.	To move the os hyoides to either ſide, forwards or upwards.
	4. (E) Genio-hyoideus.	From the inſide of the chin.	Into the baſe of the os hyoides.	To move the os hyoides forwards or upwards.
	5. Genio-gloſſus.	From the inſide of the chin.	Into the tongue and baſis of the os hyoides.	To move the tongue in various directions.
	6. Hyo-gloſſus (F).	From the horn, baſis, and appendix of the os hyoides.	Into the tongue laterally.	To draw the tongue downwards and inwards.
	7. Lingualis.	Laterally from the root of the tongue.	Into the extremity of the tongue.	To ſhorten the tongue and draw it backwards.
	8. Stylo-gloſſus.			

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coraco-hyoides by Douglas and Albinus. Winſlow calls it *omo-hyoides*, on account of its general origin from the ſcapula.

(B) From δις and γαστηρ (*biventer*), becauſe it has two fleſhy bellies with a middle tendon. This tendon paſſes through the ſtylo-hyoideus.

(C) In ſome ſubjects we meet with another muſcle, which, from its having nearly the ſame origin, inſertion, and uſe as this, has been named *ſtylo-hyoideus alter*.

(D) So named from its ariſing near the dentes molares (μυλοι) and its being inſerted into the os hyoides.

(E) From γενειον, *mentum*, "the chin."

(F) From κερας, *cornu*, and γλωσσα, *lingua*, "the tongue."

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	8. Stylo-gloſſus.	From the ſtyloid proceſs, and ſometimes alſo from a ligament that extends from thence to the angle of the lower jaw.	Into the ſide of the tongue from the root to near its tip.	To move the tongue backwards and to one ſide.
	9. Stylo-pharyngæus.	From the baſis of the ſtyloid proceſs.	Into the ſide of the pharynx and poſterior part of the thyroid cartilage.	To raiſe the thyroid cartilage and pharynx, and likewiſe to dilate the latter.
	10. Circumflexus palati.	From near the bony part of the Euſtachian tube, and from the ſpinous proceſs of the os ſphenoides.	Into the ſemilunar edge of the os palati and the velum pendulum palati (G).	To dilate and draw the velum obliquely downwards.
	11. Levator palati.	From the membranous part of the Euſtachian tube, and the extremity of the os petroſum.	Into the velum pendulum palati.	To pull the velum backwards.
Muscles ſituated about the fauces,	1. Palato-pharyngæus.	From the lower and anterior part of the cartilaginous extremity of the Euſtachian tube (H); the tendinous expanſion of the circumflexus palati; and the velum pendulum palati near the baſis and back part of the uvula.	Into the upper and poſterior part of the thyroid cartilage.	To raiſe the pharynx and thyroid cartilage, or to pull the velum and uvula backwards and downwards.
	2. Conſtrictor iſthmi faucium.	From near the baſis of the tongue laterally.	Into the velum pendulum palati, near the baſis and fore part of the uvula.	To raiſe the tongue and draw the velum towards it (I).
	3. Azygos uvulæ.	From the end of the ſuture that unites the oſſa palati.	Into the extremity of the uvula.	To ſhorten the uvula, and bring it forwards and upwards.
——— at the back part of the pharynx, -	1. Conſtrictor pharyngis ſuperior.	From the cuneiform proceſs of the occipital bone; the pterygoid proceſs of the os ſphenoides, and from each jaw near the laſt dens molaris (K).	Into the middle of the pharynx.	To move the pharynx upwards and forwards, and to compreſs its upper part.

(G) This muſcle in its courſe forms a round tendon, which, after paſſing over a kind of hook formed by the inner plate of the pterygoid proceſs of the ſphenoid bone, expands into a tendinous membrane.

(H) The few fibres that ariſe from the Euſtachian tube are deſcribed as a diſtinct muſcle by Albinus, under the name of *ſalpingo-pharyngæus*. They ſerve to dilate the mouth of the tube.

(I) This muſcle, and the palato-pharyngæus, likewiſe ſerve to cloſe the paſſage into the fauces, and to carry the food into the pharynx.

(K) The three orders of fibres here mentioned, with a few others derived from the tongue, have given occaſion to Douglas to deſcribe them as four diſtinct muſcles, under the names of *cephalo-pharyngæus*, *mylo-pharyngæus*, *ptery-pharyngæus*, and *gloſſo-pharyngæus*.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	2. Conſtrictor pharyngis medius (L).	From the horn and appendix of the os hyoides, and from the ligament that unites it with the thyroid cartilage.	Into the middle of the proceſſus cuneiformis of the occipital bone, about its middle and before the great foramen.	To draw the os hyoides and pharynx upwards, and to compreſs the latter.
	3. Conſtrictor pharyngis inferior (M).	From the cricoid and thyroid cartilages.	Into the middle of the pharynx.	To compreſs part of the pharynx.
Muscles about the glottis, -	1. Crico-arytænoideus lateralis.	From the ſide of the cricoid cartilage.	Into the baſis of the arytænoid cartilage laterally.	To open the glottis.
	2. Crico-arytænoideus poſticus.	From the cricoid cartilage poſteriorly.	Into the baſis of the arytænoid cartilage poſteriorly.	To open the glottis.
	3. Arytænoideus obliquus.	From the baſis of one of the arytænoid cartilages.	Near the extremity of the other arytænoid cartilage.	To draw the parts it is connected with towards each other.
	4. Arytænoideus tranſverſus.	From one of the arytænoid cartilages laterally.	Into the other arytænoid cartilage laterally.	To ſhut the glottis.
	5. Thyreo-arytænoideus.	From the poſterior and under part of the thyroid cartilage.	Into the arytænoid cartilage.	To draw the arytænoid cartilage forwards.
	6. Arytæno-epiglottideus.	From the upper part of the arytænoid cartilage laterally.	Into the ſide of the epiglottis.	To move the epiglottis outwards.
	7. Thyreo-epiglottideus.	From the thyroid cartilage.	Into the ſide of the epiglottis.	To pull the epiglottis obliquely downwards (N).
——— at the fore part of the neck cloſe to the vertebræ, - -	1. Rectus capitis internus major.	From the anterior extremities of the tranſverſe proceſſes of the five lowermoſt cervical vertebræ.	Into the fore part of the cuneiform proceſs of the os occipitis.	To bend the head forwards.
	2. Rectus capitis internus minor.	From the anterior and upper part of the firſt cervical vertebra.	Near the baſis of the condyloid proceſs of the os occipitis.	To aſſiſt the laſt deſcribed muſcle.
	3. Rectus capitis lateralis.	From the anterior and upper part of the tranſverſe proceſs of the firſt cervical vertebra.	Into the os occipitis, oppoſite to the ſtylo-maſtoid foramen.	To move the head to one ſide.
	4. Longus colli.	Within the thorax, laterally from the bodies of the three uppermoſt dorſal vertebra; from the baſis and fore part	Into the ſecond cervical vertebra anteriorly.	To pull the neck to one ſide (O).

of

(L) Douglas makes two muſcles of this, the *hyo-pharyngæus* and *ſyndeſmo-pharyngæus*.
(M) The crico-pharyngæus and thyro-pharyngæus of Douglas.
(N) When either this or the preceding muſcle acts with its fellow, the epiglottis is drawn directly downwards upon the glottis.
(O) When both muſcles act, the neck is drawn directly forwards.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
		of the tranſverſe proceſſes of the firſt and ſecond dorſal vertebræ, and of the laſt cervical vertebra; and laſtly, from the anterior extremities of the tranſverſe proceſſes of the 6th, 5th, 4th, and 3d cervical vertebræ.		
Muscles at the fore part of the abdomen, - -	1. Obliquus externus.	From the lower edges of the eight inferior ribs near their cartilages.	Into the linea alba (P), oſſa pubis (Q), and ſpine of the ilium (R).	To compreſs and ſupport the viſcera, aſſiſt in evacuating the fæces and urine, draw down the ribs, and bend the trunk forwards or obliquely to one ſide.
	2. Obliquus internus.	From the ſpinous proceſs of the three lowermoſt lumbar vertebræ, the back part of the os ſacrum, the ſpine of the ilium, and back part of Fallopius's ligament (T).	Into the cartilages of all the falſe ribs, linea alba (S), and fore part of the pubis.	To aſſiſt the obliquus externus.
	3. Tranſverſalis.	From the cartilages of the ſeven inferior ribs; the tranſverſe proceſſes of the laſt dorſal, and four upper lumbar vertebræ; the inner part of Fallopius's ligament and the ſpine of the ilium.	Into the linea alba and cartilago enſiformis.	To compreſs the abdominal viſcera.

(P) The linea alba is that tendinous expanſion which reaches from the cartilago enſiformis to the os pubis. It is formed by the interlacement of the tendinous fibres of the oblique and tranſverſe muſcles, and on this account ſome anatomiſts have conſidered theſe as three digaſtric muſcles.

(Q) A little above the pubis the tendinous fibres of this muſcle ſeparate from each other, ſo as to form an opening called the *ring* of the obliquus externus, and commonly, though improperly, the ring of the abdominal muſcles, there being no ſuch aperture either in the tranſverſalis or obliquus internus. This ring in the male ſubject affords a paſſage to the ſpermatic veſſels, and in the female to the round ligament of the uterus.

(R) From the anterior and upper ſpinous proceſs of the ilium, this muſcle is ſtretched tendinous to the os pubis, and thus forms what is called by ſome *Fallopius's*, and by others *Poupart's ligament*. The blood veſſels paſs under it to the thigh.

(S) The tendon formed by the upper part of this muſcle in its way to the linea alba is divided into two layers. The poſterior layer runs under, and the anterior one over, the rectus muſcle.

(T) From this part it detaches ſome fibres which extend downwards upon the ſpermatic chord, and form what is deſcribed as the cremaſter muſcle.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	4. Rectus abdominis.	From the upper edge of the pubis and the ſymphyſis pubis.	Into the cartilages of the 5th, 6th, and 7th ribs, and the edge of the cartilago enſiformis (u).	To compreſs the fore part of the abdomen, and to bend the trunk forwards.
	5. Pyramidalis (v).	From the anterior and upper part of the pubis.	Into the linea alba and inner edge of the rectus, commonly about two inches above the pubis.	To aſſiſt the lower portion of the rectus.
Muscles at the fore part of the thorax,	1. Pectoralis major.	From the cartilaginous ends of the 5th and 6th ribs; the ſternum, and anterior part of the clavicle.	Into the upper and inner part of the os humeri (w).	To draw the arm forwards, or obliquely forwards.
	2. Subclavius.	From the cartilage of the firſt rib.	Into the under ſurface of the clavicle.	To move the clavicle forwards and downwards, and to aſſiſt in raiſing the firſt rib.
	3. Pectoralis minor (x).	From the upper edges of the 3d, 4th, and 5th ribs.	Into the coracoid proceſs of the ſcapula.	To move the ſcapula forwards and downwards, or to elevate the ribs.
	4. Serratus magnus.	From the eight ſuperior ribs.	Into the baſis of the ſcapula.	To bring the ſcapula forwards.
——— that concur in forming the thorax, - -	1. Diaphragma (y).			
	2. Levatores coſtarum.	From the tranſverſe proceſſes of the laſt cervical, and the eleven upper dorſal vertebræ.	Into the upper ſide of each rib, near its tuberoſity.	To move the ribs upwards and outwards.
	3. Intercoſtales externi.	From the lower edge of each upper rib.	Into the ſuperior edge of each lower rib.	To elevate the ribs.
	4. Intercoſtales interni (a).			

5. Sterno-coſtales

(u) The fibres of the rectus are generally divided by three tendinous interſections. The two upper thirds of this muſcle paſſing between the tendinous layers of the obliquus internus, are encloſed as it were in a ſheath; but at its lower part we find it immediately contiguous to the peritonæum, the inferior portion of the tendon of the tranſverſalis paſſing over the rectus, and adhering to the interior layer of the obliquus internus.

(v) This muſcle is ſometimes wanting.

(w) The fibres of this muſcle paſs towards the axilla in a folding manner, and with thoſe of the latiſſimus dorſi form the arm-pit.

(x) This and ſome other muſcles derive their name of *ſerratus*, from their ariſing by a number of tendinous or fleſhy digitations, reſembling the teeth of a ſaw (*ſerra*).

(y) For a deſcription of the diaphragm, ſee Chap. IV. Sect. IV.

(a) The origin, inſertion, and uſe of the internal intercoſtals, are ſimilar to thoſe of the external. The reader, however, will be pleaſed to obſerve, that the intercoſtales externi occupy the ſpaces between the ribs only from the ſpine to their cartilages; from thence to the ſternum, there being only a thin membrane, which is ſpread over the intercoſtales interni; and that the latter, on the contrary, extend only from the ſternum to the angles of each rib.

The fibres of the external muſcles run obliquely forwards; thoſe of the internal obliquely backwards. This difference in the direction of their fibres induced Galen to ſuppoſe that they were intended for different uſes; that the external intercoſtals, for inſtance, ſerve to elevate, and the internal ones to depreſs the ribs. Fallopius ſeems to have been the firſt who ventured to diſpute the truth of this doctrine, which has ſince been revived by Boyle

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	5. Sterno-coſtales (B).	From the cartilago enſiformis, and lower and middle part of the ſternum.	Into the cartilages of the 2d, 3d, 4th, 5th, and 6th ribs.	To depreſs the cartilages of the ribs.
MUSCLES at the back part of the neck and trunk, - -	1. Trapezius (C), or cucullaris.	From the middle of the os occipitis, and the ſpinous proceſſes of the two inferior cervical, and of all the dorſal vertebræ (D).	Into the poſterior half of the clavicle, part of the acromion, and the ſpine of the ſcapula.	To move the ſcapula.
	2. Rhomboideus (E).	From the ſpinous proceſſes of the three lowermoſt cervical, and of all the dorſal vertebræ.	Into the baſis of the ſcapula.	To move the ſcapula upwards and backwards.
	3. Latiſſimus dorſi.	From part of the ſpine of the os ilium, the ſpinous proceſſes of the os ſacrum and lumbar vertebræ, and of ſix or eight of the dorſal vertebræ; alſo from the four inferior falſe ribs near their cartilages.	Into the os humeri, at the inner edge of the groove for lodging the long head of the biceps muſcle.	To draw the os humeri downwards and backwards, and axis.
	4. Serratus inferior poſticus.	From the ſpinous proceſſes of the two lowermoſt dorſal, and of three of the lumbar vertebræ.	Into the lower edges of the three or four lowermoſt ribs near their cartilages.	To draw the ribs outwards, downwards, and backwards.
	5. Levator ſcapulæ.	From the tranſverſe proceſſes of the four uppermoſt vertebræ colli.	Into the upper angle of the ſcapula.	To move the ſcapula forwards and upwards.
	6. Serratus ſuperior poſticus.	From the lower part of the ligamentum colli, the ſpinous proceſs of the lowermoſt cervical vertebra, and of the two ſuperior dorſal vertebræ.	Into the 2d, 3d, and 4th ribs.	To expand the thorax.

7. Splenius

Boyle, and more lately ſtill by Hamberger, whoſe theoretical arguments on this ſubject have been clearly refuted by the experiments of Haller.

(B) Theſe conſiſt of four, and ſometimes five diſtinct muſcles on each ſide. Veſalius, and after him Douglas and Albinus, conſider them as forming a ſingle muſcle, which, on account of its ſhape, they name *triangularis*. Verheyen, Winſlow, and Haller, more properly deſcribe them as ſo many ſeparate muſcles, which, on account of their origin and inſertion, they name *ſterno-coſtales*.

(C) So named by Riolanus, from τραπεζα, on account of its quadrilateral ſhape. Columbus and others give it the name of *cucullaris*, from its reſemblance to a monk's hood.

(D) The tendinous fibres of this muſcle, united with thoſe of its fellow in the nape of the neck, form what is called the *ligamentum colli*.

(E) This muſcle conſiſts of two diſtinct portions, which are deſcribed as ſeparate muſcles by Albinus, under the names of *rhomboideus minor* and *rhomboideus major*.

Name.	*Origin.*	*Inſertion.*	*Uſe.*
7. Splenius (F).	From the ſpinous proceſſes of the four or five uppermoſt vertebræ of the back, and of the lowermoſt cervical vertebra.	Into the tranſverſe proceſſes of the two firſt cervical vertebræ, the upper and back part of the maſtoid proceſs, and a ridge on the os occipitis.	To move the head backwards.
8. Complexus (G).	From the tranſverſe proceſſes of the four or five uppermoſt dorſal, and of the ſix lowermoſt cervical vertebræ.	Into the os occipitis.	To draw the head backwards.
9. Trachelo-maſtoideus (H).	From the tranſverſe proceſſes of the firſt dorſal vertebra, and four or five of the lowermoſt cervical vertebræ.	Into the maſtoid proceſs.	To draw the head backwards.
10. Rectus capitis poſticus major.	From the ſpinous proceſs of the ſecond cervical vertebra.	Into the os occipitis.	To extend the head and draw it backwards.
11. Rectus capitis poſticus minor.	From the firſt vertebra of the neck.	Into the os occipitis.	To aſſiſt the rectus major.
12. Obliquus ſuperior capitis.	From the tranſverſe proceſs of the firſt cervical vertebra.	Into the os occipitis.	To draw the head backwards.
13. Obliquus inferior capitis.	From the ſpinous proceſs of the ſecond cervical vertebra.	Into the tranſverſe proceſs of the firſt cervical vertebra.	To draw the face towards the ſhoulder, and to move the firſt vertebra upon the ſecond.
14. Sacro-lumbalis. (I).	From the back part of the os ſacrum, ſpine of the ilium, ſpinous proceſſes, and roots of the tranſverſe proceſſes of the vertebræ of the loins.	Into the lower edge of each rib.	To draw the ribs downwards, move the body upon its axis, aſſiſt in erecting the trunk, and turn the neck backwards, or to one ſide.
15. Longiſſimus dorſi (K).	The ſame as that of the ſacro-lumbalis.	Into the tranſverſe proceſſes of the dorſal vertebræ.	To ſtretch the vertebræ of the back, and keep the trunk erect.

16. Spinalis

(F) According to ſome writers, this muſcle has gotten its name from its reſemblance to the ſpleen; others derive it from *ſplenium ſplint*.

(G) So named on account of its complicated ſtructure.

(H) So named from its origin from the neck (τραχηλος) and its inſertion into the maſtoid proceſs.

(I) Several thin faſciculi of fleſhy fibres ariſe from the lower ribs, and terminate in the inner ſide of this muſcle. Steno names them *muſculi ad ſacro-lumbalem acceſſorii*. The ſacro-lumbalis likewiſe ſends off a fleſhy ſlip from its upper part, which by Douglas and Albinus is deſcribed as a diſtinct muſcle, under the name of *cervicalis deſcendens*. Morgagni has very properly conſidered it as a part of the ſacro-lumbalis.

(K) At the upper part of this muſcle a broad thin layer of fleſhy fibres is found croſſing, and intimately adhering to it. This portion, which is deſcribed by Albinus under the name of *tranſverſalis cervicis*, may very properly be conſidered as an appendage to the longiſſimus dorſi. It ariſes from the tranſverſe proceſſes of the five or ſix ſuperior dorſal vertebræ, and is inſerted into the tranſverſe proceſſes of the ſix inferior cervical vertebræ. By means of this appendage the longiſſimus dorſi may ſerve to move the neck to one ſide, or obliquely backwards.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	16. Spinalis dorſi.	From the ſpinous proceſſes of the uppermoſt lumbar and lowermoſt dorſal vertebræ.	Into the ſpinous proceſſes of the nine ſuperior dorſal vertebræ.	To extend the vertebræ.
	17. Semi-ſpinalis dorſi.	From the tranſverſe proceſſes of the 7th, 8th, 9th, and 10th vertebræ of the back.	Into the ſpinous proceſſes of the four uppermoſt dorſal, and lowermoſt of the cervical vertebræ.	To extend the ſpine obliquely backwards.
	18. Multifidus ſpinæ (L).	From the os ſacrum, ilium, oblique and tranſverſe proceſſes of the lumbar vertebræ, tranſverſe proceſſes of the dorſal, and four of the cervical vertebræ.	Into the ſpinous proceſſes of the lumbar, dorſal, and ſix of the cervical vertebræ.	To extend the back and draw it backwards, or to one ſide.
	19. Semi-ſpinalis colli.	From the tranſverſe proceſſes of the five or ſix uppermoſt dorſal vertebræ.	Into the ſpinous proceſſes of the 2d, 3d, 4th, 5th, and 6th cervical vertebræ.	To ſtretch the neck obliquely backwards.
	20. Scalenus (M).	From the tranſverſe proceſſes of the five inferior cervical vertebræ.	Into the upper and outer part of the firſt and ſecond ribs.	To move the neck forwards, or to one ſide.
	21. Inter-ſpinales (N).	From the upper part of each of the ſpinous proceſſes of the ſix inferior cervical vertebræ.	Into the under part of each of the ſpinous proceſſes of the vertebræ above.	To draw the ſpinous proceſſes towards each other.
	22. Inter-tranſverſales (O).	From the upper part of each of the tranſverſe proceſſes of the vertebræ.	Into the under part of each of the tranſverſe proceſſes of the vertebræ above.	To draw the tranſverſe proceſſes towards each other.
Muscles within the cavity of the abomen, on the anterior and lateral parts of the ſpine,	1. Pſoas parvus (P).	From the ſides and tranſverſe proceſſes of the uppermoſt lumbar vertebra, and ſometimes of the lowermoſt dorſal vertebra.	Into the brim of the pelvis, at the junction of the os pubis with the ilium.	To bend the loins forwards.

2. Pſoas

(L) Anatomiſts in general have unneceſſarily multiplied the muſcles of the ſpine. Albinus has the merit of having introduced greater ſimplicity into this part of myology. Under the name of *multifidus ſpinæ*, he has very properly included thoſe portions of muſcular fleſh intermixed with tendinous fibres, ſituated cloſe to the back part of the ſpine, and which are deſcribed by Douglas under the names of *tranſverſales colli*, *dorſi*, *et lumborum*.

(M) The ancients gave it this name from its reſemblance to an irregular triangle (σκαληνος). It conſiſts of three fleſhy portions. The anterior one affords a paſſage to the axillary artery, and between this and the middle portion we find the nerves going to the upper extremities. The middle is in part covered by the poſterior portion, which is the longeſt and thinneſt of the three.

(N) In the generality of anatomical books we find theſe muſcles divided into *inter-ſpinales cervicis*, *dorſi*, and *lumborum*, but we do not find any ſuch muſcles either in the loins or back.

(O) Theſe muſcles are to be found only in the neck and loins; what have been deſcribed as the *inter-tranſverſales dorſi* being rather ſmall tendons than muſcles.

(P) This and the following pair of muſcles derive their name of *pſoas* from ψοα, *lumbus*, on account of their ſituation at the anterior part of the loins.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	2. Pſoas magnus.	From the bodies and tranſverſe proceſſes of the laſt dorſal, and all the lumbar vertebræ.	Into the os femoris, a little below the trochanter minor.	To bend the thigh forwards.
	3. Iliacus internus.	From the inner lip, hollow part, and edge of the os ilium.	In common with the pſoas magnus.	To aſſiſt the pſoas magnus.
	4. Quadratus lumborum (Q).	From the poſterior part of the ſpine of the ilium.	Into the tranſverſe proceſſes of the four uppermoſt lumbar vertebræ, the inferior edge of the laſt rib, and the ſide of the lowermoſt dorſal vertebra.	To ſupport the ſpine, or to draw it to one ſide.
	5. Coccygæus.	From the poſterior and inner edge of the ſpine of the iſchium.	Into the lower part of the os ſacrum, and almoſt the whole length of the os coccygis laterally.	To draw the os coccygis forwards and inwards (R).
Muscles on the ſcapula and upper part of the os humeri, - -	1. Deltoides (S).	From the clavicle, proceſſus acromion, and ſpine of the ſcapula.	Into the anterior and middle part of the os humeri.	To raiſe the arm.
	2. Supra-ſpinatus.	From the baſis, ſpine, and upper coſta of the ſcapula.	Into a large tuberoſity at the head of the os humeri.	To raiſe the arm.
	3. Infra-ſpinatus.	From the baſis and ſpine of the ſcapula.	Into the upper and middle part of the tuberoſity.	To roll the os humeri outwards.
	4. Teres minor (T).	From the inferior coſta of the ſcapula.	Into the lower part of the tuberoſity.	To aſſiſt the infra-ſpinatus.
	5. Teres major.	From the inferior angle, and inferior coſta of the ſcapula.	Into the ridge at the inner ſide of the groove formed for the long head of the biceps.	To aſſiſt in the rotatory motion of the arm.
	6. Subſcapularis.	From the baſis, ſuperior and inferior coſtæ of the ſcapula.	Into the upper part of a ſmall tuberoſity at the head of the os humeri.	To roll the arm inwards.
	7. Coraco-brachialis (U).	From the coracoid proceſs of the ſcapula.	Into the middle and inner ſide of the os humeri.	To roll the arm forwards and upwards.

Muscles

(Q) So called from its ſhape, which is that of an irregular ſquare.

(R) Some of the fibres of this muſcle are united with thoſe of the levator ani, ſo that it aſſiſts in cloſing the lower part of the pelvis.

(S) So named from its ſuppoſed reſemblance to the Greek Δ reverſed.

(T) This and the following pair are called *teres*, from their being of a long and round ſhape.

(U) This muſcle affords a paſſage to the muſculo-cutaneous nerve.

Of the Muſcles.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
Muscles on the os humeri, - -	1. Biceps flexor cubiti.	By two heads, one from the coracoid proceſs, and the other, or long head, from the upper and outer edge of the glenoid cavity of the ſcapula.	Into the tuberoſity at the upper end of the radius.	To bend the fore-arm.
	2. Brachialis internus.	From the os humeri, below, and at each ſide of the tendon of the deltoides.	Into a ſmall tuberoſity at the fore part of the coronoid proceſs of the ulna.	To aſſiſt in bending the fore-arm.
	3. Triceps extenſor cubiti.	By three heads: the firſt, from the inferior coſta of the ſcapula; the ſecond, from the upper and outer part of the os humeri; and the third, from the back part of that bone.	Into the upper and outer part of the olecranon.	To extend the fore-arm.
——— on the fore-arm, - - -	1. Supinator longus.	From the outer ridge and anterior ſurface of the os humeri, a little above its outer condyle.	Into the radius near its ſtyloid proceſs.	To aſſiſt in turning the palm of the hand upwards.
	2. Extenſor carpi radialis longus.	Immediately below the origin of the ſupinator longus.	Into the upper part of the metacarpal bone of the fore-finger.	To extend the wriſt.
	3. Extenſor carpi radialis brevis.	From the outer and lower part of the outer condyle of the os humeri, and the upper part of the radius.	Into the upper part of the metacarpal bone of the middle finger.	To aſſiſt the extenſor longus.
	4. Extenſor digitorum communis.	From the outer condyle of the os humeri.	Into the back part of all the bones of the four fingers.	To extend the fingers.
	5. Extenſor minimi digiti.	From the outer condyle of the os humeri.	Into the bones of the little finger.	To extend the little finger.
	6. Extenſor carpi ulnaris.	From the outer condyle of the os humeri.	Into the metacarpal bone of the little finger.	To aſſiſt in extending the wriſt.
	7. Anconæus (v).	From the outer condyle of the os humeri.	Into the outer edge of the ulna.	To extend the fore-arm.
	8. Flexor carpi ulnaris.	From the inner condyle of the os humeri, and anterior edge of the olecranon (w).	Into the os piſiforme.	To aſſiſt in bending the hand.
	9. Palmaris longus.	From the inner condyle of the os humeri.	Into the internal annular ligament, and aponeuroſis palmaris (x).	To bend the hand.

(v) So called from ἀγκων, *cubitus*.

(w) Between the two origins of this muſcle we find the ulnar nerve going to the fore-arm.

(x) The aponeuroſis palmaris is a tendinous membrane that extends over the palm of the hand. Some anatomiſts

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	10. Flexor carpi radialis.	From the inner condyle of the os humeri.	Into the metacarpal bone of the forefinger.	To bend the hand.
	11. Pronator radii teres.	From the outer condyle of the os humeri, and coronoid proceſs of the ulna.	Into the anterior and convex edge of the radius, near its middle.	To roll the hand inwards.
	12. Flexor ſublimis perforatus (y).	From the inner condyle of the os humeri, inner edge of the coronoid proceſs of the ulna, and upper and anterior part of the radius.	Into the ſecond bone of each finger.	To bend the ſecond joint of the fingers.
	13. Supinator radii brevis.	From the outer condyle of the os humeri, and poſterior ſurface and outer edge of the ulna.	Into the anterior, inner, and upper part of the radius.	To roll the radius outwards.
	14. Abductor pollicis longus.	From the middle and back part of the ulna, interoſſeous ligament, and radius.	By two tendons into the os trapezium, and firſt bone of the thumb.	To ſtretch the firſt bone of the thumb outwards.
	15. Extenſor minor pollicis.	From the back part of the ulna, and interoſſeous ligament and radius.	Into the convex part of the ſecond bone of the thumb.	To extend the ſecond bone of the thumb obliquely outwards.
	16. Extenſor major pollicis.	From the back of the ulna and interoſſeous ligament.	Into the third and laſt bone of the thumb.	To ſtretch the thumb obliquely backwards.
	17. Indicator.	From the middle of the ulna.	Into the metacarpal bone of the forefinger.	To extend the forefinger.
	18. Flexor profundus perforans.	From the upper and fore part of the ulna, and interoſſeous ligament.	Into the fore part of the laſt bone of each of the fingers.	To bend the laſt joint of the fingers.
	19. Flexor longus pollicis.	From the upper and fore part of the radius.	Into the laſt joint of the thumb.	To bend the laſt joint of the thumb.
	20. Pronator radii quadratus.	From the inner and lower part of the ulna.	Into the radius, oppoſite to its origin.	To roll the radius inwards, and of courſe to aſſiſt in the pronation of the hand.
Muscles on the hand, - -	1. Lumbricales (z).	From the tendons of the perforans.	Into the tendons of the extenſor digitorum communis.	To bend the firſt, and to extend the two laſt joints of the fingers (a).

2. Abductor

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tomiſts have ſuppoſed it to be a production of the tendon of this muſcle, but without ſufficient grounds; for in ſome ſubjects we find the palmaris longus inſerted wholly into the annular ligament, ſo as to be perfectly diſtinct from this aponeuroſis; and it now and then happens, that no palmaris longus is to be found, whereas this expanſion is never deficient.

(y) This muſcle is named *perforatus*, on account of the four tendons in which it terminates, being perforated by thoſe of another muſcle, the perforans.

(z) So named from their being ſhaped ſomewhat like the lumbricus or earth-worm.

(a) Fallopius was the firſt who remarked the two oppoſite uſes of this muſcle. Their extending power is owing to their connexion with the extenſor communis.

Of the Muſcles.

Name.	*Origin.*	*Inſertion.*	*Uſe.*
2. Abductor brevis pollicis.	From the fore part of the internal annular ligament, os ſcaphoides, and one of the tendons of the abductor longus pollicis.	Into the outer ſide of the 2d bone of the thumb, near its root.	To move the thumb from the fingers.
3. Opponens pollicis.	From the inner and anterior part of the internal annular ligament, and from the os ſcaphoides.	Into the firſt bone of the thumb.	To move the thumb inwards, and to turn it upon its axis.
4. Flexor brevis pollicis.	From the os trapezoides, internal annular ligament, os magnum, and os unciforme.	Into the oſſa ſeſamoidea and ſecond bone of the thumb.	To bend the ſecond joint of the thumb.
5. Adductor pollicis.	From the metacarpal bone of the middle finger.	Into the baſis of the ſecond bone of the thumb.	To move the thumb towards the fingers.
6. Abductor indicis.	From the inner ſide of the firſt bone of the thumb, and from the os trapezium.	Into the firſt bone of the fore finger poſteriorly.	To move the fore finger towards the thumb.
7. Palmaris brevis.	From the internal annular ligament, and aponeuroſis palmaris.	Into the os piſiforme, and the ſkin covering the abductor minimi digiti.	To contract the palm of the hand.
8. Abductor minimi digiti.	From the internal annular ligament, and os piſiforme.	Into the ſide of the firſt bone of the little finger.	To draw the little finger from the reſt.
9. Flexor parvus minimi digiti.	From the os unciforme and internal annular ligament.	Into the firſt bone of the little finger.	To bend the little finger.
10. Adductor metacarpi minimi digiti.	From the os unciforme, and internal annular ligament.	Into the metacarpal bone of the little finger.	To move that bone towards the reſt.
11. Interoſſei interni.	Situated between the metacarpal bones.	Into the roots of the fingers.	To extend the fingers and move them towards the thumb (B).
12. Interoſſei externi.	Situated between the metacarpal bones on the back of the hand.	Into the roots of the fingers.	To extend the fingers; but the firſt draws the middle finger inwards, the ſecond draws it outwards, and the third draws the ring finger inwards.
MUSCLES at the back part of the pelvis, and upper part of the thigh, -			
1. Glutæus (C) maximus.	From the ſpine of the ilium, poſterior ſacro-iſchiatic ligaments, os ſacrum, and os coccygis.	Into the upper part of the *linea aſpera* of the os femoris.	To extend the thigh and draw it outwards.

(B) The third interoſſeus internus (for there are four of the externi and three of the interni) differs from the reſt in drawing the middle finger from the thumb.

(C) From γλουτος, *nates*.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	2. Glutæus medius.	From the ſpine and ſuperior ſurface of the ilium.	Into the outer and back part of the great trochanter of the os femoris.	To draw the thigh outwards and a little backwards, and when it is bended, to roll it.
	3. Glutæus minimus.	From the outer ſurface of the ilium and the border of its great niche.	Into the upper and anterior part of the great trochanter.	To aſſiſt the former.
	4. Pyriformis (D).	From the anterior part of the os ſacrum.	Into a cavity at the root of the trochanter major.	To roll the thigh outwards.
	5. Gemini (E).	By two portions, one from the outer ſurface of the ſpine of the iſchium; the other from the tuberoſity of the iſchium and poſterior ſacro-iſchiatic ligament.	Into the ſame cavity as the pyriformis.	To roll the thigh outwards, and likewiſe to confine the tendon of the obturator internus, when the latter is in action.
	6. Obturator internus.	From the ſuperior half of the inner border of the foramen thyroideum.	Into the ſame cavity with the former.	To roll the thigh outwards.
	7. Quadratus (F) femoris.	From the tuberoſity of the iſchium.	Into a ridge between the trochanter major and trochanter minor.	To move the thigh outwards.
Muscles on the thigh (G),	1. Biceps flexor cruris.	By two heads; one from the tuberoſity of the iſchium the other from the linea aſpera near the inſertion of the glutæus maximus.	Into the upper and back part of the fibula (H).	To bend the leg.
	2. Semi-tendinoſus.	From the tuberoſity of the iſchium.	Into the upper and inner part of the tibia.	To bend and draw the leg inwards.
	3. Semi-membranoſus (I).	From the tuberoſity of the iſchium.	Into the upper and back part of the head of the tibia.	To bend the leg.
	4. Tenſor vaginæ femoris.	From the ſuperior and anterior ſpinous proceſs of the ilium.	Into the inner ſide of the faſcia lata, which covers the outſide of the thigh.	To ſtretch the faſcia.

5. Sartorius.

(D) So named from its pear-like ſhape.

(E) The two portions of this muſcle having been deſcribed as two diſtinct muſcles by ſome anatomiſts, have occaſioned it to be named *gemini*. The tendon of the obturator internus runs between theſe two portions.

(F) This muſcle is not of the ſquare ſhape its name would ſeem to indicate.

(G) The muſcles of the leg and thigh are covered by a broad tendinous membrane called *faſcia lata*, that ſurrounds them in the manner of a ſheath. It is ſent off from the tendons of the glutæi and other muſcles, and dipping down between the muſcles it covers, adheres to the linea aſpera, and ſpreading over the joint of the knee, gradually diſappears on the leg. It is thickeſt on the inſide of the thigh.

(H) The tendon of this muſcle forms the *outer ham-ſtring*.

(I) So named on account of its origin, which is by a broad flat tendon three inches long.

Name.	*Origin.*	*Inſertion.*	*Uſe.*
5. Sartorius.	From the ſuperior and anterior ſpinous proceſs of the ilium.	Into the upper and inner part of the tibia.	To bend the leg inwards (K).
6. Rectus.	By two tendons; one from the anterior and inferior ſpinous proceſs of the ilium; the other from the poſterior edge of the cotyloid cavity.	Into the upper and fore part of the patella.	To extend the leg.
7. Gracilis.	From the fore part of the iſchium and pubis.	Into the upper and inner part of the tibia.	To bend the leg.
8. Vaſtus externus (L).	From the anterior and lower part of the great trochanter, and the outer edge of the linea aſpera.	To the upper and outer part of the patella.	To extend the leg.
9. Vaſtus internus.	From the inner edge of the linea aſpera, beginning between the fore part of the os femoris and the root of the leſſer trochanter.	Into the upper and inner part of the patella.	To extend the leg.
10. Cruræus (M).	From the outer and anterior part of the leſſer trochanter.	Into the upper part of the patella.	To extend the leg.
11. Pectinalis.	From the anterior edge of the os pubis, or pectinis, as it is ſometimes called.	Into the upper and fore part of the linea aſpera.	To draw the thigh inwards, upwards, and to roll it a little outwards.
12. Adductor longus femoris (N).	From the upper and fore part of the os pubis.	Near the middle and back part of the linea aſpera.	To draw the thigh inwards, upwards, and to roll it a little outwards.
13. Adductor brevis femoris.	From the fore part of the ramus of the os pubis.	Into the inner and upper part of the linea aſpera.	
14. Adductor magnus femoris.	From the lower and fore part of the ramus of the os pubis.	Into the whole length of the linea aſpera.	
15. Obturator externus.	From part of the obturator ligament, and the inner half of the circumference of the foramen thyroideum.	Into the os femoris, near the root of the great trochanter.	To move the thigh outwards in an oblique direction, and likewiſe to bend and draw it inwards.

MUSCLES

(K) Spigelius was the firſt who gave this the name of *ſartorius*, or the taylor's muſcle, from its uſe in croſſing the legs.

(L) The vaſtus externus, vaſtus internus, and cruræus, are ſo intimately connected with each other, that ſome anatomiſts have been induced to conſider them as a *triceps*, or ſingle muſcle with three heads.

(M) Under the cruræus we ſometimes meet with two ſmall muſcles, to which Albinus has given the name of *ſub-cruræi*. They terminate on each ſide of the patella, and prevent the capſular ligament from being pinched. When they are wanting, which is very often the caſe, ſome of the fibres of the cruræus are found adhering to the capſula.

(N) This and the two following muſcles have been uſually, but improperly, conſidered as forming a ſingle muſcle with three heads, and on that account named *triceps femoris*.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
MUSCLES on the leg,	1. Gaſtrocnemius (o) externus.	By two heads; one from the inner condyle, the other from the outer condyle of the os femoris.	By a great round tendon, common to this and the following muſcle.	To extend the foot.
	2. Gaſtrocnemius (p) internus.	By two heads; one from the back part of the head of the fibula, the other from the upper and back part of the tibia.	By a large tendon (the *tendo achillis*) common to this and the former muſcle, into the lower and back part of the os calcis.	To extend the foot.
	3. Plantaris (q).	From the upper and poſterior part of the outer condyle of the os femoris.	Into the inſide of the back part of the os calcis.	To aſſiſt in extending the foot.
	4. Popliteus (r).	From the outer condyle of the thigh.	Into the upper and inner part of the tibia.	To aſſiſt in bending the leg and rolling it inwards.
	5. Flexor longus digitorum pedis (s).	From the upper and inner part of the tibia.	By four tendons, which, after paſſing through the perforations in thoſe of the flexor digitorum brevis, are inſerted into the laſt bone of all the toes, except the great toe.	To bend the laſt joint of the toe.
	6. Flexor longus pollicis pedis.	From the back part, and a little below the head of the fibula.	Into the laſt bone of the great toe.	To bend the great toe.
	7. Tibialis poſticus.	From the back part and outer edge of the tibia, and likewiſe from the interoſſeous ligament and adjacent part of the fibula.	Into the inner and upper part of the os naviculare and ſide of the os cuneiforme medium.	To move the foot inwards.
	8. Peroneus longus.	From the outer ſide of the head of the tibia, and alſo from the upper, anterior, and outer part of the *perone* or fibula, to which it adheres for a conſiderable way down.	Into the metatarſal bone of the great toe.	To move the foot outwards.
	9. Peroneus brevis.	From the outer and fore part of the fibula.	Into the metatarſal bone of the little toe.	To aſſiſt the laſt deſcribed muſcle.

10. Extenſor

(o) Γαστροκνημια, *ſura*, "the calf of the leg."

(p) This muſcle is by ſome anatomiſts named *ſoleus*, on account of its being ſhaped like the ſole-fiſh.

(q) This muſcle has gotten the name of *plantaris*, from its being ſuppoſed to furniſh the aponeuroſis that covers the ſole of the foot; but it does not in the leaſt contribute to the formation of that tendinous expanſion.

(r) So called on account of its ſituation at the ham (*poples*).

(s) This muſcle, about the middle of the foot, unites with a fleſhy maſs, which, from its having firſt been deſcribed by Sylvius, is uſually called *maſſa carnea* JACOBI SYLVII.

	Name.	*Origin.*	*Inſertion.*	*Uſe.*
	10. Extenſor longus digitorum pedis.	From the upper, outer, and fore part of the tibia, interoſſeous ligament, and inner edge of the fibula.	By four tendons into the firſt joint of the ſmaller toes.	To extend the toes.
	11. Peroneus tertius.	From the fore part of the lower half of the fibula, and from the interoſſeous ligament.	Into the metatarſal bone of the little toe.	To bend the foot,
	12. Tibialis anticus.	From the upper and fore part of the tibia.	Into the os cuneiforme internum.	To bend the foot.
	13. Extenſor proprius pollicis pedis.	From the upper and fore part of the tibia.	Into the convex ſurface of the bones of the great toe.	To extend the great toe.
Muscles on the foot,	1. Extenſor brevis digitorum pedis.	From the upper and anterior part of the os calcis.	By four tendons; one of which joins the tendon of the externus longus pollicis, and the other three the tendons of the extenſor digitorum longus.	To extend the toes.
	2. Flexor brevis digitorum pedis.	From the lower part of the os calcis.	By four tendons, which, after affording a paſſage to thoſe of the flexor longus, are inſerted into the ſecond phalanx of each of the ſmall toes.	To bend the ſecond joint of the toes.
	3. Abductor pollicis pedis.	From the inner and lower part of the os calcis.	Into the firſt joint of the great toe.	To move the great toe from the other toes.
	4. Abductor minimi digiti.	From the outer tubercle of the os calcis, the root of the metatarſal bone of the little toe, and alſo from the aponeuroſis plantaris.	Into the outer ſide of the firſt joint of the little toe.	To draw the little toe outwards.
	5. Lumbricales pedis.	From the tendons of the flexor longus digitorum pedis.	Into the tendinous expanſion at the upper part of the toes.	To draw the toes inwards.
	6. Flexor brevis pollicis pedis.	From the inferior and anterior part of the os calcis, and alſo from the inferior part of the os cuneiforme externum.	By two tendons into the firſt joint of the great toe.	To bend the firſt joint of the great toe.
	7. Adductor pollicis pedis.	From near the roots of the metatarſal bones of the 2d, 3d, and 4th toes.	Into the outer os ſeſamoideum, or firſt joint of the great toe.	To draw the great toe nearer to the reſt, and alſo to bend it.
	8. Tranſverſales pedis.	From the outer and under part of the anterior end of the metatarſal bone of the little toe.	Into the inner os ſeſamoideum, and anterior end of the metatarſal bone of the great toe.	To contract the foot.

9. Flexor

Name.	*Origin.*	*Insertion.*	*Use.*
9. Flexor brevis minimi digiti pedis.	From the basis of the metatarsal bone of the little toe.	Into the first joint of the little toe.	To bend the little toe.
10. Interossei pedis interni (t).	Situated between the metatarsal bones.		
11. Interossei externi (u).			

EXPLANATION of PLATES XXV. and XXVI.

Plate XXV.

Fig. 1. The Muscles immediately under the common teguments on the anterior part of the body are represented on the right side; and on the left side the Muscles are seen which come in view when the exterior ones are taken away.

A, The frontal muscle. B, The tendinous aponeurosis which joins it to the occipital; hence both named *occipito-frontalis*. C, Attollens aurem. D, The ear. E, Anterior auris. FF, Orbicularis palpebrarum. G, Levator labii superioris alæque nasi. H, Levator anguli oris. I, Zygomaticus minor. K, Zygomaticus major. L, Masseter. M, Orbicularis oris. N, Depressor labii inferioris. O, Depressor anguli oris. P, Buccinator. QQ, Platysma myoides. RR, Sterno-cleido-mastoidæus. S, Part of the trapezius. T, Part of the scaleni.

Superior Extremity.—U, Deltoides. V, Pectoralis major. W, Part of the latissimus dorsi. XX, Biceps flexor cubiti. YY, Part of the brachialis externus. ZZ, The beginning of the tendinous aponeurosis (from the biceps), which is spread over the muscles of the fore arm. aa, Its strong tendon inserted into the tubercle of the radius. bb, Part of the brachialis internus. c, Pronator radii teres. d, Flexor carpi radialis. e, Part of the flexor carpi ulnaris. f, Palmaris longus. g, Aponeurosis palmaris. 3, Palmaris brevis. 1, Ligamentum carpi annulare. 2 2, Abductor minimi digiti. h, Supinator radii longus. i, The tendons of the thumb. k, Abductor pollicis. l, Flexor pollicis longus. mm, The tendons of the flexor sublimis perforatus, profundus perforans, and lumbricales.—The sheaths are entire in the right hand, —in the left cut open, to show the tendons of the flexor profundus perforating the sublimis.

Muscles not referred to—in the left superior extremity.—n, Pectoralis minor, seu serratus anticus minor. o, The two heads of (xx) the biceps. p, Coracobrachialis. qq, The long head of the triceps extensor cubiti. rr, Teres major. ss, Subscapularis. tt, Extensores radiales. u, Supinator brevis. v, The cut extremity of the pronator teres. w, Flexor sublimis perforatus. x, Part of the flexor profundus. y, Flexor pollicis longus. z, Part of the flexor pollicis brevis. 4, Abductor minimi digiti. 5, The four lumbricales.

Trunk.—6, Serrated extremities of the serratus anticus major. 7 7, Obliquus externus abdominis. 8 8, The linea alba. 9, The umbilicus. 10, Pyramidalis. 11 11, The spermatic cord. On the left side it is covered by the cremaster. 12 12, Rectus abdominis. 13, Obliquus internus. 14 14, &c. Intercostal muscles.

Inferior Extremities.—*a a*, The gracilis. *b b*, Part of the triceps. *c c*, Pectialis. *d d*, Psoas magnus. *e e*, Iliacus internus, *f*, Part of the glutæus medius. *g*, Part of the glutæus minimus. *h*, Cut extremity of the rectus cruris. *i i*, Vastus externus. *k*, Tendon of the rectus cruris. *l l*, Vastus internus. * Sartorius muscle. * * Fleshy origin of the tensor vaginæ femoris or membranosus. Its tendinous aponeurosis covers (*i*) the vastus externus in the right side. *m m*, Patella. *n n*, Ligament or tendon from it to the tibia. *o*, Rectus cruris. *p*, Cruræus. *q q*, The tibia. *r r*, Part of the gemellus or gastrocnemius externus. *s s s*, Part of the soleus or gastrocnemius internus. *t*, Tibialis anticus. *u*, Tibialus posticus. *v v*, Pæronæi muscles. *w w*, Extensor longus digitorum pedis. *x x*, Extensor longus pollicis pedis. *y*, Abductor pollicis pedis.

Fig. 2. The Muscles, Glands, &c. of the left Side of the Face and Neck, after the common Teguments and Platysma myoides have been taken off.

a, The frontal muscle. b, Temporalis and temporal artery. c, Orbicularis palpebrarum. d, Levator labii superioris alæque nasi. e, Levator anguli oris. f, Zygomaticus. g, Depressor labii inferioris. h, Depressor anguli oris. i, Buccinator. k, Masseter. ll, Parotid gland. m, Its duct. n, Sterno-cleido-mastoidæus. o, Part of the trapezius. p, Sterno-hyoidæus. q, Sterno-thyroidæus. r, Omo-hyoidæus. s, Levator scapulæ. tt, Scaleni, u, Part of the splenius.

Fig. 3. The Muscles of the Face and Neck in view after the exterior ones are taken away.

a a, Corrugator supercilii. b, Temporalis. c, Tendon of the levator palpebræ superioris. d, Tendon of the orbicularis palpebrarum. e, Masseter. f, Buccinator. g, Levator anguli oris. h, Depressor labii superioris alæque nasi. i, Orbicularis oris. k, Depressor anguli oris. l, Muscles of the os hyoides. m, Sterno-cleido-mastoidæus

Fig.

(t) The interossei interni are three in number; their use is to draw the smaller toes towards the great toe.

(u) The interossei externi are four in number; the first serves to move the fore toe towards the great toe; the rest move the toes outwards. All the interossei assist in extending the toes.

Of the Abdomen.

Fig. 4. Some of the Muscles of the Os Hyoides and Submaxillary Gland.

a, Part of the maſſeter muſcle. b, Poſterior head of the digaſtric. c, Its anterior head. dd, Sterno-hyoidæus. e, Omo-hyoidæus. f, Stylo-hyoidæus. g, Submaxillary gland in ſitu.

Fig. 5. The Submaxillary Gland and Duct.

a, Muſculus mylo-hyoidæus. b, Hyo-gloſſus. c, Submaxillary gland extra ſitum. d, Its duct.

Plate XXVI.

Fig. 1. The Muscles immediately under the common teguments on the poſterior part of the body are repreſented in the right ſide; and on the left ſide the Muscles are ſeen which come in view when the exterior ones are taken away.

Head.—AA, Occipito-frontalis. B, Attollens aurem. C, Part of the orbicularis palpebrarum. D, Maſſeter. E, Pterygoidæus internus.

Trunk.—Right ſide. FFF, Trapezius ſeu cucullaris. GGGG, Latiſſimus dorſi. H, Part of the obliquus externus abdominis.

Trunk.—Left ſide. I, Splenius. K, Part of the complexus. L, Levator ſcapulæ. M, Rhomboides. NN, Serratus poſticus inferior. O, part of the longiſſimus dorſi. P, Part of the ſacro-lumbalis. Q, Part of the ſemi-ſpinalis dorſi. R, Part of the ſerratus anticus major. S, Part of the obliquus internus abdominis.

Superior Extremity.—Right ſide. T, Deltoides. U, Triceps extenſor cubiti. V, Supinator longus. WW, Extenſores carpi radialis longior and brevior. XX, Extenſor carpi ulnaris. YY, Extenſor digitorum communis. Z, Abductor indicis. 1 2 3, Extenſores pollicis.

Superior Extremity.—Left ſide. a, Supra ſpinatus. b, Infra ſpinatus. c, Teres minor. d, Teres major. e, Triceps extenſor cubiti. ff, Extenſores carpi radiales. g, Supinator brevis. h, Indicator. 1 2 3, Extenſores pollicis. i, Abductor minimi digiti. k, Interoſſei.

Inferior Extremity.—Right ſide. l, Glutæus maximus. m, Part of the glutæus medius. n, Tenſor vaginæ femoris. o, Gracilis. pp, Adductor femoris magnus. q, Part of the vaſtus internus. r, Semimembranoſus. s, Semitendinoſus. t, Long head of the biceps flexor cruris. uu, Gaſtrocnemius externus ſeu gemellus. v, Tendo Achillis. w, Solæus ſeu gaſtrocnemius internus. x x, Peronæus longus and brevis. y, Tendons of the flexor longus digitorum pedis;—and under them * flexor brevis digitorum pedis. z, Abductor minimi digiti pedis.

Inferior Extremity.—Left ſide. *m*, *n*, *o*, *p p*, *q*, *r*, *s*, *t*, *v*, *w w*, *x x*, *y*, *z*, Point the ſame parts as in the right ſide. *a*, Pyriformis. *b b*, Gemini. *c c*, Obturator internus. *d*, Quadratus femoris. *e*, Coccygæus. *f*, The ſhort head of the biceps flexor cruris. *g g*, Plantaris. *h*, Poplitæus. *i*, Flexor longus pollicis pedis.

Fig. 2. The Palm of the Left Hand after the common Teguments are removed, to ſhow the Muscles of the Fingers.

a, Tendon of the flexor carpi radialis. b, Tendon of the flexor carpi ulnaris. c, Tendons of the flexor ſublimis perforatus, profundus perforans, and lumbricales. d, Abductor pollicis. ee, Flexor pollicis longus. f, Flexor pollicis brevis. g, Palmaris brevis. h, Abductor minimi digiti. i, Ligamentum carpiannulare. k, A probe put under the tendons of the flexor digitorum ſublimis; which are perforated by l, the flexor digitorum profundus. mmmm, Lumbricales. n, Adductor pollicis.

Fig. 3. A Fore view of the Foot and tendons of the Flexores Digitorum.

a, Cut extremity of the tendo Achillis. b, Upper part of the aſtragalus. c, Os calcis. d, Tendon of the tibialis anticus. e, Tendon of the extenſor pollicis longus. f, Tendon of the peronæus brevis. g, Tendons of the flexor digitorum longus, with the nonus Veſalii. hh, The whole of the flexor digitorum brevis.

Fig. 4. Muscles of the Anus.

aa, An outline of the buttocks, and upper part of the thighs. b, The teſtes contained in the ſcrotum. cc, Sphincter ani. d, Anus. e, Levator ani. ff, Erector penis. gg, Accelerator urinæ. h, Corpus cavernoſum urethræ.

Fig. 5. Muscles of the Penis.

aa, b, d, ee, ff, h, point the ſame as in fig. 4. c, Sphincter ani. gg, Tranſverſalis penis.

CHAP. III. OF THE ABDOMEN, OR LOWER BELLY.

88 THE abdomen, or lower belly, extends from the lower extremity of the ſternum, or the hollow uſually called the pit of the ſtomach, and more properly *ſcrobiculus cordis*, to the lower part of the trunk.

It is diſtinguiſhed into three diviſions called *regions*; of theſe the upper one, which is called the *epigaſtric region*, begins immediately under the ſternum, and extends to within two fingers breadth of the navel, where the middle or *umbilical region* begins, and reaches to the ſame diſtance below the navel. The third, which is called the *hypogaſtric*, includes the reſt of the abdomen, as far as the os pubis.

Each of theſe regions is ſubdivided into three others; two of which compoſe the ſides, and the other the middle part of each region.

The middle part of the upper region is called *epigaſtrium*, and its two ſides *hypochondria*. The middle part of the next region is the umbilical region, properly ſo called, and its two ſides are the flanks, or iliac regions. Laſtly, The middle part of the lower region retains the name of hypogaſtrium, and its ſides are called inguina or groins. The back part of the abdomen bears the name of lumbar region.

Theſe are the diviſions of the lower belly, which are neceſſary to be held in remembrance, as they frequently occur in ſurgical and anatomical writing. We will now proceed to examine the contents of the abdomen; and after having pointed out the names and arrangement of the ſeveral viſcera contained in it, deſcribe each of them ſeparately.

Of the Abdomen.

After having removed the ſkin, adipoſe membrane, and abdominal muſcles, we diſcover the peritonæum or membrane that envelopes all the viſcera of the lower belly. This being opened, the firſt part that preſents itſelf is the omentum or cawl, floating on the ſurface of the inteſtines, which are likewiſe ſeen everywhere looſe and moiſt, and making a great number of circumvolutions through the whole cavity of the abdomen. The ſtomach is placed in the epigaſtrium, and under the ſtomach is the pancreas. The liver fills the right hypochondrium, and the ſpleen is ſituated in the left. The kidneys are ſeen about the middle of the lumbar region, and the urinary bladder and parts of generation are ſeated in the lower diviſion of the belly.

Sect. I. *Of the Peritonæum.*

89 The peritonæum is a ſtrong ſimple membrane, by which all the viſcera of the abdomen are ſurrounded, and in ſome meaſure ſupported. Many anatomical writers, particularly Winſlow, have deſcribed it as being compoſed of two diſtinct membranous laminæ; but their deſcription ſeems to be erroneous: what perhaps appeared to be a ſecond lamina, being found to be ſimply a cellular coat, which ſends off productions to the blood veſſels paſſing out of the abdominal cavity. The aorta and vena cava likewiſe derive a covering from the ſame membrane, which ſeems to be a part of the cellular membrane we have already deſcribed.

The peritonæum, by its productions and reduplications, envelopes the greateſt part of the abdominal viſcera. It is ſoft, and capable of conſiderable extenſion; and is kept ſmooth and moiſt by a vapour, which is conſtantly exhaling from its inner ſurface, and is returned again into the circulation by the abſorbents.

This moiſture not only contributes to the ſoftneſs of the peritonæum, but prevents the attrition, and other ill effects which would otherwiſe probably be occaſioned, by the motion of the viſcera upon each other.

When this fluid is ſupplied in too great a quantity, or the abſorbents become incapable of carrying it off, it accumulates, and conſtitutes an aſcites or dropſy of the belly; and when by any means the exhalation is diſcontinued, the peritonæum thickens, becomes diſeaſed, and the viſcera are ſometimes found adhering to each other.

The peritonæum is not a very vaſcular membrane. In a ſound ſtate it ſeems to be endued with little or no feeling, and the nerves that paſs through it appear to belong to the abdominal muſcles.

Sect. II. *Of the Omentum.*

90 The omentum, epiploon, or cawl, is a double membrane, produced from the peritonæum. It is interlarded with fat, and adheres to the ſtomach, ſpleen, duodenum, and colon; from thence hanging down looſe and floating on the ſurface of the inteſtines. Its ſize is different in different ſubjects. In ſome it deſcends as low as the pelvis, and it is commonly longer at the left ſide than the right.

Of the Abdomen.

This part, the ſituation of which we have juſt now deſcribed, was the only one known to the ancients under the name of *epiploon;* but at preſent we diſtinguiſh three omenta, viz. *omentum magnum colico-gaſtricum*, *omentum parvum hepatico-gaſtricum*, and *omentum colicum*. They all agree in being formed of two very delicate laminæ, ſeparated by a thin layer of cellular membrane.

The omentum magnum colico-gaſtricum, of which we have already ſpoken, derives its arteries from the ſplenic and hepatic. Its veins terminate in the vena portæ. Its nerves, which are very few, come from the ſplenic and hepatic plexus.

The omentum parvum hepatico-gaſtricum abounds leſs with fat than the great epiploon. It begins at the upper part of the duodenum, extends along the leſſer curvature of the ſtomach as far as the œſophagus, and terminates about the neck of the gall-bladder, and behind the left ligament of the liver, ſo that it covers the leſſer lobe; near the beginning of which we may obſerve a ſmall opening, firſt deſcribed by Winſlow, through which the whole pouch may eaſily be diſtended with air (x). The veſſels of the omentum parvum are derived chiefly from the coronary ſtomachic arteries and veins.

The omentum colicum begins at the fore part of the cæcum and right ſide of the colon. It appears as a hollow conical appendage to theſe inteſtines, and uſually terminates at the back of the omentum magnum. It ſeems to be nothing more than a membranous coat of the cæcum and colon, aſſuming a conical ſhape when diſtended with air.

The uſes of the omentum are not yet ſatisfactorily determined. Perhaps by its ſoftneſs and looſeneſs it may ſerve to prevent thoſe adheſions of the abdominal viſcera, which have been found to take place when the fat of the omentum has been much waſted. Some authors have ſuppoſed, that it aſſiſts in the preparation of bile; but this idea is founded merely on conjecture.

Sect. III. *Of the Stomach.*

91 The ſtomach is a membranous and muſcular bag, in ſhape not unlike a bagpipe, lying acroſs the upper part of the abdomen, and inclining rather more to the left than the right ſide.

It has two orifices, one of which receives the end of the œſophagus, and is called the *cardia*, and ſometimes the left and upper orifice of the ſtomach; though its ſituation is not much higher than the other, which is ſtyled the right and inferior orifice, and more commonly the *pylorus;* both theſe openings are more elevated than the body of the ſtomach.

The aliment paſſes down the œſophagus into the ſtomach through the cardia, and after having undergone

(x) This membranous bag, though exceedingly thin and tranſparent, is found capable of ſupporting mercury, thrown into it by the ſame channel.

Of the Abdomen.

gone the neceſſary digeſtion, paſſes out at the pylorus where the inteſtinal canal commences.

The ſtomach is compoſed of four tunics or coats, which are ſo intimately connected together that it requires no little dexterity in the anatomiſt to demonſtrate them. The exterior one is membranous, being derived from the peritonæum. The ſecond is a muſcular tonic, compoſed of fleſhy fibres which are in the greateſt number about the two orifices. The third is called the nervous coat, and within this is the villous or velvet-like coat which compoſes the inſide of the ſtomach.

The two laſt coats being more extenſive than the two firſt, form the folds, which are obſerved everywhere in the cavity of this viſcus, and more particularly about the pylorus; where they ſeem to impede the too haſty excluſion of the aliment, making a conſiderable plait, called *valvula pylori*.

The inner coat is conſtantly moiſtened by a mucus, which approaches to the nature of the ſaliva, and is called the gaſtric juice: this liquor has been ſuppoſed to be ſecreted by certain minute glands (y) ſeated in the nervous tunic, whoſe excretory ducts open on the ſurface of the villous coat.

The arteries of the ſtomach called the gaſtric arteries are principally derived from the cæliac; ſome of its veins paſs to the ſplenic, and others to the vena portæ; and its nerves are chiefly from the eighth pair or par vagum.

The account given of the tunics of the ſtomach may be applied to the whole alimentary canal; for both the œſophagus and inteſtines are, like this viſcus, compoſed of four coats.

Before we deſcribe the courſe of the aliment, and the uſes of the ſtomach, it will be neceſſary to ſpeak of other parts which aſſiſt in the proceſs of digeſtion.

Sect. IV. *Of the Oeſophagus.*

92 The œſophagus or gullet is a membranous and muſcular canal, extending from the bottom of the mouth to the upper orifice of the ſtomach. Its upper part where the aliment is received is ſhaped ſomewhat like a funnel, and is called the *pharynx*.

From hence it runs down cloſe to the bodies of the vertebræ as far as the diaphragm, in which there is an opening through which it paſſes, and then terminates in the ſtomach about the eleventh or twelfth vertebra of the back.

The œſophagus is plentifully ſupplied with arteries from the external carotid, bronchial, and ſuperior intercoſtal arteries; its veins empty themſelves into the vena azygos, internal jugular, and mammary veins, &c.

Its nerves are derived chiefly from the eighth pair.

We likewiſe meet with a mucus in the œſophagus, which everywhere lubricates its inner ſurface, and tends to aſſiſt in deglutition. This mucus ſeems to be ſecreted by very minute glands, like the mucus in other parts of the alimentary canal.

Of the Abdomen.

Sect. V. *Of the Inteſtines.*

The inteſtines form a canal, which is uſually ſix times longer than the body to which it belongs. This canal extends from the pylorus, or inferior orifice of the ſtomach, to the anus. 93

It will be eaſily underſtood, that a part of ſuch great length muſt neceſſarily make many circumvolutions, to be confined with ſo many other viſcera within the cavity of the lower belly.

Although the inteſtines are in fact, as we have obſerved, only one long and extenſive canal, yet different parts have been diſtinguiſhed by different names.

The inteſtines are firſt diſtinguiſhed into two parts, one of which begins at the ſtomach, and is called the *thin* or *ſmall inteſtines*, from the ſmall ſize of the canal, when compared with the other part, which is called the *large inteſtines*, and includes the lower portion of the canal down to the anus.

Each of theſe parts has its ſubdiviſions. The ſmall inteſtines being diſtinguiſhed into duodenum, jejunum, and ileum, and the larger portion into cæcum, colon, and rectum.

The ſmall inteſtines fill the middle and fore parts of the belly, while the large inteſtines fill the ſides and both the upper and lower parts of the cavity.

The duodenum, which is the firſt of the ſmall inteſtines, is ſo called, becauſe it is about 12 inches long. It begins at the pylorus, and terminates in the jejunum, which is a part of the canal obſerved to be uſually more empty than the other inteſtines. This appearance gives it its name, and likewiſe ſerves to point out where it begins.

The next diviſion is the ileum, which of itſelf exceeds the united length of the duodenum and jejunum, and has received its name from its numerous circumvolutions. The large circumvolution of the ileum covers the firſt of the large inteſtines called the *cæcum* (x), which ſeems properly to belong to the colon, being a kind of pouch of about four fingers in width, and nearly of the ſame length, having exteriorly a little appendix, called *appendix cæci*.

The cæcum is placed in the cavity of the os ilium on the right ſide, and terminates in the colon, which is the largeſt of all the inteſtines.

This inteſtine aſcends by the right kidney to which it is attached, paſſes under the hollow part of the liver, and the bottom of the ſtomach, to the ſpleen, to which it is likewiſe ſecured, as it is alſo to the left kidney; and from thence paſſes down towards the os ſacrum,

(y) Heiſter, ſpeaking of theſe glands, very properly ſays, "in *porcis* facile, in *homine* raro obſervantur;" for although many anatomical writers have deſcribed their appearance and figure, yet they do not ſeem to have been hitherto ſatisfactorily demonſtrated in the human ſtomach; and the gaſtric juice is now more generally believed to be derived from the exhalant arteries of the ſtomach.

(x) Anatomiſts have differed with reſpect to this diviſion of the inteſtines.—The method here followed is now generally adopted; but there are authors who allow the name of *cæcum* only to the little appendix, which has likewiſe been called the *vermiform appendix*, from its reſemblance to a worm in ſize and length.

Of the Abdomen.

where, from its ſtraight courſe, the canal begins to take the name of *rectum*.

There are three ligamentous bands extending through the whole length of the colon, which by being ſhorter than its two inner coats, ſerve to increaſe the plaits on the inner ſurface of this gut.

The *anus*, which terminates the inteſtinum rectum, is furniſhed with three muſcles; one of theſe is compoſed of circular fibres, and from its uſe in ſhutting the paſſage of the anus is called *ſphincter ani*.

The other two are the *levatores ani*, ſo called, becauſe they elevate the anus after dejection. When theſe by palſy, or any other diſeaſe, loſe the power of contracting, the anus prolapſes; and when the ſphincter is affected by ſimilar cauſes, the fæces are voided involuntarily.

It has been already obſerved, that the inteſtinal canal is compoſed of four tunics; but it remains to be remarked, that here, as in the ſtomach, the two inner tunics being more extenſive than the other two, form the plaits which are to be ſeen in the inner ſurface of the inteſtines, and are called *valvulæ conniventes*.

Some authors have conſidered theſe plaits as tending to retard the motion of the fæces, in order to afford more time for the ſeparation of the chyle; but there are others who attribute to them a different uſe: they contend, that theſe valves, by being naturally inclined downwards, cannot impede the deſcent of the fæces, but that they are intended to prevent their return upwards.

They are probably deſtined for both theſe uſes; for although theſe folds incline to their lower ſide, yet the inequalities they occaſion in the canal are ſufficient to retard in ſome meaſure the progreſſive motion of the fæces, and to afford a greater ſurface for the abſorption of chyle; and their natural poſition ſeems to oppoſe itſelf to the return of the aliment.

Beſides theſe *valvulæ conniventes*, there is one more conſiderable than the reſt, called the *valve of the colon;* which is found at that part of the canal where the inteſtinum ileum is joined to the colon. This valve permits the alimentary pulp to paſs downwards, but ſerves to prevent its return upwards; and it is by this valve that clyſters are prevented from paſſing into the ſmall inteſtines (y).

Of the little vermiform appendix of the cæcum, it will be ſufficient to ſay, that its uſes have never yet been aſcertained. In birds we meet with two of theſe appendices.

The inteſtines are lubricated by a conſtant ſupply of mucus, which is probably ſecreted by very minute follicles (z). This mucus promotes the deſcent of the alimentary pulp, and in ſome meaſure defends the inner ſurface of the inteſtines from the irritation to which it would, perhaps, otherwiſe be continually expoſed from the aliment; and which, when in a certain degree, excites a painful diſorder called *colic*, a name given to the diſeaſe, becauſe its moſt uſual ſeat is in the inteſtinum colon.

The inteſtines are likewiſe frequently diſtended with air, and this diſtenſion ſometimes occaſions pain, and conſtitutes the flatulent colic.

The arteries of the inteſtines are continuations of the meſenteric arteries which are derived in two conſiderable branches from the aorta.—The redundant blood is carried back into the vena portarum.

In the rectum the veins are called *hæmorrhoidal*, and are there diſtinguiſhed into internal and external: the firſt are branches of the inferior meſenteric vien, but the latter paſs into other veins. Sometimes theſe veins are diſtended with blood from obſtructions, from weakneſs of their coats, or from other cauſes, and what we call the *hæmorrhoids* takes place. In this diſeaſe they are ſometimes ruptured; and the diſcharge of blood which conſequently follows, has probably occaſioned them to be called *hæmorrhoidal veins*.

The nerves of the inteſtines are derived from the eighth pair.

Sect. VI. *Of the Meſentery.*

The name of the *meſentery* implies its ſituation amidſt the inteſtines. It is in fact a part of the peritonæum, being a reduplication (a) of that membrane from each ſide of the lumbar vertebræ, to which it is firmly attached, ſo that it is formed of two laminæ connected to each other by cellular membrane. 94

The inteſtines, in their different circumvolutions, form a great number of arches, and the meſentery accompanies them through all theſe turns; but by being attached

(y) This is not invariably the caſe; for the contents of a clyſter have been found not only to reach the ſmall inteſtines, but to be voided at the mouth. Such inſtances, however, are not common.

(z) Some writers have diſtinguiſhed theſe glands into miliary, lenticular, &c.—Brunner and Peyer were the firſt anatomiſts who deſcribed the glands of the inteſtines, and their deſcriptions were chiefly taken from animals, theſe glandular appearances not ſeeming to have been hitherto ſatisfactorily pointed out in the human ſubject. It is now pretty generally believed, that the mucus which everywhere lubricates the alimentary canal, is exhaled from the minute ends of arteries; and that theſe extremities firſt open into a hollow veſicle, from whence the depoſited juice of ſeveral branches flows out through one common orifice.

(a) He who only reads of the reduplication of membranes, will perhaps not eaſily underſtand how the peritoneum and pleura are reflected over the viſcera in their ſeveral cavities; for one of theſe ſerves the ſame purpoſes in the thorax that the other does in the abdomen. This diſpoſition, for the diſcovery of which we are indebted to modern anatomiſts, conſtitutes a curious part of anatomical knowledge: but the ſtudent, unaided by experience, and aſſiſted only by what the limits of this work would permit us to ſay on the occaſion, would probably imbibe only confuſed ideas of the matter; and it will perfectly anſwer the preſent purpoſe, if he conſiders the meſentery as a membrane attached by one of its ſides to the lumbar vertebræ, and by the other to the inteſtines.

Of the Abdomen.

attached only to the hollow part of each arch, it is found to have only a third of the extent of the inteſtines.

That part of this membrane which accompanies the ſmall inteſtines is the *meſentery*, properly ſo called; but thoſe parts of it which are attached to the colon and rectum are diſtinguiſhed by the names of *meſo-colon* and *meſo-rectum*.

There are many conglobate glands diſperſed through this double membrane, through which the lacteals and lymphatics paſs in their way to the thoracic duct. The blood veſſels of the meſentery were deſcribed in ſpeaking of the inteſtines.

This membrane, by its attachment to the vertebræ, ſerves to keep the inteſtines in their natural ſituation. The idea uſually formed of the colic called *miſerere*, is perfectly erroneous; it being impoſſible that the inteſtines can be twiſted, as many ſuppoſe they are, in that diſeaſe, their attachment to the meſentery effectually preventing ſuch an accident—but a diſarrangement ſometimes takes place in the inteſtinal canal itſelf, which is productive of diſagreeable and ſometimes fatal conſequences.—This is by an introſuſception of the inteſtine, an idea of which may be eaſily formed, by taking the finger of a glove, and involving one part of it within the other.

If inflammation takes place, the ſtricture in this caſe is increaſed, and the periſtaltic motion of the inteſtines (by which is meant the progreſſive motion of the fæces downwards) is inverted, and what is called the *iliac paſſion* takes place. The ſame effects may be occaſioned by a deſcent of the inteſtine, or of the omentum either with it or by itſelf, and thus conſtituting what is called a *hernia* or *rupture*; a term by which in general is meant the falling down or protruſion of any part of the inteſtine or omentum, which ought naturally to be contained within the cavity of the belly.

To convey an idea of the manner in which ſuch a deſcent takes place, it will be neceſſary to obſerve, that the lower edge of the tendon of the muſculus obliquus externus, is ſtretched from the fore part of the os ilium or haunch bone of the os pubis, and conſtitutes what is called *Poupart's* or *Fallopius's ligament*, forming an opening, through which paſs the great crural artery and vein. Near the os pubis the ſame tendinous fibres are ſeparated from each other, and form an opening on each ſide, called the *abdominal ring*, through which the ſpermatic veſſels paſs in men, and the ligamenta uteri in women. In conſequence of violent efforts, or perhaps of natural cauſes, the inteſtines are found ſometimes to paſs through theſe openings; but the peritoneum which encloſes them when in their natural cavity, ſtill continues to ſurround them even in their deſcent. This membrane does not become torn or lacerated by the violence, as might be eaſily imagined; but its dilatability enables it to paſs out with the viſcus, which it encloſes as it were in a bag, and thus forms what is called the *hernial ſac*.

If the hernia be under Poupart's ligament, it is called *femoral*; if in the groin *inguinal* (B); and *ſcrotal*, if in the ſcrotum. Different names are likewiſe given to the hernia as the contents of the ſac differ, whether of omentum only, or inteſtine, or both;—but theſe definitions more properly belong to the province of ſurgery.

Of the Abdomen.

Sect. VII. *Of the Pancreas.*

The pancreas is a conglomerate gland, placed behind the bottom of the ſtomach, towards the firſt vertebra of the loins; ſhaped like a dog's tongue, with its point ſtretched out towards the ſpleen, and its other end extending towards the duodenum. It is about eight fingers breadth in length, two or three in width, and one in thickneſs. 95

This viſcus, which is of a yellowiſh colour, ſomewhat inclining to red, is covered with a membrane which it derives from the peritoneum. Its arteries, which are rather numerous than large, are derived chiefly from the ſplenic and hepatic, and its veins paſs into the veins of the ſame name.—Its nerves are derived from the intercoſtal.

The many little glands of which it has been obſerved the pancreas is compoſed, all ſerve to ſecrete a liquor called the *pancreatic juice*, which, in its colour, conſiſtence, and other properties, does not ſeem to differ from the ſaliva. Each of theſe glands ſends out a little excretory duct, which uniting with others, help to form larger ducts; and all theſe at laſt terminate in one common excretory duct (firſt diſcovered by Virtſungus in 1642), which runs through the middle of the gland, and is now uſually called *ductus pancreaticus Virtſungi*. This canal opens into the inteſtinum duodenum, ſometimes by the ſame orifice with the biliary duct, and ſometimes by a diſtinct opening. The liquor it diſcharges being of a mild and inſipid nature, ſerves to dilute the alimentary pulp, and to incorporate it more eaſily with the bile.

Sect. VIII. *Of the Liver.*

The liver is a viſcus of conſiderable ſize, and of a reddiſh colour; convex ſuperiorly and anteriorly where it is placed under the ribs and diaphragm, and of an unequal ſurface poſteriorly. It is chiefly ſituated in the right hypochondrium, and under the falſe ribs; but it likewiſe extends into the epigaſtric region, where it borders upon the ſtomach. It is covered by a production of the peritonæum, which ſerves to attach it by three of its reduplications to the falſe ribs. Theſe reduplications are called *ligaments*, though very different in their texture from what are called by the ſame name in other parts of the body. The umbilical cord, too, which in the fœtus is pervious, gradually becomes a ſimple ligament after birth; and by paſſing to the liver, ſerves likewiſe to ſecure it in its ſituation. 96

At the poſterior part of this organ where the umbilical veſſels enter, it is found divided into two lobes. Of theſe, the largeſt is placed in the right hypochondrium; the other, which covers part of the ſtomach, is called the *little lobe*. All the veſſels which go to the liver paſs in at the fiſſure we have mentioned; and the production of the peritonæum, which inveſts the liver, was deſcribed by Gliſſon, an Engliſh anatomiſt, as accompanying them in their paſſage, and ſurrounding

(B) The hernia congenita will be conſidered with the male organs of generation, with which it is intimately connected.

Of the Abdomen.

ſurrounding them like a glove; hence this production has been commonly known by the name of *capſula of Gliſſon:* but it appears to be chiefly a continuation of the cellular membrane which covers the vena portæ ventralis.

The liver was conſidered by the ancients as an organ deſtined to prepare and perfect the blood; but later diſcoveries have proved, that this opinion was wrong, and that the liver is a glandular ſubſtance formed for the ſecretion of the bile.

The blood is conveyed to the liver by the hepatic artery and the vena portæ. This is contrary to the mode of circulation in other parts, where veins only ſerve to carry off the redundant blood: but in this viſcus the hepatic artery, which is derived from the cæliac, is principally deſtined for its nouriſhment; and the vena portæ, which is formed by the union of the veins from moſt of the abdominal viſcera, furniſhes the blood from which the bile is chiefly to be ſeparated: ſo that theſe two ſeries of veſſels ſerve very diſtinct purpoſes. The vena portæ, as it is ramified through the liver, performs the office both of a vein and an artery; for like the former it returns the blood from the extremities of arteries, while as the latter it prepares it for ſecretion.

The nerves of the liver are branches of the intercoſtal and par vagum, The bile, after being ſeparated from the maſs of blood, in a manner of which mention will be made in another place, is conveyed out of this organ by very minute excretory ducts, called *pori biliarii;* theſe uniting together like the excretory ducts in the pancreas, gradually form larger ones, which at length terminate in a conſiderable channel called *ductus hepaticus.*

Sect. IX. *Of the Gall-Bladder.*

97 The gall-bladder is a little membranous bag, ſhaped like a pear, and attached to the poſterior and almoſt inferior part of the great lobe of the liver.

It has two tunics; of which the exterior one is a production of the peritonæum. The interior, or villous coat, is ſupplied with a mucus that defends it from the acrimony of the bile. Theſe two coverings are intimately connected by means of cellular membrane, which from its firm gliſtening appearance has generally been ſpoken of as a muſcular tunic.

The gall-bladder is ſupplied with blood veſſels from the hepatic arteries. Theſe branches are called the *cyſtic arteries*, and the cyſtic veins carry back the blood.

Its nerves are derived from the ſame origin as thoſe of the liver.

The neck of the gall-bladder is continued in the form of a canal called *ductus cyſticus*, which ſoon unites with the ductus hepaticus we deſcribed as the excretory duct of the liver; and forming one common canal, takes the name of *ductus choledochus communis*, through which both the cyſtic and hepatic bile are diſcharged into the duodenum. This canal opens into the inteſtine in an oblique direction, firſt paſſing through the exterior tunic, and then piercing the other coats after running between each of them a very little way. This economy ſerves two uſeful purpoſes;—to promote the diſcharge of bile and to prevent its return.

Of the Abdomen.

98 Of the bile.

The bile may be defined to be a natural liquid ſoap, ſomewhat unctuous and bitter, and of a yellowiſh colour, which eaſily mixes with water, oil, and vinous ſpirits, and is capable of diſſolving reſinous ſubſtances. From ſome late experiments made by M. Cadet *, it appears to be formed of an animal oil, combined with the alkaline baſe of ſea ſalt, a ſalt of the nature of milk, and a calcareous earth which is ſlightly ferruginous.

* *Mem. de l' Acad. des Sciences,* 1767.

Its definition ſeems ſufficiently to point out the uſes for which it is intended (c). It blends the alimentary maſs, by dividing and attenuating it; corrects the too great diſpoſition to aceſcency, which the aliment acquires in the ſtomach; and, finally, by its acrimony, tends to excite the periſtaltic motion of the inteſtines.

After what has been ſaid, it will be conceived that there are two ſorts of bile; one of which is derived immediately from the liver through the hepatic duct, and the other from the gall-bladder. Theſe two biles, however, do not eſſentially differ from each other. The hepatic bile indeed is milder, and more liquid than the cyſtic, which is conſtantly thicker and yellower; and by being bitterer, ſeems to poſſeſs greater activity than the other.

Every body knows the ſource of the hepatic bile, that it is ſecreted from the maſs of blood by the liver; but the origin of the cyſtic bile has occaſioned no little controverſy amongſt anatomical writers. There are ſome who contend, that it is ſeparated in the ſubſtance of the liver, from whence it paſſes into the gall-bladder through particular veſſels. In deer, and in ſome other quadrupeds, as well as in ſeveral birds and fiſhes, there is an evident communication, by means of particular veſſels, between the liver and the gall-bladder. Bianchi, Winſlow, and others, have aſſerted the exiſtence of ſuch veſſels in the human ſubject, and named them *hepaticyſtic ducts;* but it is certain that no ſuch ducts exiſt.—In obſtructions of the cyſtic duct, the gall-bladder has been found ſhrivelled and empty: ſo that we may conſider the gall-bladder as a reſervoir of hepatic bile; and that it is an eſtabliſhed fact, that the whole of the bile contained in the gall-bladder is derived from the liver; that it paſſes from the hepatic or the cyſtic duct, and from that to the gall-bladder. The difference in the colour, conſiſtence, and taſte of the bile, is merely the conſequence of ſtagnation and abſorption. When the ſtomach is diſtended with aliment, this reſervoir undergoes a certain degree of compreſſion, and the bile paſſes out into the inteſtinal canal; and in the efforts to vomit, the gall-bladder ſeems to be conſtantly affected, and at ſuch times diſcharges itſelf of its contents.

Sometimes

(c) The ancients, who were not acquainted with the real uſe of the liver, conſidered the bile as an excrementitious and uſeleſs fluid.

Of the Abdomen.

Sometime the bile concretes in the gall-bladder, ſo as to form what are called *gall ſtones* (D). When theſe concretions paſs into the cyſtic duct, they ſometimes occaſion exquiſite pain, by diſtending the canal in their way to the duodenum; and by lodging in the ductus choledochus communis, and obſtructing the courſe of the bile, this fluid will be abſorbed, and by being carried back into the circulation occaſion a temporary jaundice.

Sect. X. *Of the Spleen.*

99 The ſpleen is a ſoft and ſpongy viſcus, of a bluiſh colour, and about five or ſix fingers breadth in length, and three in width, ſituated in the left hypochondrium, between the ſtomach and the falſe ribs. That ſide of it which is placed on the ſide of the ribs is convex; and the other, which is turned towards the ſtomach, is concave.

The ſplenic artery, which is a branch from the cæliac, ſupplies this viſcus with blood, and a vein of the ſame name carries it back into the vena portæ.

Its nerves are derived from a particular plexus called the *ſplenic*, which is formed by branches of the intercoſtal nerve, and by the eighth pair, or par vagum.

The ancients, who ſuppoſed two ſorts of bile, conſidered the ſpleen as the receptacle of what they called *atra bilis*. Havers, who wrote profeſſedly on the bones, determined its uſe to be that of ſecreting the ſynovia; and the late Mr Hewſon imagined, that it concurred with the thymus and lymphatic glands of the body in forming the red globules of the blood. All theſe opinions ſeem to be equally fanciful. The want of an excretory duct has occaſioned the real uſe of this viſcus to be ſtill doubtful. Perhaps the blood undergoes ſome change in it, which may aſſiſt in the preparation of the bile. This is the opinion of the generality of modern phyſiologiſts; and the great quantity of blood with which it is ſupplied, together with the courſe of its veins into the vena portæ, ſeem to render this notion probable.

Sect. XI. *Of the Glandulæ Renales, Kidneys, and Ureters.*

100 The glandulæ renales, which were by the ancients ſuppoſed to ſecrete the atra bilis, and by them named *capſulæ atrabiliares*, are two flat bodies of an irregular figure, one on each ſide between the kidney and the aorta.

In the fœtus they are as large as the kidneys: but they do not increaſe afterwards in proportion to thoſe parts; and in adults and old people they are generally found ſhrivelled, and much waſted. They have their arteries and veins. Their arteries uſually ariſe from the ſplenic or the emulgent, and ſometimes from the aorta; and their veins go to the neighbouring veins, or to the vena cava. Their nerves are branches of the intercoſtal. Of the Abdomen.

The uſe of theſe parts is not yet perfectly known. In the fœtus the ſecretion of urine muſt be in a very ſmall quantity, and a part of the blood may perhaps then paſs through theſe channels, which in the adult is carried to the kidneys to ſupply the matter of urine.

101 Kidneys. The kidneys are two in number, ſituated one on the right and the other on the left ſide in the lumbar region, between the laſt falſe rib and the os ilium, by the ſides of the vertebræ. Each kidney in its figure reſembles a ſort of bean, which from its ſhape is called *kidney bean*. The concave part of each kidney is turned towards the aorta and vena cava aſcendens. They are ſurrounded by a good deal of fat, and receive a coat from the peritonæum; and when this is removed, a very fine membrane is found inveſting their ſubſtance and the veſſels which ramify through them.

Each kidney has a conſiderable artery and vein, which are called the *emulgent*. The artery is a branch from the aorta, and the vein paſſes into the vena cava. Their nerves, which everywhere accompany the blood veſſels, ariſe from a conſiderable plexus, which is derived from the intercoſtal.

In each kidney, which in the adult is of a pretty firm texture, there are three ſubſtances to be diſtinguiſhed (E). The outer part is glandular or cortical, beyond this is the vaſcular or tubular ſubſtance, and the inner part is papillary or membranous.

It is in the cortical part of the kidney that the ſecretion is carried on; the urine being here received from the minute extremities of the capillary arteries, is conveyed out of this cortical ſubſtance by an infinite number of very ſmall cylindrical canals or excretory veſſels, which conſtitute the tubular part. Theſe tubes, as they approach the inner ſubſtance of the kidney, gradually unite together; and thus forming larger canals, at length terminate in ten or twelve little protuberances called *papillæ*, the orifices of which may be ſeen without the aſſiſtance of glaſſes. Theſe papillæ open into a ſmall cavity or reſervoir called the *pelvis of the kidney*, and formed by a diſtinct membranous bag which embraces the papillæ. From this pelvis the urine is conveyed through a membranous canal which paſſes out from the hollow ſide of the kidney, a little below the blood veſſels, and is called *ureter*.

102 Ureters. The ureters are each about as large as a common writing pen. They are ſomewhat curved in their courſe from the kidneys, like the letter *ſ*, and at length terminate in the poſterior and almoſt inferior part of the bladder, at ſome diſtance from each other. They paſs into the bladder in the ſame manner as the ductus choledochus communis paſſes into the inteſtinum duodenum, not by a direct paſſage, but by an oblique courſe

(D) Theſe concretions ſometimes remain in the gall-bladder without cauſing any uneaſineſs. Dr Heberden relates, that a gall ſtone weighing two drachms was found in the gall-bladder of the late Lord Bath, though he had never complained of the jaundice, nor of any diſorder which he could attribute to that cauſe. *Med. Tranſ.* vol. ii.

(E) The kidneys in the fœtus are diſtinctly lobulated; but in the adult they become perfectly firm, ſmooth, and regular.

Of the Abdomen.

courſe between the two coats; ſo that the diſcharge of urine into the bladder is promoted, whilſt its return is prevented. Nor does this mode of ſtructure prevent the paſſage of fluids only from the bladder into the ureters, but likewiſe air:—for air thrown into the bladder inflates it, and it continues to be diſtended if a ligature is paſſed round its neck; which ſeems to prove ſufficiently that it cannot paſs into the ureters.

Sect. XII. *Of the Urinary Bladder.*

103 The urinary bladder is a membranous and muſcular bag of an oblong roundiſh ſhape, ſituated in the pelvis, between the os pubis and inteſtinum rectum in men, and between the os pubis and uterus in women. Its upper and wideſt part is uſually called the *bottom*, its narrower part the *neck* of the bladder; the former only is covered by the peritonæum.

The bladder is formed of three coats, connected together by means of cellular membrane. The external or peritonæal, is only a partial one, covering the upper and back part of the bladder. The middle, or muſcular coat, is compoſed of irritable, and of courſe muſcular fibres, which are moſt collected around the neck of the bladder, but not ſo as to form a diſtinct muſcle, or ſphincter, as the generality of anatomiſts have hitherto ſuppoſed.

The inner coat, though much ſmoother, has been ſaid to reſemble the villous tunic of the inteſtines, and like that is provided with a mucus, which defends it againſt the acrimony of the urine.

104 Of the urine.

It will be eaſily conceived from what has been ſaid, that the kidneys are two glandular bodies, through which a ſaline and excrementitious fluid called *urine* is conſtantly filtering from the maſs of blood.

While only a ſmall quantity of urine is collected in the bladder, it excites no kind of uneaſineſs: but when a greater quantity is accumulated, ſo that the bladder is diſtended in a certain degree, it excites in us a certain ſenſation, which brings on as it were a voluntary contraction of the bladder to promote its diſcharge.—But this contraction is not effected by the muſcular fibres of the bladder alone: for all the abdominal muſcles contract in obedience to our will, and preſs downwards all the viſcera of the lower belly; and theſe powers being united, at length overcome the reſiſtance of the fibres ſurrounding the neck of the bladder, which dilates and affords a paſſage to the urine through the urethra.

The frequency of this evacuation depends on the quantity of urine ſecreted; on the degree of acrimony it poſſeſſes; on the ſize of the bladder, and on its degree of ſenſibility.

The urine varies much in its colour and contents. Theſe varieties depend on age, ſex, climate, diet, and other circumſtances. In infants it is generally a clear watery fluid, without ſmell or taſte. As we advance in life, it acquires more colour and ſmell, and becomes more impregnated with ſalts. In old people it becomes ſtill more acrid and fetid.

In a healthy ſtate it is nearly of a ſtraw colour.—After being kept for ſome time, it depoſites a tartarous matter, which is found to be compoſed chiefly of earth and ſalt, and ſoon incruſts the ſides of the veſſel in which it is contained. While this ſeparation is taking place, appearances like minute fibres or threads of a whitiſh colour, may be ſeen in the middle of the urine, and an oily ſcum obſerved floating on its ſurface. So that the moſt common appearances of the urine are ſufficient to aſcertain that it is a watery ſubſtance, impregnated with earthy, ſaline, and oily particles.

Of the Abdomen.

The urine is not always voided of the ſame colour and conſiſtence; for theſe are found to depend on the proportion of its watery part to that of its other conſtituent principles.—Its colour and degree of fluidity ſeem to depend on the quantity of ſaline and inflammable particles contained in it: ſo that an increaſed proportion of thoſe parts will conſtantly give the urine a higher colour, and add to the quantity of ſediment.

The variety in the appearances of the urine, depends on the nature and quantity of ſolid and fluid aliment we take in; and it is likewiſe occaſioned by the different ſtate of the urinary veſſels, by which we mean the channels through which it is ſeparated from the blood, and conveyed through the pelvis into the ureters. The cauſes of calculous concretions in the urinary paſſages, are to be looked for in the natural conſtitution of the body, mode of life, &c.

It having been obſerved, that after drinking any light wine or Spa water, it very ſoon paſſed off by urine, it has been ſuppoſed by ſome, that the urine is not altogether conveyed to the bladder by the ordinary courſe of circulation, but that there muſt certainly exiſt ſome other ſhorter means of communication, perhaps by certain veſſels between the ſtomach and the bladder, or by a retrograde motion in the lymphatics. But it is certain, that if we open the belly of a dog, preſs out the urine from the bladder, paſs a ligature round the emulgent arteries, and then ſew up the abdomen, and give him even the moſt diuretic liquor to drink, the ſtomach and other channels will be diſtended with it, but not a drop of urine will be found to have paſſed into the bladder; or the ſame thing happens when a ligature is thrown round the two ureters. This experiment then ſeems to be a ſufficient proof, that all the urine we evacuate is conveyed to the kidneys through the emulgent arteries, in the manner we have deſcribed.—It is true, that wine and other liquors promote a ſpeedy evacuation of urine: but the diſcharge ſeems to be merely the effect of the ſtimulus they occaſion; by which the bladder and urinary parts are ſolicited to a more copious diſcharge of the urine, which was before in the body, and not immediately of that which was laſt drank; and this increaſed diſcharge, if the ſupply is kept up, will continue: nor will this appear wonderful, if we conſider the great capacity of the veſſels that go to the kidneys; the conſtant ſupply of freſh blood that is eſſential to health; and the rapidity with which it is inceſſantly circulated through the heart to all parts of the body.

Sect. XIII. *Of Digeſtion.*

105 We are now proceeding to ſpeak of *digeſtion*, which ſeems to be introduced in this place with propriety, after a deſcription of the abdominal viſcera, the greater part of which contribute to this function. By *digeſtion* is to be underſtood, the changes the aliment undergoes

Of the Abdomen.

dergoes for the formation of chyle:—theſe changes are effected in the mouth, ſtomach, and ſmall inteſtines.

The mouth, of which every body has a general knowledge, is the cavity between the two jaws, formed anteriorly and laterally by the lips, teeth, and cheeks, and terminating poſteriorly in the throat.

The lips and cheeks are made up of fat and muſcles, covered by the cuticle, which is continued over the whole inner ſurface of the mouth, like a fine and delicate membrane.—Beſides this membrane, the inſide of the mouth is furniſhed with a ſpongy and very vaſcular ſubſtance called the *gums*, by means of which the teeth are ſecured in their ſockets. A ſimilar ſubſtance covers the roof of the mouth, and forms what is called the *velum pendulum palati*, which is fixed to the extremity of the arch formed by the oſſa maxillaria and oſſa palati, and terminates in a ſoft, ſmall, and conical body, named *uvula*; which appears, as it were, ſuſpended from the middle of the arch over the baſis of the tongue.

The velum pendulum palati performs the office of a valve between the cavity of the mouth and the pharynx, being moved by ſeveral muſcles (F).

The tongue is compoſed of ſeveral muſcles (G) which enable it to perform a variety of motions for the articulation of the voice; for the purpoſes of maſtication; and for conveying the aliment into the pharynx. Its upper part is covered with papillæ, which conſtitute the organ of taſte, and are eaſily to be diſtinguiſhed; it is covered by the ſame membrane that lines the inſide of the mouth, and which makes at its inferior part towards its baſis a reduplication called *frænum*.

Poſteriorly, under the velum palati, and at the baſis of the tongue, is the pharynx; which is the beginning of the œſophagus, ſtretched out every way, ſo as to reſemble the top of a funnel, through which the aliment paſſes into the ſtomach.

The mouth has a communication with the noſtrils at its poſterior and upper part; with the ears, by the Euſtachian tubes; with the lungs, by means of the larynx; and with the ſtomach, by means of the œſophagus.

The pharynx is conſtantly moiſtened by a fluid, ſecreted by two conſiderable glands called the *tonſils*, one on each ſide of the velum palati. Theſe glands, from their ſuppoſed reſemblance to almonds, have likewiſe been called *amygdalus*.

The mouth is moiſtened by a conſiderable quantity of ſaliva. This fluid is derived from the *parotid glands*; a name which by its etymology points out their ſituation to be near the ears. They are two in number, one on each ſide under the os malæ: and they are of the conglomerate kind; being formed of many ſmaller glands, each of which ſends out a very ſmall excretory duct, which unites with the reſt, to form one common channel, that runs over the cheek, and piercing the buccinator muſcle, opens into the mouth on each ſide, by an orifice into which a briſtle may be eaſily introduced.

—Beſides theſe, the maxillary glands, which are placed near the inner ſurface of the angle of the lower jaw on each ſide; the ſublingual glands, which are ſituated at the root of the tongue; the glands of the palate, which are ſeated in the velum palati; and thoſe of the cheeks, lips, &c. together with many other leſs conſiderable ones,—pour the ſaliva into the mouth though their ſeveral excretory ducts.

The ſaliva, like all the other humours of the body, is found to be different in different people; but in general, it is a limpid and inſipid fluid, without ſmell in healthy ſubjects; and theſe properties would ſeem to prove, that it contains very few ſaline or inflammable particles.

The uſes of the ſaliva ſeem to be to moiſten and lubricate the mouth, and to aſſiſt in reducing the aliment into a ſoft pulp before it is conveyed into the ſtomach.

106 Of hunger and thirſt.

The variety of functions which are conſtantly performed by the living body, muſt neceſſarily occaſion a continual waſte and diſſipation of its ſeveral parts. A great quantity is every day thrown off by the inſenſible perſpiration and other diſcharges; and were not theſe loſſes conſtantly recruited by a freſh ſupply of chyle, the body would ſoon effect its own diſſolution. But nature has very wiſely favoured us with organs fitted to produce ſuch a ſupply; and has at the ſame time endued us with the ſenſations of hunger and thirſt, that our attention may not be diverted from the neceſſary buſineſs of nutrition. The ſenſation of hunger is univerſally known; but it would perhaps be difficult to deſcribe it perfectly in words. It may, however be defined to be a certain uneaſy ſenſation in the ſtomach, which induces us to wiſh for ſolid food; and which likewiſe ſerves to point out the proper quantity, and time for taking it. In deſcribing the ſtomach, mention was made of the gaſtric juice, as everywhere lubricating its inner coat. This humour mixes itſelf with the aliment in the ſtomach, and helps to prepare it for its paſſage into the inteſtines; but when the ſtomach is perfectly empty, this ſame fluid irritates the coats of the ſtomach itſelf, and produces the ſenſation of hunger.

A certain proportion of liquid aliment is required to aſſiſt in the proceſs of digeſtion, and to afford that moiſture to the body, of which there is ſuch a conſtant diſſipation. Thirſt induces us to take this neceſſary ſupply of drink; and the ſeat of this ſenſation is in the tongue, fauces, and œſophagus, which from their great ſenſibility are required to be kept moiſt: for though the fauces are naturally moiſtened by the mucus and ſalival juices; yet the blood, when deprived of its watery part, or rendered acrimonious by any natural cauſes, never fails particularly to affect theſe parts, and the whole alimentary canal, and to occaſion thirſt.—This is the common effect of fevers and of hard labour, by both which too much of the watery part of the blood is diſſipated.

It has been obſerved, that the aliment undergoes

(F) Theſe are the circumflexus palati, levator palati mollis, palato-pharyngæus conſtrictor iſthmi faucium, and azygos uvulæ.

(G) Theſe are, the genio-gloſſus, hyo-gloſſus, lingualis, and ſtylo-gloſſus.

Of the Abdomen.

107 Of mastication and deglutition.

some preparation in the mouth before it passes into the stomach; and this preparation is the effect of mastication. In treating of the upper and lower jaws, mention was made of the number and arrangement of the teeth. The upper jaw was described as being immoveable; but the lower jaw was spoken of as being capable of elevation and depression, and of a grinding motion. The aliment, when first carried into the mouth, is pressed between the teeth of the two jaws, by a very strong and frequent motion of the lower jaw; and the tongue and the cheeks assisting in this process, continue to replace the food between the teeth till it is perfectly divided, and reduced to the consistence of pulp. The incisores and canini divide it first into smaller pieces, but it is between the surfaces of the dentes molares by the grinding motion of the jaw that the mastication is completed.

During this process, the salival glands being gently compressed by the contraction of the muscles that move the lower jaw, pour out their saliva: this helps to divide and break down the food, which at length becomes a kind of pulp, and is then carried over the basis of the tongue into the fauces. But to effect this passage into the œsophagus, it is necessary that the other openings which were mentioned as having a communication with the mouth as well as the pharynx, should be closed; that none of the aliment, whether solid or liquid, may pass into them, whilst the pharynx alone is dilated to receive it:—And such a disposition actually takes place in a manner we will endeavour to describe.

The trachea arteria, or windpipe, through which the air is conveyed to the lungs, is placed before the œsophagus—in the act of swallowing; therefore, if the *larynx* (for so the upper part of the trachea is called) is not closed, the aliment will pass into it in its way to the œsophagus. But this is prevented by a small and very elastic cartilage, called *epiglottis*, which is attached only to the fore part of the larynx; so that the food in its passage to the œsophagus presses down this cartilage, which then covers the glottis or opening of the larynx; and at the same time the velum palati being capable of some degree of motion, is drawn backwards by its muscles, and closes the openings into the nose and the Eustachian tubes.—This, however, is not all. The larynx, which being composed of cartilaginous rings cannot fail in its ordinary state to compress the membranous canal of the œsophagus, is in the act of deglutition carried forwards and upwards by muscles destined for that purpose; and consequently drawing the fore part of the pharynx with it, that opening is fully dilated. When the aliment has reached the pharynx, its descent is promoted by its own proper weight, and by the muscular fibres of the œsophagus, which continue to contract from above downwards, until the aliment has reached the stomach. That these fibres have no inconsiderable share in deglutition, any person may experience, by swallowing with his head downwards, when the descent of the aliment cannot possibly be effected by its weight.

Of the Abdomen.

It is necessary that the nostrils and the lungs should communicate with the mouth, for the purposes of speech and respiration; but if the most minute part of our food happens to be introduced into the trachea, it never fails to produce a violent cough, and sometimes the most alarming symptoms. This is liable to happen when we laugh or speak in the act of deglutition; the food is then said to have passed the wrong way. And indeed this is not improperly expressed: for death would soon follow, if the quantity of aliment introduced into the trachea should be sufficient to obstruct the respiration only during a very short time; or if the irritating particles of food should not soon be thrown up again by means of the cough, which in these cases very seasonably increases in proportion to the degree of irritation.

If the velum palati did not close the passage to the nostrils, deglutition would be performed with difficulty, and perhaps not at all; for the aliment would return through the nose, as is sometimes the case in drinking. Children, from a deficiency in this velum palati, have been seen to die a few hours after birth; and they who from disease or any other causes have not this part perfect, swallow with difficulty.

The aliment, after having been sufficiently divided by the action of the teeth, and attenuated by the saliva, is received into the stomach, where it is destined to undergo a more considerable change.

The properties of the aliment not being much altered at its first entrance into the stomach, and before it is thoroughly blended with the gastric juice, it is capable of irritating the inner coat of the stomach to a certain degree, and occasions a contraction of its two orifices.—In this membranous bag, surrounded by the abdominal viscera, and with a certain degree of natural heat, the aliment undergoes a constant agitation by means of the abdominal muscles and of the diaphragm, and likewise by a certain contraction or expansion of the muscular fibres of the stomach itself. By this motion, every part of the food is exposed to the action of the gastric juice, which gradually divides and attenuates it, and prepares it for its passage into the intestines.

Some observations lately published by Mr Hunter in the Philosophical Transactions tend to throw considerable light on the principles of digestion. There are few dead bodies in which the stomach, at its great end, is not found to be in some degree digested (H). Animals, or parts of animals, possessed of the living principle,

(H) The Abbé Spallanzani, who has written upon digestion, found, from a variety of experiments made upon quadrupeds, birds, and fishes, that digestion goes on for some time after death, though far less considerable than in living animals: but heat is necessary in many animals, or at least promotes it in a much greater degree. He found also, that when the stomach was cut out of the body, it had somewhat of the power of digestion, though this was trifling when compared with that which took place when the stomach was left in the body. In not one of the animals was the great curvature of the stomach dissolved, or much eroded after death. There was often a little erosion, especially in different fishes; in which, when he had cleared the stomach of its contents, the internal coat was wanting. In other animals there was only a slight excoriation: and the injury

Of the Abdomen.

principle, when taken into the ſtomach, are not in the leaſt affected by the action of that viſcus; but the moment they loſe the living principle, they become ſubject to its digeſtive powers. This ſeems to be the caſe with the ſtomach, which is enabled to reſiſt the action of its juices in the living body: but when deprived of the living principle, it is then no longer able to reſiſt the powers of that menſtruum, which it had itſelf formed for the digeſtion of its contents; the proceſs of digeſtion appearing to be continued after death. This is confirmed by what happens in the ſtomachs of fiſhes: They frequently ſwallow, without maſtication, fiſh which are larger than the digeſting parts of their ſtomach can contain; and in ſuch caſes, that part which is taken into the ſtomach, is more or leſs diſſolved, while that part which remains in the œſophagus is perfectly ſound; and here, as well as in the human body, the digeſting part of the ſtomach is often reduced to the ſame ſtate as the digeſted part of the food. Theſe appearances tend to prove, that digeſtion is not effected by a mechanical power, by contractions of the ſtomach, or by heat; but by a fluid ſecreted in the coats of the ſtomach, which is poured into its cavity, and there animalizes the food, or aſſimilates it to the nature of blood.

From ſome late experiments by M. Sage*, it appears, that inflammable air has the property of deſtroying and diſſolving the animal texture: And as we ſwallow with the ſubſtances which ſerve us for food a great quantity of atmoſpherical air, M. Sage thinks it poſſible, that dephlogiſticated, which is its principle, may be converted in the ſtomach into inflammable air, or may modify into inflammable air a portion of the oily ſubſtance which is the principle of aliments. In this caſe, would not the inflammable air (he aſks), by diſſolving our food, facilitate its converſion into chyle?

* *Hiſt. de l'Academie Royale des Sciences, &c. pour* 1784. mem. 15.

Be this as it may, the food, after having remained one, two, or three hours in the ſtomach, is converted into a grayiſh pulp, which is uſually called *chymus*, a word of Greek etymology, ſignifying *juice*, and ſome few milky or chylous particles begin to appear.—But the term of its reſidence in this bag is proportioned to the nature of the aliment, and to the ſtate of the ſtomach and its juices. The thinner and more perfectly digeſted parts of the food paſs by a little at a time into the duodenum, through the pylorus, the fibres of which relax to afford it a paſſage; and the groſſer and leſs digeſted particles remain in the ſtomach, till they acquire a ſufficient fluidity to paſs into the inteſtines, where the nature of the chymus is perfectly changed. The bile and pancreatic juice which flow into the duodenum, and the mucus, which is everywhere diſtilled from the ſurface of the inteſtines, mix themſelves with the alimentary pulp, which they ſtill farther attenuate and diſſolve, and into which they ſeem to infuſe new properties.

Two matters very different from each other in their nature and deſtination, are the reſult of this combination.—One of theſe, which is compoſed of the liquid parts of the aliment, and of ſome of its more ſolid particles, extremely divided and mixed with the juices we have deſcribed, conſtitutes a very mild, ſweet, and whitiſh fluid reſembling milk, and diſtinguiſhed by the name of *chyle*. This fluid is abſorbed by the lacteal veins, which convey it into the circulation, where, by being aſſimilated into the nature of blood, it affords the ſupply of nutrition, which the continual waſte of that body is found to require.—The other is the remains of the alimentary maſs deprived of all its nutritious particles, and containing only ſuch parts as were rejected by the abſorbing mouths of the lacteals. This groſſer part, called the *fæces*, paſſes on through the courſe of the inteſtines, to be voided at the anus, as will be explained hereafter; for this proceſs in the œconomy cannot be well underſtood till the motion of reſpiration has been explained. But the ſtructure of the inteſtines is a ſubject which may be properly deſcribed in this place, and deſerves to be attended to.

Of the Abdomen.

It has been already obſerved, that the inteſtinal canal is five or ſix times as long as the body, and that it forms many circumvolutions in the cavity of the abdomen, which it traverſes from the right to the left, and again from the left to the right; in one place deſcending, and in another extending itſelf upwards. It was noticed likewiſe, that the inner coat of the inteſtines, by being more capacious than their exterior tunics, formed a mutitude of plaits placed at a certain diſtance from each other, and called *valvulæ conniventes*. Now this diſpoſition will be found to afford a farther proof of that divine wiſdom, which the anatomiſt and phyſiologiſt cannot fail to diſcover in all their purſuits. —For if the inteſtinal canal was much ſhorter than it naturally is; if inſtead of the preſent circumvolution, it paſſed in a direct courſe from the ſtomach; and if its inner ſurface was ſmooth and deſtitute of valves; the aliment would conſequently paſs with great rapidity to the anus, and ſufficient time would be wanting to aſſimilate the chyle, and for the neceſſary abſorption of it into the lacteals: ſo that the body would be deprived of the ſupply of nutrition, which is ſo eſſential to life and health; but the length and circumvolutions of the inteſtines, the inequality of their internal ſurface, and the courſe of the aliment through them, all concur to perfect the ſeparation of the chyle from the fæces, and to afford the neceſſary nouriſhment to the body.

Sect. XIV. *Of the Courſe of the Chyle, and of the Lymphatic Syſtem.*

An infinite number of very minute veſſels, called the *lacteal veins*, ariſe like net-work from the inner ſurface of the inteſtines (but principally from the *jejunum* and *ileum*), which are deſtined to imbibe the nutritious fluid or chyle. Theſe veſſels, which were diſcovered by Aſellius in 1622 (1), paſs obliquely through the coats 108

jury in all of them was at the inferior part, or great curvature. The coats of the ſtomach ſuffer leſs after death than fleſh, or part of the ſtomach of ſimilar animals put into it: The author aſſigns as a reaſon for this, that theſe bodies are inveſted on all ſides by the gaſtric fluid, whereas it only acts on the internal ſurface of the ſtomach.

(1) We are informed by Galen, that the lacteals had been ſeen in kids by Eraſiſtratus, who conſidered them as

Of the Abdomen.

of the inteſtine, and running along the meſentery, unite as they advance, and form larger branches, all of which paſs through the meſenteric or conglobate glands, which are very numerous in the human ſubject. As they run between the inteſtines and theſe glands, they are ſtyled *venæ lacteæ primi generis:* but after leaving theſe glands they are found to be leſs numerous, and being increaſed in ſize, are then called *venæ lacteæ ſecundi generis*, which go to depoſite their contents in the *thoracic duct*, through which the chyle is conveyed into the blood.

The *thoracic duct* begins about the lower part of the firſt vertebra lumborum, from whence it paſſes up by the ſide of the aorta, between that and the vena azygos, cloſe to the vertebræ, being covered by the pleura. Sometimes it is found divided into two branches; but they uſually unite again into one canal, which opens into the left ſubclavian vein, after having run a little way in an oblique courſe between its coats. The ſubclavian vein communicates with the vena cava, which paſſes to the right auricle of the heart.

The lower part of this duct being uſually larger than any other part of it, has been named *receptaculum chyli*, or *Pecquet's receptacle*, in honour of the anatomiſt who firſt diſcovered it in 1651. In ſome quadrupeds, in turtle and in fiſh, this enlargement * is more conſiderable in proportion to the ſize of the duct, than it uſually is in the human ſubject, where it is not commonly found large enough to merit the name of *receptaculum*.

* *Hewſon's Exp. Inq.* Part II.

Opportunities of obſerving the lacteals in the human ſubject do not often occur; but they may be eaſily demonſtrated in a dog or any other quadruped that is killed two or three hours after feeding upon milk, for then they appear filled with white chyle.

But theſe *lacteals* which we have deſcribed, as paſſing from the inteſtines through the meſentery to the thoracic duct, compoſe only a part of a ſyſtem of veſſels which perform the office of *abſorption*, and which conſtitute, with their common trunk, the thoracic duct, and the conglobate glands that are diſperſed through the body, what may be ſtyled the *lymphatic ſyſtem*. So that what is ſaid of the ſtructure of one of theſe ſeries of veſſels may very properly be applied to that of the other.

Of the Abdomen.

109 Lymphatic veſſels.

The *lymphatic veins* (κ) are minute pellucid tubes, which, like the lacteals, direct their courſe towards the centre of the body, where they pour a colourleſs fluid into the thoracic duct. The lymphatics from all the lower parts of the body gradually unite as they approach this duct, into which they enter by three or four very large trunks, that ſeem to form the lower extremity of this canal, or *receptaculum chyli*, which may be conſidered as the great trunk of the lymphatic ſyſtem. The lacteals open into it near the ſame place; and the lymphatics, from a large ſhare of the upper parts of the body, pour their lymph into different parts of this duct as it runs upwards, to terminate in the left ſubclavian vein. The lymphatics from the right ſide of the neck, thorax, and right arm, &c. terminate in the right ſubclavian vein.

As the lymphatics commonly lie cloſe to the large blood veſſels, a ligature paſſed round the crural artery in a living animal, by encloſing the lymphatics, will occaſion a diſtention of theſe veſſels below the ligature, ſo as to demonſtrate them with eaſe; and a ligature paſſed round the thoracic duct, inſtantly after killing an animal, will, by ſtopping the courſe of its contents into the ſubclavian vein, diſtend not only the lacteals, but alſo the lymphatics in the abdomen and lower extremities, with their natural fluids (λ).

The coats of theſe veſſels are too thin to be ſeparated from each other; but the mercury they are capable of ſuſtaining, proves them to be very ſtrong; and their great power of contraction, after undergoing conſiderable diſtention, together with the irritability with which Baron Haller found them to be endued *, ſeems to render it probable, that, like the blood veſſels, they have a muſcular coat.

* *Sur le mouvement du ſang*, Ex. 295, 298.

The lymphatics are nouriſhed after the ſame manner as

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as arteries carrying a milky fluid: but from the remote time in which he lived, they do not ſeem to have been noticed till they were diſcovered in a living dog by Aſellius, who denominated them *lacteals*, and conſidered them as ſerving to convey the chyle from the inteſtines to the liver; for before the diſcovery of the thoracic duct, the uſe of the liver was univerſally ſuppoſed to be that of converting the chyle into blood. But the diſcovery of the thoracic duct by Pecquet, not long after, corrected this error. Pecquet very candidly confeſſes, that his diſcovery accidentally aroſe from his obſerving a white fluid, mixed with the blood, flowing out of the vena cava, after he had cut off the heart of a living dog; which he ſuſpected to be chyle, and afterwards traced to its ſource from the thoracic duct: This duct had been ſeen near an hundred years before in a horſe by Euſtachius, who ſpeaks of it as a vein of a particular ſtructure, but without knowing any thing of its termination or uſe.

(κ) The arteries in their courſe through the body becoming gradually too minute to admit the red globules of the blood, have then been ſtyled *capillary* or *lymphatic arteries*. The veſſels which are here deſcribed as conſtituting the lymphatic ſyſtem, were at firſt ſuppoſed to be continued from thoſe arteries, and to convey back the lymph, either into the red veins or the thoracic duct; the office of abſorption having been attributed to the *red veins*. But we know that the *lymphatic veins* are not continuations of the *lymphatic arteries*, but that they conſtitute the *abſorbent ſyſtem*. There are ſtill, however, ſome very reſpectable names among the anatomiſts of the preſent age, who contend, that the red veins act likewiſe as abſorbents: but it ſeems to have been clearly proved, that the red veins do abſorb nowhere but in the cavernous cells of the penis, the erection of which is occaſioned by a diſtention of thoſe cells with arterial blood.

(λ) In the dead body they may be eaſily demonſtrated by opening the artery ramifying through any viſcus, as in the ſpleen, for inſtance, and then throwing in air; by which the lymphatics will be diſtended. One of them may then be punctured, and mercury introduced into it through a blowpipe.

Of the Abdomen.

as all the other parts of the body. For even the moſt minute of theſe veſſels are probably ſupplied with ſtill more minute arterics and vcins. This ſeems to be proved by the inflammation of which they are ſuſceptible; and the painful ſwellings which ſometimes take place in lymphatic veſſels, prove that they have nerves as well as blood veſſels.

Both the lacteals, lymphatics, and thoracic duct, are furniſhed with valves, which are much more common in theſe veſſels than in the red veins. Theſe valves are uſually in pairs, and ſerve to promote the courſe of the chyle and lymph towards the thoracic duct, and to prevent its return. Mention has been made of the glands, through which the lacteals paſs in their courſe through the meſentery; and it is to be obſerved, that the lymphatics paſs through ſimilar glands in their way to the thoracic duct. Theſe glands are all of the conglobate kind, but the changes which the chyle and lymph undergo in their paſſage through them, havc not yct been aſcertained.

The *lymphatic veſſels* begin from ſurfaces and cavities in all parts of the body as *abſorbents*. This is a fact now univerſally allowed; but how the fluids they abſorb are poured into thoſe cavities, is a ſubject of controverſy. The contents of the abdomen, for inſtance, were deſcribed as being conſtantly moiſtened by a very thin watery fluid. The ſame thing takes place in the pericardium, pleura, and all the other cavities of the body, and this watery fluid is the *lymph*. But whether it is exhaled into thoſe cavities through the minute ends of arteries, or tranſuded through their coats, are the points in diſpute. We cannot here be permitted to relate the many ingenious arguments that have been advanced in favour of each of theſe opinions; nor is it perhaps of conſequence to our preſent purpoſe to enter into the diſpute. It will be ſufficient if the reader can form an idea of what the lymph is, and of the manner in which it is abſorbed.

The *lymph*, from its tranſparency and want of colour, would ſeem to be nothing but water; and hence the firſt diſcoverers of theſe veſſels ſtyled them *ductus aquoſi*: but experiments prove, that the lymph of a healthy animal coagulates by being expoſed to the air, or a certain degree of heat, and likewiſe by being ſuffered to reſt; ſeeming to agree in this property with that part of the blood called the *coagulable lymph*.—This property of the lymph leads to determine its uſe, in moiſtening and lubricating the ſeveral cavities of the body in which it is found; and for which, by its gelatinous principle, it ſeems to be much better calculated than a pure and watery fluid would be, for ſuch it has been ſuppoſed to be by ſome anatomiſts.

Of the Abdomen.

The mouths of the *lymphatics* and *lacteals*, by acting as capillary tubes, ſeem to abſorb the *lymph* and *chyle* ſomewhat in the ſame manner as a capillary tube of glaſs, when put into a baſon of water, is enabled to attract the water into it to a certain height: but it is probable that they likewiſe poſſeſs a living power, which aſſiſts in performing this office. In the human body the *lymph*, or the *chyle*, is probably conveyed upon this principle as far as the firſt pair of valves, which ſeem to be placed not far from the orifice of the abſorbing veſſel, whether *lymphatic* or *lacteal*; and the fluid will then be propelled forwards, by a continuation of the abſorption at the orifice. But this does not ſeem to be the only inducement to its progreſs towards the thoracic duct; theſe veſſels have probably a muſcular coat, which may ſerve to preſs the fluid forwards from one pair of valves to another; and as the large lymphatic veſſels and the thoracic duct are placed cloſe to the large arteries, which have a conſiderable pulſation, it is reaſonable to ſuppoſe, that they derive ſome advantages from this ſituation.

Sect. XV. *Of the Generative Organs; of Conception*, &c.

§ 1. *The Male Organs.*

The male organs of generation have been uſually 110
divided into the parts which ſerve to prepare the ſemen from the blood, and thoſe which are deſtined to convey it into the womb. But it ſeems to be more proper to diſtinguiſh them into the *preparing*, the *containing*, and the *expelling* parts, which are the different offices of the *teſtes*, the *veſiculæ ſeminales*, and the *penis*; and this is the order in which we propoſe to deſcribe them.

The teſtes are two glandular bodies, ſerving to ſecrete the ſemen from the blood. They are originally formed and lodged within the cavity of the abdomen; and it is not till after the child is born, or very near that time, that they begin to paſs into the groin, and from thence into the ſcrotum (M). By this diſpoſition they are very wiſely protected from the injuries to which they would be liable to be expoſed, from the different poſitions of the child at the time of parturition.

The teſticles in this ſtate are looſely attached to the pſoæ muſcles, by means of the peritonæum by which they are covered; and they are at this time of life connected in a very particular manner to the parietes of the abdomen, and likewiſe to the ſcrotum, by means of a ſubſtance which Mr Hunter calls the *ligament* or *gubernaculum teſtis*, becauſe it connects the teſtis with the ſcrotum,

(M) It ſometimes happens in diſſecting ruptures, that the inteſtine is found in the ſame ſac, and in contact with the teſtis. This appearance was at firſt attributed to a ſuppoſed laceration of the peritonæum; but later obſervations, by pointing out the ſituation of the teſticles in the fœtus, have led to prove, that the teſtis, as it deſcends into the ſcrotum, carries with it a portion or elongation of the peritonæum, which becomes its tunica vaginalis, or a kind of ſac, in which the teſticle is lodged, as will be explained in the courſe of this ſection. The communication between this ſac and the cavity of the abdomen is uſually ſoon cut off; but in ſome ſubjects it continues open during life; and when a hernia or deſcent of the inteſtine takes place in ſuch a ſubject, it does not puſh down a portion of the peritonæum before it, as it muſt otherwiſe neceſſarily do, but paſſes at once through this opening, and comes in contact with the naked teſticle, conſtituting that particular ſpecies of rupture called *hernia congenita*.

ſcrotum, and directs its courſe in its deſcent. This gubernaculum is of a pyramidal form, with its bulbous head fixed to the lower end of the teſtis and epididymis, and loſes its lower and ſlender extremity in the cellular membrane of the ſcrotum. It is difficult to aſcertain what the ſtructure and compoſition of this gubernaculum is, but it is certainly vaſcular and fibrous; and from certain circumſtances, it would ſeem to be in part compoſed of the cremaſter muſcle, running upwards to join the lower end of the teſtis.

We are not to ſuppoſe that the teſticle, when deſcended into the ſcrotum, is to be ſeen looſe as a piece of gut or omentum would be in a common hernial ſac. We have already obſerved, that during its reſidence in the cavity of the abdomen it is attached to the peritonæum, which deſcends with it; ſo that when the ſac is completed in the ſcrotum, the teſticle is at firſt attached only to the poſterior part of it, while the fore part of it lies looſe, and for ſome time affords a communication with the abdomen. The ſpermatic chord, which is made up of the ſpermatic artery and vein, and of the vas deferens or excretory duct of the teſtis, is cloſely attached behind to the poſterior part of this elongation of the peritonæum. But the fore part of the peritoneal ſac, which is at firſt looſe and not attached to the teſticle, cloſes after a certain time, and becomes united to the poſterior part, and thus perfectly ſurrounds the teſticle as it were in a purſe.

The teſticles of the fœtus differ only in their ſize and ſituation from thoſe of the adult. In their paſſage from the abdomen they deſcend through the abdominal rings into the ſcrotum, where they are ſupported and defended by various integuments.

What the immediate cauſe of this deſcent is, has not yet been ſatisfactorily determined. It has been aſcribed to the effects of reſpiration, but the teſticles have ſometimes been found in the ſcrotum before the child has breathed; and it does not ſeem to be occaſioned by the action of the cremaſter muſcle, becauſe the ſame effect would be liable to happen in the hedgehog and ſome other quadrupeds, whoſe teſticles remain in the abdomen during life.

The ſcrotum, which is the external or common covering of both teſticles, is a kind of ſac formed by the common integuments, and externally divided into two equal parts by a prominent line called *raphe*.

In the inner part of the ſcrotum we meet with a cellular coat called *dartos* (N), which by its duplicature divides the ſcrotum into two equal parts, and forms what is called *ſeptum ſcroti*, which correſponds with the raphe. The collapſion which is ſo often obſerved to take place in the ſcrotum of the healthy ſubject, when excited by cold or by the ſtimulus of venery, ſeems to be very properly attributed to the contractile motion of the ſkin, and not to any muſcular fibres, as is the caſe in dogs and ſome other quadrupeds.

The ſcrotum, then, by means of its ſeptum, is found to make two diſtinct bags, in which the teſticles, inveſted by their proper tunics, are ſecurely lodged and ſeparated from each other. Theſe coats are the cremaſter, the tunica vaginalis, and the tunica albuginea. The firſt of theſe is compoſed of muſcular fibres, and is to be conſidered only as a partial covering of the teſtis; for it ſurrounds only the ſpermatic chord, and terminates upon the upper and external parts of the tunica vaginalis teſtis, ſerving to draw up and ſuſpend the teſticle (O). The tunica vaginalis teſtis has already been deſcribed as being a thin production of the peritonæum looſely adhering everywhere to the teſticle, which it includes as it were in a bag. The tunica albuginea is a firm, white, and very compact membrane of a gliſtening appearance, which immediately inveſts the body of the teſtis and the epididymis; ſerving in ſome meaſure to connect them to each other, but without extending itſelf at all to the ſpermatic chord. This tunica albuginea ſerves to confine the growth of the teſtis and epididymis within certain limits, and by giving them a due degree of firmneſs, enables them to perform their proper functions.

Having removed this laſt tunic, we diſcover the ſubſtance of the teſticle itſelf, which appears to be made up of an infinite number of very elaſtic filaments, which may be beſt diſtinguiſhed after macerating the teſticle in water. Each teſticle is made up of the ſpermatic artery and vein, and the excretory veſſels or tubuli ſeminiferi. There are likewiſe a great number of abſorbent veſſels, and ſome branches of nerves to be met with in the teſticles.

The ſpermatic arteries ariſe one on each ſide from the aorta, generally about an inch below the emulgents. The right ſpermatic vein commonly paſſes into the vena cava; but the left ſpermatic vein uſually empties itſelf into the emulgent on that ſide; and it is ſuppoſed to take this courſe into the emulgent, that it may avoid paſſing over the aorta, which it would be obliged to do in its way to the vena cava.

The blood is circulated very ſlowly through the ſpermatic artery, which makes an infinite number of circumvolutions in the ſubſtance of the teſticle, where it depoſites the ſemen, which paſſes through the tubuli ſeminiferi. Theſe tubuli ſeminiferi are ſeen running in ſhort waves from the tunica albuginea to the axis of the teſticle; and are divided into diſtinct portions by certain thin membranous productions, which originate from the tunica albuginea. They at length unite, and by an infinite number of convolutions form a ſort of appendix to the teſtis called *epididymis* (P), which is

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(N) The dartos has uſually been conſidered as a muſcle, and is deſcribed as ſuch both by Douglas and Winſlow. But there being no part of the ſcrotum of the human ſubject which can be ſaid to conſiſt of muſcular fibres, Albinus and Haller have very properly omitted to deſcribe the dartos as a muſcle, and conſider it merely as a cellular coat.

(O) The cremaſter muſcle is compoſed of a few fibres from the obliquus internus abdominis, which uniting with a few from the tranſverſalis, deſcend upon the ſpermatic chord, and are inſenſibly loſt upon the tunica vaginalis of the teſticle. It ſerves to ſuſpend and draw up the teſticle.

(P) The teſticles were named *didymi* by the ancients; and the name of this part was given to it on account of its ſituation upon the teſticle.

Of the Abdomen.

a vaſcular body of an oblong ſhape, ſituated upon the ſuperior part of each teſticle. Theſe tubuli of the epididymis at length form an excretory duct called *vas deferens*, which aſcends towards the abdominal rings, with the other parts that make up the ſpermatic chord, and then a ſeparation takes place; the nerves and blood veſſels paſſing on to their ſeveral terminations, and the vas deferens going to depoſite its ſemen in the veſiculæ ſeminales, which are two ſoft bodies of a white and convoluted appearance externally, ſituated obliquely between the rectum and the lower part of the bladder, and uniting together at the lower extremity. From theſe reſervoirs (q), which are plentifully ſupplied with blood veſſels and nerves, the ſemen is occaſionally diſcharged through two ſhort paſſages, which open into the urethra cloſe to a little eminence called *verumontanum*.

Near this eminence we meet with the proſtate, which is ſituated at the neck of the bladder, and is deſcribed as being of a glandular ſtructure. It is ſhaped ſomewhat like a heart with its ſmall end foremoſt, and inveſts the origin of the urethra. Internally it appears to be of a firm ſubſtance, and compoſed of ſeveral follicles, ſecreting a whitiſh viſcid fluid, that is diſcharged by ten or twelve excretory ducts into the urethra, on each ſide of the openings of the veſiculæ ſeminales at the ſame time, and from the ſame cauſes that the ſemen is expelled. As this latter fluid is found to be exceedingly limpid in the veſiculæ ſeminales of the dead ſubject, it probably owes its whiteneſs and viſcidity to this liquor of the proſtate.

Of the Abdomen.

The penis, which is to be conſidered as the vehicle or active organ of procreation, is compoſed of two columns, the corpora cavernoſa and corpus ſpongioſum. The corpora cavernoſa, which conſtitute the greateſt part of the penis, may be deſcribed as two cylindrical ligamentous tubes, each of which is compoſed of an infinite number of minute cells of a ſpongy texture. which communicate with each other. Theſe two bodies are of a very pliant texture, and capable of conſiderable diſtention; and being united laterally to each other, occaſion by this union a ſpace above and another below. The uppermoſt of theſe ſpaces is filled by the blood veſſels, and the lower one, which is larger than the other, by the urethra and its corpus ſpongioſum. Theſe two cavernous bodies are at firſt only ſeparated

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(q) That the bags called *veſiculæ ſeminales* are reſervoirs of ſemen, is a circumſtance which has been by anatomiſts univerſally believed. Mr J. Hunter, however, from ſeveral circumſtances, has been induced to think this opinion erroneous.

He has examined theſe veſiculæ in people who have died ſuddenly, and he found their contents to be different in their properties from the ſemen. In thoſe who had loſt one of the teſticles, or the uſe of one of them, by diſeaſe, both the veſiculæ were full, and their contents ſimilar. And in a *luſus naturæ*, where there was no communication between the vaſa deferentia and veſiculæ, nor between the veſiculæ and penis, the ſame thing took place.

From theſe obſervations, he thinks we have a preſumptive proof, That the ſemen can be abſorbed in the body of the teſticle and in the epididymis, and that the veſiculæ ſecrete a mucus which they are capable of abſorbing when it cannot be made uſe of: that the ſemen is not retained in reſervoirs after it is ſecreted, and kept there till it is uſed; but that it is ſecreted at the time in conſequence of certain affections of the mind ſtimulating the teſticles to this action.

He corroborates his obſervations by the appearance on diſſection in other animals; and here he finds, That the ſhape and contents of the veſiculæ vary much in different animals, while the ſemen in moſt of them he has examined is nearly the ſame: That the vaſa deferentia in many animals do not communicate with the veſiculæ: That the contents of the veſiculæ of caſtrated and perfect animals are ſimilar, and nearly equal in quantity, in no way reſembling the ſemen as emitted from the animal *in coitu*, or what is found in the vas deferens after death. He obſerves likewiſe, that the bulb of the urethra of perfect males is conſiderably larger than in caſtrated animals.

From the whole, he thinks the following inferences may be fairly drawn: That the bags called *veſiculæ ſeminales* are not ſeminal reſervoirs, but glands ſecreting a peculiar mucus; and that the bulb of the urethra is properly ſpeaking the receptacle of the ſemen, in which it is accumulated previous to ejection.

But although he has endeavoured to prove that the veſiculæ do not contain the ſemen, he has not been able to aſcertain their particular uſe. He thinks, however, we may be allowed upon the whole to conclude, that they are, together with other parts, ſubſervient to the purpoſes of generation.

Although the author has treated this ſubject very ably, and made many ingenious obſervations, ſome things may be objected to what he has advanced; of which the following are a few: That thoſe animals who have bags called *veſiculæ ſeminales* perform copulation quickly; whereas others that want them, as the dog kind, are tedious in copulation: That in the human body, at leaſt, there is a free communication between the vaſa deferentia and veſiculæ; and in animals where the author has obſerved no communication between the vaſa deferentia and veſiculæ, there may be a communication by veſſels not yet diſcovered, and which may be compared to the hepato-cyſtic ducts in fowls and fiſhes: That the fluid in the end of the vaſa deferentia and the veſiculæ ſeminales are ſimilar, according to the author's own obſervation: That the veſiculæ in ſome animals increaſe and decreaſe with the teſticle at particular ſeaſons: That in birds and certain fiſhes, there is a dilatation of the ends of the vaſa deferentia, which the author himſelf allows to be a reſervoir for the ſemen.

With reſpect to the circumſtance of the bulb of the urethra anſwering the purpoſe of a reſervoir, the author has mentioned no facts which tend to eſtabliſh this opinion. See *Obſervations on certain Parts of the Animal Economy*.

Of the Abdomen.

parated by a partition of tendinous fibres, which allow them to communicate with each other: but they afterwards divaricate from each other like the branches of the letter Y, and diminiſhing gradually in ſize, are attached, one on each ſide, by means of the ligamentum ſuſpenſorium penis, to the ramus iſchii, and to the inferior portion of the os pubis.

The corpus ſpongioſum penis, or corpus ſpongioſum urethræ, as it is ſtyled by ſome authors, begins as ſoon as the urethra has paſſed the proſtate, with a thick origin almoſt like a heart, firſt under the urethra, and afterwards above it, becoming gradually thinner, and ſurrounding the whole canal of the urethra, till it terminates in a conſiderable expanſion, and conſtitutes what is called the *glans penis*, which is exceedingly vaſcular, and covered with papillæ like the tongue. The cuticle which lines the inner ſurface of the urethra, is continued over the glans in the ſame manner as it is ſpread over the lips.

The penis is inveſted by the common integuments, but the cutis is reflected back everywhere from the glans as it is in the eyelids; ſo that it covers this part, when the penis is in a relaxed ſtate, as it were with a hood, and from this uſe is called *prepuce*.

The prepuce is tied down to the under part of the glans by a ſmall ligament called *frænum*, which is in fact only a continuation of the cuticle and cutis. There are many ſimple ſebaceous follicles called *glandulæ odoriferæ*, placed round the baſis of the glans; and the fluid they ſecrete ſerves to preſerve the exquiſite ſenſibility of this part of the penis, and to prevent the ill effects of attrition from the prepuce.

The urethra may be defined to be a membranous canal, paſſing from the bladder through the whole extent of the penis. Several very ſmall openings, called *lacunæ*, communicate with this canal, through which a mucus is diſcharged into it; and beſides theſe, there are two glands, firſt deſcribed by Cowper, as ſecreting a fluid for lubricating the urethra, and called *Cowper's glands* (R); and Littre * ſpeaks of a gland ſituated near the proſtrate, as being deſtined for the ſame uſe.

* *Memoires de l'Acad. Royale des Sciences, 1700.*

The urethra being continued from the neck of the bladder, is to be conſidered as making part of the urinary paſſage; and it likewiſe affords a conveyance to the ſemen, which we have obſerved is occaſionally diſcharged into it from the veſiculæ ſeminales. The direction of this canal being firſt under and then before the pubis, occaſions a winding in its courſe from the bladder to the penis, nor unlike the turns of the letter *S*.

The penis has three pair of muſcles, the erectores, acceleratores, and tranſverſales. They puſh the blood from the crura to the fore part of the corpora cavernoſa. The firſt originate from the tuberoſity of the iſchium, and terminate in the corpora cavernoſa. The acceleratores ariſe from the ſphincter, and by their inſertion ſerve to compreſs the bulbous part of the urethra; and the tranſverſales are deſtined to afford a paſſage to the ſemen, by dilating the canal of the urethra.

The arteries of the penis are chiefly derived from the internal iliacs. Some of them are ſuppoſed to terminate by pabulous orifices within the corpora cavernoſa and corpus ſpongioſum; and others terminate in veins, which at laſt make up the vena magna dorſi penis, and other ſmaller veins, which are in general diſtributed in like order with the arteries.

Its nerves are large and numerous. They ariſe from the great ſciatic nerve, and accompany the arteries in their courſe through the penis.

We have now deſcribed the anatomy of this organ; and there only remains to be explained, how it is enabled to attain that degree of firmneſs and diſtention which is eſſential to the great work of generation.

The greateſt part of the penis has been ſpoken of as being of a ſpongy and cellular texture, plentifully ſupplied with blood veſſels and nerves, and as having muſcles to move it in different directions. Now, the blood is conſtantly paſſing into its cells through the ſmall branches of the arteries which open into them, and is from thence as conſtantly returned by the veins, ſo long as the corpora cavernoſa and corpus ſpongioſum continue to be in a relaxed and pliant ſtate. But when, from any nervous influence, or other means which it is not neceſſary here to define or explain, the erectores penis, ejaculatores ſeminis, levatores ani, &c. are induced to contract, the veins undergo a certain degree of compreſſion, and the paſſage of the blood through them is ſo much impeded, that it collects in them in a greater proportion than they are enabled to carry off, ſo that the penis gradually enlarges, and being more and more forcibly drawn up againſt the os pubis, the vena magna itſelf is at length compreſſed, and the penis becomes fully diſtended. But as the cauſes which firſt occaſioned this diſtention ſubſide, the penis gradually returns to its ſtate of relaxation.

§ 2. *Female Organs of Generation.*

111 Anatomical writers uſually divide the female organs of generation into *external* and *internal*. In the firſt diviſion they include the *mons veneris*, *labia pudendi*, *perinæum*, *clitoris*, *nymphæ*, and *caruncula myrtiformes*: and in the latter, the vagina, with the *uterus* and its appendages.

The *mons veneris*, which is placed on the upper part of the ſymphyſis pubis, is internally compoſed of adipoſe membranes, which makes it ſoft and prominent: it divides into two parts called *labia pudendi*, which deſcending towards the rectum, from which they are divided by the perinæum, form what is called the *fourchette*. The perinæum is that fleſhy ſpace which extends about an inch and a half from the fourchette to the anus, and from thence about two inches to the coccyx.

The labia pudendi being ſeparated, we obſerve a ſulcus called *foſſa magna*; in the upper part of which is placed the clitoris, a ſmall round ſpongy body, in ſome meaſure reſembling the male penis, but impervious, compoſed of two corpora cavernoſa, ariſing from the tuberoſities of the oſſa iſchii; furniſhed with two pair of

(R) Both Heiſter and Morgagni obſerve, that they have ſometimes not been able to find theſe glands; ſo that they do not ſeem to exiſt in all ſubjects.

Of the Abdomen.

of muſcles, the erectores clitoridis, and the ſphincter or conſtrictor oſtii vaginæ; and terminating in a glans, which is covered with its prepuce. From the lower part, on each ſide of the foſſa, paſs the nymphæ, two membranous and ſpongy folds which ſeem deſtined for uſeful purpoſes in parturition, by tending to enlarge the volume of the vagina as the child's head paſſes through it. Between theſe, about the middle of the foſſa magna, we perceive the orifice of the vagina or os externum, cloſed by folds and wrinkles; and about half an inch above this, and about an inch below the clitoris, appears the meatus urinarius or orifice of the urethra, much ſhorter, though ſomewhat larger, than in men, with a little prominence at its lower edge, which facilitates the introduction of the catheter.

The os externum is ſurrounded internally by ſeveral membranous folds called *caruncuiæ myrtiformes*, which are partly the remains of a thin membrane called *hymen*, that covers the vagina in children. In general the hymen is ſufficiently open to admit the paſſage of the menſes, if it exiſts at the time of their appearance; ſometimes, however, it has been found perfectly cloſed.

The vagina, ſituated between the urethra and the rectum, is a membranous cavity, ſurrounded, eſpecially at its external extremity, with a ſpongy and vaſcular ſubſtance, which is covered by the ſphincter oſtii vaginæ. It terminates in the uterus, about half an inch above the os tincæ, and is wider and ſhorter in women who have had children than in virgins.

All theſe parts are plentifully ſupplied with blood veſſels and nerves. Around the nymphæ there are ſebaceous follicles, which pour out a fluid to lubricate the inner ſurface of the vagina; and the meatus urinarius, like the urethra in the male ſubject, is conſtantly moiſtened by a mucus, which defends it againſt the acrimony of the urine.

The *uterus* is a hollow viſcus, ſituated in the hypogaſtric region, between the rectum and bladder. It is deſtined to receive the firſt rudiments of the fœtus, and to aſſiſt in the developement of all its parts, till it arrives at a ſtate of perfection, and is fitted to enter into the world, at the time appointed by the wiſe Author of nature.

The uterus, in its unimpregnated ſtate, reſembles a pear in ſhape, ſomewhat flattened, with its fundus or bottom part turned towards the abdomen, and its cervix or neck ſurrounded by the vagina. The entrance into its cavity forms a little protuberance, which has been compared to the mouth of a tench, and is therefore called *os tincæ*.

The ſubſtance of the uterus, which is of a conſiderable thickneſs, appears to be compoſed of muſcular and ſmall ligamentous fibres, ſmall branches of nerves, ſome lymphatics, and with arteries and veins innumerable. Its nerves are chiefly derived from the intercoſtal, and its arteries and veins from the hypogaſtric and ſpermatic. The membrane which lines its cervix is a continuation of the inner membrane of the vagina; but the outer ſurface of the body of the uterus is covered with the peritonæum, which is reflected over it, and deſcends from thence to the inteſtinum rectum. This duplicature of the peritonæum, by paſſing off from the ſides of the uterus to the ſides of the pelvis, is there firmly connected, and forms what are called *ligamenta uteri lata*; which not only ſerve to ſupport the uterus, but to convey nerves and blood veſſels to it. Of the Abdomen.

The *ligamenta uteri rotunda* ariſe from the ſides of the fundus uteri, and paſſing along within the fore part of the ligamenta lata, deſcend through the abdominal rings, and terminate in the ſubſtance of the mons veneris. The ſubſtance of theſe ligaments is vaſcular; and although both they and the ligamenta lata admit the uterus, in the virgin ſtate, to move only about an inch up and down, yet in the courſe of pregnancy they admit of conſiderable diſtention, and after parturition return nearly to their original ſtate with ſurpriſing quickneſs.

On each ſide of the inner ſurface of the uterus, in the angle near the fundus, a ſmall orifice is to be diſcovered, which is the beginning of one of the tubæ Falloپianæ. Each of theſe tubes, which are two in number, paſſing through the ſubſtance of the uterus, is extended along the broad ligaments, till it reaches the edge of the pelvis, from whence it reflects back; and turning over behind the ligaments, about an inch of its extremity is ſeen hanging looſe in the pelvis, near the ovarium. Theſe extremities, having a jagged appearance, are called *fimbriæ*, or *morſus diaboli*. Each tuba Fallopiana is uſually about three or four inches long. Their cavities are at firſt very ſmall, but become gradually larger, like a trumpet, as they approach the fimbriæ.

Near the fimbriæ of each tuba Fallopiana, about an inch from the uterus, is ſituated an oval body called *ovarium*, of about half the ſize of the male teſticle. Each of theſe ovaria is covered by a production of the peritonæum, and hangs looſe in the pelvis. They are of a flat and angular form, and appear to be compoſed of a white and cellular ſubſtance, in which we are able to diſcover ſeveral minute veſicles filled with a coagulable lymph, of an uncertain number, commonly exceeding 12 in each ovary. In the female of riper years, theſe veſicles become exceedingly turgid, and a kind of yellow coagulum is gradually formed within one of them, which increaſes for a certain time. In conception, one of theſe mature ova is ſuppoſed to be impregnated with the male ſemen, and to be ſqueezed out of its nidus into the Fallopian tube; after which the ruptured part forms a ſubſtance which in ſome animals is of a yellow colour, and is therefore called *corpus luteum*; and it is obſervable, that the number of theſe ſcars or fiſſures in the ovarium, conſtantly correſponds with the number of fœtuſes excluded by the mother.

§ 3. *Of Conception.*

Man, being ever curious and inquiſitive, has naturally been led to inquire after the origin of his exiſtence; and the ſubject of generation has employed the philoſophical world in all ages: but in following nature up to her minute receſſes, the philoſopher ſoon finds himſelf bewildered, and his imagination often ſupplies that which he ſo eagerly wiſhes to diſcover, but which is deſtined perhaps never to be revealed to him. Of the many theories which have been formed on this ſubject, that of the ancient philoſophers ſeems to have been the moſt ſimple: they conſidered the male ſemen as alone capable of forming the fœtus, and 112

believed

Of the Abdomen.

believed that the female only afforded it a lodging in the womb, and ſupplied it with nouriſhment after it was perfectly formed. This opinion, however, ſoon gave place to another, in which the female was allowed a more conſiderable ſhare in conception.

This ſecond ſyſtem conſidered the fœtus as being formed by the mixture of the ſeminal liquor of both ſexes, by a certain arrangement of its ſeveral particles in the uterus. But in the 16th century, veſicles or eggs were diſcovered in the ovaria or female teſticles; the fœtus had been found ſometimes in the abdomen, and ſometimes in the Fallopian tubes; and the two former opinions were exploded in favour of a new doctrine. The ovaria were compared to a bunch of grapes, being ſuppoſed to conſiſt of veſicles, each of which had a ſtalk; ſo that it might be diſengaged without hurting the reſt, or ſpilling the liquor it contained. Each veſicle was ſaid to include a little animal, almoſt complete in all its parts; and the vapour of the male ſemen being conveyed to the ovarium, was ſuppoſed to produce a fermentation in the veſicle, which approached the neareſt to maturity; and thus inducing it to diſengage itſelf from the ovarium, it paſſed into the tuba Fallopiana, through which it was conveyed to the uterus. Here it was ſuppoſed to take root like a vegetable ſeed, and to form with the veſſels originating from the uterus, what is called the *placenta;* by means of which the circulation is carried on between the mother and the fœtus.

This opinion, with all its abſurdities, continued to be almoſt univerſally adopted till the cloſe of the ſame century, when Leeuwenhoek, by means of his glaſſes, diſcovered certain opaque particles, which he deſcribed as ſo many animalcula, floating in the ſeminal fluid of the male.

This diſcovery introduced a new ſchiſm among the philoſophers of that time, and gave riſe to a ſyſtem which is not yet entirely exploded. According to this theory, the male ſemen paſſing into the tubæ Fallopianæ, one of the animalcula penetrates into the ſubſtance of the ovarium, and enters into one of its veſicles or ova. This impregnated ovum is then ſqueezed from its huſk, through the coats of the ovarium, and being ſeized by the fimbriæ, is conducted through the tube to the uterus, where it is nouriſhed till it arrives at a ſtate of perfection. In this ſyſtem there is much ingenuity; but there are certain circumſtances ſuppoſed to take place, which have been hitherto inexplicable. A celebrated modern writer, M. Buffon, endeavours to reſtore, in ſome meaſure, the moſt ancient opinion, by allowing the female ſemen a ſhare in this office; aſſerting, that animalcula or organic particles are to be diſcovered in the ſeminal liquor of both ſexes: he derives the female ſemen from the ovaria, and he contends that no ovum exiſts in thoſe parts. But in this idea he is evidently miſtaken; and the opinion now moſt generally adopted is, that an impregnation of the ovum, by the influence of the male ſemen, is eſſential to conception. That the ovum is to be impregnated, there can be no doubt; but as the manner in which ſuch an impregnation is ſuppoſed to take place, and the means by which the ovum afterwards gets into the Fallopian tube, and from thence into the uterus, are ſtill founded chiefly on hypotheſis, we will not attempt to extend farther the inveſtigation of a ſubject concerning which ſo little can be advanced with certainty.

Of the Abdomen.

§ 4. *Of the Fœtus in Utero.*

Opportunities of diſſecting the human gravid uterus occurring but ſeldom, the ſtate of the embryo (s) immediately after conception cannot be perfectly known. 113

When the ovum deſcends into the uterus, it is ſuppoſed to be very minute; and it is not till a conſiderable time after conception that the rudiments of the embryo begin to be aſcertained.

About the third or fourth week the eye may diſcover the firſt lineaments of the fœtus; but theſe lineaments are as yet very imperfect, it being only about the ſize of a houſe fly. Two little veſicles appear in an almoſt tranſparent jelly; the largeſt of which is deſtined to become the head of the fœtus, and the other ſmaller one is reſerved for the trunk. But at this period no extremities are to be ſeen; the umbilical cord appears only as a very minute thread, and the placenta does not as yet abſorb the red particles of the blood. At ſix weeks, not only the head, but the features of the face, begin to be developed. The noſe appears like a ſmall prominent line, and we are able to diſcover another line under it, which is deſtined for the ſeparation of the lips. Two black points appear in the place of eyes, and two minute holes mark the ears. At the ſides of the trunk, both above and below, we ſee four minute protuberances, which are the rudiments of the arms and legs. At the end of eight weeks the body of the fœtus is upwards of an inch in length, and both the hands and feet are to be diſtinguiſhed. The upper extremities are found to increaſe faſter than the lower ones, and the ſeparation of the fingers is accompliſhed ſooner than that of the toes.

At this period the human form may be deciſively aſcertained; all the parts of the face may be diſtinguiſhed, the ſhape of the body is clearly marked out, the haunches and the abdomen are elevated, the fingers and toes are ſeparated from each other, and the inteſtines appear like minute threads.

At the end of the third month, the fœtus meaſures about three inches; at the end of the fourth month, five inches; in the fifth month, ſix or ſeven inches; in the ſixth month, eight or nine inches; in the ſeventh month, eleven or twelve inches; in the eighth month, fourteen or fifteen inches; and at the end of the ninth month, or full time, from eighteen to twenty-two inches. But as we have not an opportunity of examining the ſame fœtus at different periods of pregnancy, and as their ſize and length may be influenced by the conſtitution and mode of life of the mother, calculations of this kind muſt be very uncertain.

The fœtus during all this time aſſumes an oval figure,

(s) The rudiments of the child are uſually diſtinguiſhed by this name till the human figure can be diſtinctly aſcertained, and then it has the appellation of *fœtus*.

Of the Abdomen.

gure, which corresponds with the shape of the uterus. Its chin is found reclining on its breast with its knees drawn up towards its chin, and its arms folded over them. But it seems likely, that the posture of some of these parts is varied in the latter months of pregnancy, so as to cause those painful twitches which its mother usually feels from time to time. In natural cases, its head is probably placed towards the os tincæ from the time of conception to that of its birth; though formerly it was considered as being placed towards the fundus uteri till about the eighth or ninth month, when the head, by becoming specifically heavier than the other parts of the body, was supposed to be turned downwards.

The capacity of the uterus increases in proportion to the growth of the fœtus, but without becoming thinner in its substance, as might naturally be expected. The nourishment of the fœtus, during all this time, seems to be derived from the placenta, which appears to be originally formed by that part of the ovum which is next the fundus uteri. The remaining part of the ovum is covered by a membrane called *spongy chorion* (T); within which is another called *true chorion*, which includes a third termed *amnios* (U): this contains a watery fluid, which is the *liquor amnii* (V), in which the fœtus floats till the time of its birth. On the side next the fœtus, the placenta is covered by the amnios and true chorion; on the side next the mother it has a production continued from the spongy chorion. The amnios and chorion are remarkably thin and transparent, having no blood vessels entering into their composition. The spongy chorion is opaque and vascular.

In the first months of pregnancy, the involucra bear a large proportion to their contents; but this proportion is afterwards reversed, as the fœtus increases in bulk.

The placenta, which is the medium through which the blood is conveyed from the mother to the fœtus, and the manner in which this conveyance takes place, deserve next to be considered.

The placenta is a broad, flat, and spongy substance, like a cake, closely adhering to the inner surface of the womb, usually near the fundus, and appearing to be chiefly made up of the ramifications of the umbilical arteries and vein, and partly of the extremities of the uterine vessels. The arteries of the uterus discharge their contents into the substance of this cake; and the veins of the placenta, receiving the blood either by a direct communication of vessels, or by absorption, at length form the umbilical vein, which passes on to the sinus of the vena portæ, and from thence to the vena cava, by means of the canalis venosus, a communication that is closed in the adult. But the circulation of the blood through the heart is not conducted in the fœtus as in the adult; in the latter, the blood is carried from the right auricle of the heart through the pulmonary artery, and is returned to the left auricle by the pulmonary vein; but a dilatation of the lungs is essential to the passage of the blood through the pulmonary vessels, and this dilatation cannot take place till after the child is born and has respired. This deficiency, however, is supplied in the fœtus by an immediate communication between the right and left auricle, through an oval opening, in the septum which divides the two auricles, called *foramen ovale*. The blood is likewise transmitted from the pulmonary artery to the aorta, by means of a duct called *canalis arteriosus*, which, like the canalis venosus, and foramen ovale, gradually closes after birth.

The blood is returned again from the fœtus through two arteries called the *umbilical arteries*, which arise from the iliacs. These two vessels taking a winding course with the vein, form with that, and the membranes by which they are surrounded, what is called the *umbilical chord*. These arteries, after ramifying through the substance of the placenta, discharge their blood into the veins of the uterus; in the same manner as the uterine arteries discharged their blood into the branches of the umbilical vein. So that the blood is constantly passing in at one side of the placenta and out at the other; but in what particular manner it gets through the placenta is a point not yet determined.

(T) Dr Hunter has described this as a lamella from the inner surface of the uterus. In the latter months of pregnancy it becomes gradually thinner and more connected with the chorion: he has named it *membrana caduca*, or *decidua*, as it is cast off with the placenta. Signior Scarpa, with more probability, considers it as being composed of an inspissated coagulable lymph.

(U) In some quadrupeds, the urine appears to be conveyed from the bladder through a canal called *urachus* to the *allantois*, which is a reservoir, resembling a long and blind gut, situated between the chorion and amnios. The human fœtus seems to have no such reservoir, though some writers have supposed that it does exist. From the top of the bladder a few longitudinal fibres are extended to the umbilical chord; and these fibres have been considered as the urachus, though without having been ever found pervious.

(V) The liquor amnii coagulates like the lymph. It has been supposed to pass into the œsophagus, and to afford nourishment to the fœtus; but this does not seem probable. Children have come into the world without an œsophagus, or any communication between the stomach and the mouth; but there has been no well attested instance of a child's having been born without a placenta; and it does not seem likely, that any of the fluid can be absorbed through the pores of the skin, the skin in the fœtus being everywhere covered with a great quantity of mucus.

EXPLANATION of PLATES XXVII. XXVIII. and XXIX.

Plate XXVII.

Fig. 1. Shows the Contents of the Thorax and Addomen in ſitu.

1. Top of the trachea, or windpipe. 2 2, The internal jugular veins. 3 3, The ſubclavian veins. 4, The vena cava deſcendens. 5, The right auricle of the heart. 6, The right ventricle. 7, Part of the left ventricle. 8, The aorta deſcendens. 9, The pulmonary artery. 10, The right lung, part of which is cut off to ſhow the great blood veſſels. 11, The left lung entire. 12 12, The anterior edge of the diaphragm. 13 13, The two great lobes of the liver. 14, The ligamentum rotundum. 15, The gall-bladder. 16, The ſtomach. 17 17, The jejunum and ilium. 18, The ſpleen.

Fig. 2. Shows the Organs ſubſervient to the Chylopoietic Viſcera,—with thoſe of Urine and Generation.

1 1, The under ſide of the two great lobes of the liver. a, Lobulus Spigelii. 2, The ligamentum rotundum. 3, The gall-bladder. 4, The pancreas. 5, The ſpleen. 6 6, The kidneys. 7, The aorta deſcendens. 8, Vena cava aſcendens. 9 9, The renal veins covering the arteries. 10, A probe under the ſpermatic veſſels and a bit of the inferior menſenteric artery, and over the ureters. 11 11, The ureters. 12 12, The iliac arteries and veins. 13, The rectum inteſtinum. 14, The bladder of urine.

Fig. 3. Shows the Chylopoietic Viſcera, and Organs ſubſervient to them, taken out of the Body entire.

AA, The under ſide of the two great lobes of the liver. B, Ligamentum rotundum. C, The gall-bladder. D, Ductus cyſticus. E, Ductus hepaticus. F, Ductus communis choledochus. G, Vena portarum. H, Arteria hepatica. II, The ſtomach. KK, Venæ et arteriæ gaſtro-epiploicæ, dextræ et ſiniſtræ. LL, Venæ et arteriæ coronariæ ventriculi. M, The ſpleen. NN, Meſocolon, with its veſſels. OOO, Inteſtinum colon. P, One of the ligaments of the colon, which is a bundle of longitudinal muſcular fibres. QQQQ, Jejunum and ilium. RR, Sigmoid flexure of the colon with the ligament continued, and over S, the rectum inteſtinum. TT, Levatores ani. U, Sphincter ani. V, The place to which the proſtate gland is connected. W, The anus.

Fig. 4. Shows the Heart of a Fœtus at the full time, with the Right Auricle cut open to ſhow the Foramen Ovale, or paſſage between both Auricles.

a, The right ventricle. b, The left ventricle. cc, The outer ſide of the right auricle ſtretched out. dd, The poſterior ſide, which forms the anterior ſide of the ſeptum. e, The foramen ovale, with the membrane or valve which covers the left ſide. f, Vena cava inferior paſſing through g, a portion of the diaphragm.

Fig. 5. Shows the Heart and Large Veſſels of a Fœtus at the full time.

a, The left ventricle. b, The right ventricle. c, A part of the right auricle. d, Left auricle. ee, The right branch of the pulmonary artery. f, Arteria pulmonalis. gg, The left branch of the pulmonary artery, with a number of its largeſt branches diſſected from the lungs. h, The canalis arterioſus. i, The arch of the aorta. kk, The aorta deſcendens. l, The left ſubclavian artery. m, The left carotid artery. n, The right carotid artery. o, The right ſubclavian artery. p, The origin of the right carotid and right ſubclavian arteries in one common trunk. q, The vena cava ſuperior or deſcendens. r, The right common ſubclavian vein. s, The left common ſubclavian vein.

N. B. All the parts deſcribed in this figure are to be found in the adult, except the canalis arterioſus.

Plate XXVIII.

Fig. 1. Exhibits the more ſuperficial Lymphatic Veſſels of the Lower Extremity.

A, The ſpine of the os ilium. B, The os pubis. C, The iliac artery. D, The knee. EEF, Branches of the crural artery. G, The muſculus gaſtrocnemius. H, The tibia. I, The tendon of the muſculus tibialis anticus. On the outlines, a, A lymphatic veſſel belonging to the top of the foot. b, Its firſt diviſion into branches. c, c, c, Other diviſions of the ſame lymphatic veſſel. d, A ſmall lymphatic gland. e, The lymphatic veſſels which lie between the ſkin and the muſcles of the thigh. ff, Two lymphatic glands at the upper part of the thigh below the groin. gg, Other glands. h, A lymphatic veſſel which paſſes by the ſide of thoſe glands without communicating with them; and, bending towards the inſide of the groin at (i), opens into the lymphatic gland (k). l, l, Lymphatic glands in the groin, which are common to the lymphatic veſſels of the genitals and thoſe of the lower extremity. m, n, A plexus of lymphatic veſſels paſſing on the inſide of the iliac artery.

Fig. 2. Exhibits a Back View of the Lower Extremity, diſſected ſo as to ſhow the deeper-ſeated Lymphatic Veſſels which accompany the Arteries.

A, The os pubis. B, The tuberoſity of the iſchium. C, That part of the os ilium which was articulated with the os ſacrum. D, The extremity of the iliac artery appearing above the groin. E, The knee. F, F, The two cut ſurfaces of the triceps muſcle, which was divided to ſhow the lymphatic veſſels that paſs through its perforation along with the crural artery. G, The edge of the muſculus gracilis. H, The gaſtrocnemius and ſoleus, much ſhrunk by being dried, and by the ſolcus being ſeparated from the tibia to expoſe the veſſels. I, The heel. K, The ſole of the foot. L, The ſuperficial lymphatic veſſels paſſing over the knee, to get to the thigh. On the outlines;

Of the Abdomen.

outlines; M, The poſterior tibial artery. a, A lymphatic veſſel accompanying the poſterior tibial artery. b, The ſame veſſel croſſing the artery. c, A ſmall lymphatic gland, through which this deep-ſeated lymphatic veſſel paſſes. d, The lymphatic veſſel paſſing under a ſmall part of the ſoleus, which is left attached to the bone, the reſt being removed. e, The lymphatic veſſel croſſing the popliteal artery. f, g, h, Lymphatic glands in the ham, through which the lymphatic veſſel paſſes. i, The lymphatic veſſel paſſing with the crural artery, through the perforation of the triceps muſcle. k, The lymphatic veſſel, after it has paſſed the perforation of the triceps, dividing into branches which embrace the artery (l). m, A lymphatic gland belonging to the deep-ſeated lymphatic veſſel. At this place thoſe veſſels paſs to the fore part of the groin, where they communicate with the ſuperficial lymphatic veſſels. n, A part of the ſuperficial lymphatic veſſel appearing on the brim of the pelvis.

FIG. 3. Exhibits the Trunk of the Human Subject, prepared to ſhow the Lymphatic Veſſels and the Ductus Thoracicus.

A, The neck. BB, The two jugular veins. C, The vena cava ſuperior. DDDD, The ſubclavian veins, E, The beginning of the aorta, pulled to the left ſide by means of a ligature, in order to ſhow the thoracic duct behind it. F, The branches ariſing from the curvature of the aorta. GG, The two carotid arteries. HH, The firſt ribs. II, The trachea. KK, The ſpine. LL, The vena azygos. MM, The deſcending aorta. N, The cœliac artery, dividing into three branches. O, The ſuperior meſenteric artery. P, The right crus diaphragmatis. QQ, The two kidneys. R, The right emulgent artery. SS, The external iliac arteries. gd, The muſculi pſoæ. T, The internal iliac artery. U, The cavity of the pelvis. XX, The ſpine of the os ilium. YY, The groins. *a*, A lymphatic gland in the groin, into which lymphatic veſſels from the lower extremity are ſeen to enter. *bb*, The lymphatic veſſels of the lower extremities paſſing under Poupart's ligament. *cc*, A plexus of the lymphatic veſſels lying on each ſide of the pelvis. *d*, The pſoas muſcle with lymphatic veſſels lying upon its inſide. *e*, A plexus of lymphatics, which having paſſed over the brim of the pelvis at (*c*), having entered the cavity of the pelvis, and received the lymphatic veſſels belonging to the viſcera contained in that cavity, next aſcends, and paſſes behind the iliac artery to (*g*). *f*, Some lymphatic veſſels of the left ſide paſſing over the upper part of the os ſacrum, to meet thoſe of the right ſide. *g*, The right pſoas, with a large plexus of lymphatics lying on its inſide. *hh*, The plexus lying on each ſide of the ſpine. *iii*, Spaces occupied by the lymphatic glands. *k*, The trunk of the lacteals, lying on the under ſide of the ſuperior meſenteric artery. *l*, The ſame dividing into two branches, one of which paſſes on each ſide of the aorta; that of the right ſide being ſeen to enter the thoracic duct at (*m*). *m*, The thoracic duct beginning from the large lymphatics. *n*, The duct paſſing under the lower part of the crus diaphragmatis, and under the right emulgent artery. *o*, The thoracic duct penetrating the thorax. *p*, Some lymphatic veſſels joining that duct in the thorax. *q*, The thoracic duct paſſing under the curvature of the aorta to get to the left ſubclavian vein. The aorta being drawn aſide to ſhow the duct. *r*, A plexus of lymphatic veſſels paſſing upon the trachea from the thyroid gland to the thoracic duct.

Of the Abdomen.

PLATE XXIX.

FIG. 1. Repreſents the Under and Poſterior Side of the Bladder of Urine, &c.

a, The bladder. bb, The inſertion of the ureters. cc, The vaſa deferentia, which convey the ſemen from the teſticles to dd, The veſiculæ ſeminales—and paſs through e, The proſtate gland, to diſcharge themſelves into f, The beginning of the urethra.

FIG. 2. A tranſverſe Section of the Penis.

gg, Corpora cavernoſa penis. h, Corpus cavernoſum urethræ. i, Urethra. k, Septum penis. ll, The ſeptum between the corpus cavernoſum urethræ and that of the penis.

FIG. 3. A longitudinal Section of the Penis.

mm, The corpora cavernoſa penis, divided by o, The ſeptum penis. n, The corpus cavernoſum glandis, which is the continuation of that of the urethra.

FIG. 4. Repreſents the Female Organs of Generation.

a, That ſide of the uterus which is next the os ſacrum. 1, Its fundus. 2, Its cervix. bb, The Fallopian or uterine tubes, which open into the cavity of the uterus;—but the other end is open within the pelvis, and ſurrounded by cc, The fimbriæ. dd, The ovaria. e, The os internum uteri, or mouth of the womb. ff, The ligamenta rotunda, which paſſes without the belly, and is fixed to the labia pudendi. gg, The cut edges of the ligamenta lata, which connects the uterus to the pelvis. h, The inſide of the vagina. i, The orifice of the urethra. k, The clitoris ſurrounded by (l,) The præputium. mm, The labia pudendi. nn, The nymphæ.

FIG. 5. Shows the Spermatic Ducts of the Teſticle filled with Mercury.

A, The vas deferens. B, Its beginning, which forms the poſterior part of the epididymis. C, The middle of the epididymis, compoſed of ſerpentine ducts. D, The head or anterior part of the epididymis unravelled. eeee, The whole ducts which compoſe the head of the epididymis unravelled. ff, The vaſa deferentia. gg, Rete teſtis. hh, Some rectilineal ducts which ſend off the vaſa deferentia. iii, The ſubſtance of the teſticle.

FIG. 6. The Right Teſticle entire, and the Epididymis filled with Mercury.

A, The beginning of the vas deferens. B, The vas deferens aſcending towards the abdomen. C, The poſterior part of the epididymis, named *globus minor*. D, The ſpermatic veſſels encloſed in cellular ſubſtance. E, The body of the epididymis. F, Its head, named *globus major*. G, Its beginning from the teſticle. H, The body of the teſticle, encloſed in the tunica albuginea.

CHAP. IV. OF THE THORAX.

114 Of the cheſt.

THE thorax, or cheſt, is that cavity of the trunk which extends from the clavicles, or the lower part of the neck, to the diaphragm; and includes the vital organs, which are the heart and lungs, and likewiſe the trachea and œſophagus.—This cavity is formed by the ribs and vertebræ of the back, covered by a great number of muſcles, and by the common integuments, and anteriorly by two glandular bodies called the *breaſts*. The ſpaces between the ribs are filled up by muſcular fibres, which from their ſituation are called *intercoſtal muſcles*.

SECT. I. *Of the Breaſts.*

115 THE *breaſts* may be defined to be two large conglomerate glands, mixed with a good deal of adipoſe membrane. The glandular part is compoſed of an infinite number of minute arteries, veins, and nerves.

The arteries are derived from two different trunks; one of which is called the *internal*, and the other the *external*, *mammary artery*. The firſt of theſe ariſes from the ſubclavian, and the latter from the axillary.

The veins everywhere accompany the arteries, and are diſtinguiſhed by the ſame name. The nerves are chiefly from the vertebral pairs. Like all other conglomerate glands, the breaſts are made up of a great many ſmall diſtinct glands, in which the milk is ſecreted from the ultimate branches of arteries. The excretory ducts of theſe ſeveral glands, gradually uniting as they approach the nipple, form the tubuli lactiferi, which are uſually more than a dozen in number, and open at its apex, but have little or no communication, as has been ſuppoſed, at the root of the nipple. Theſe ducts, in their courſe from the glands, are ſurrounded by a ligamentary elaſtic ſubſtance, which terminates with them in the nipple. Both this ſubſtance, and the ducts which it contains, are capable of conſiderable extenſion and contraction; but in their natural ſtate are moderately corrugated, ſo as to prevent an involuntary flow of milk, unleſs the diſtending force be very great from the accumulation of too great a quantity.

The whole ſubſtance of the nipple is very ſpongy and elaſtic: its external ſurface is uneven, and full of ſmall tubercles. The nipple is ſurrounded with a diſk or circle of a different colour, called the *areola;* and on the inſide of the ſkin, under the areola, are many ſebaceous glands, which pour out a mucus to defend the areola and nipple; for the ſkin upon theſe parts is very thin; and the nervous papillæ lying very bare, are much expoſed to irritation.

The breaſts are formed for the ſecretion of milk, which is deſtined for the nouriſhment of the child for ſome time after its birth. This ſecretion begins to take place ſoon after delivery, and continues to flow for many months in very large quantities, if the woman ſuckles her child.

The operation of ſuction depends on the principles of the air pump, and the flow of milk through the lactiferous tubes is facilitated by their being ſtretched out.

The milk, examined chemically, appears to be compoſed of oil, mucilage, and water, and of a conſiderable quantity of ſugar. The generality of phyſiologiſts have ſuppoſed that, like the chyle, it frequently retains the properties of the aliment and medicines taken into the ſtomach; but from ſome late experiments *, this ſuppoſition appears to be ill founded.

* *Journ. de Med.* 1781.

SECT. II. *Of the Pleura.*

116 THE cavity of the thorax is everywhere lined by a membrane of a firm texture called *pleura*. It is compoſed of two diſtinct portions or bags, which, by being applied to each other laterally, form a ſeptum called *mediaſtinum;* which divides the cavity into two parts, and is attached poſteriorly to the vertebræ of the back, and anteriorly to the ſternum. But the two laminæ of which this ſeptum is formed, do not everywhere adhere to each other; for at the lower part of the thorax they are ſeparated to afford a lodgment to the heart; and at the upper part of the cavity, they receive between them the thymus.

The pleura is plentifully ſupplied with arteries and veins from the internal mammary and the intercoſtals. Its nerves, which are very inconſiderable, are derived chiefly from the dorſal and intercoſtal nerves.

The ſurface of the pleura, like that of the peritonæum and other membranes lining cavities, is conſtantly bedewed with a ſerous moiſture (w), which prevents adheſions of the viſcera.

The mediaſtinum, by dividing the breaſt into two cavities, obviates many inconveniences, to which we ſhould otherwiſe be liable. It prevents the two lobes of the lungs from compreſſing each other when we lie on one ſide; and conſequently contributes to the freedom of reſpiration, which is diſturbed by the leaſt preſſure on the lungs. If the point of a ſword penetrates between the ribs into the cavity of the thorax, the lungs on that ſide ceaſe to perform their office; becauſe the air being admitted through the wound, prevents the dilatation of that lobe; while the other lobe, which is ſeparated from it by the mediaſtinum, remains unhurt, and continues to perform its function as uſual.

SECT. III. *Of the Thymus.*

117 THE *thymus* is a glandular ſubſtance, the uſe of which is not perfectly aſcertained, its excretory duct not

(w) When this fluid is exhaled in too great a quantity, or is not properly carried off, it accumulates and conſtitutes the hydrops pectoris.

not having yet been diſcovered. It is of an oblong figure, and is larger in the fœtus and in young children than in adults, being ſometimes nearly effaced in very old ſubjects. It is placed in the upper part of the thorax, between the two laminæ of the mediaſtinum; but at firſt is not altogether contained within the cavity of the cheſt, being found to border upon the upper extremity of the ſternum.

Sect. IV. *Of the Diaphragm.*

118 The cavity of the thorax is ſeparated from that of the abdomen by a fleſhy and membranous ſeptum called the *diaphragm* or *midriff*. The greateſt part of it is compoſed of muſcular fibres; and on this account ſyſtematic writers uſually place it very properly among the muſcles. Its middle part is tendinous, and it is covered by the pleura above, and by the peritonæum below. It ſeems to have been improperly named *ſeptum tranſverſum*, as it does not make a plane tranſverſe diviſion of the two cavities, but forms a kind of vault, the fore part of which is attached to the ſternum. Laterally it is fixed to the laſt of the true ribs, and to all the falſe ribs: and its lower and poſterior part is attached to the vertebræ lumborum, where it may be ſaid to be divided into two portions or crura (x).

The principal arteries of the diaphragm are derived from the aorta, and its veins paſs into the vena cava. Its nerves are chiefly derived from the cervical pairs. It affords a paſſage to the vena cava through its tendinous part, and to the œſophagus through its fleſhy portion. The aorta paſſes down behind it between its crura.

The diaphragm not only ſerves to divide the thorax from the abdomen, but by its muſcular ſtructure is rendered one of the chief agents in reſpiration. When its fibres contract, its convex ſide, which is turned towards the thorax, becomes gradually flat, and by increaſing the cavity of the breaſt, affords room for a complete dilatation of the lungs, by means of the air which is then drawn into them by the act of inſpiration. The fibres of the diaphragm then relax; and as it reſumes its former ſtate, the cavity of the thorax becomes gradually diminiſhed, and the air is driven out again from the lungs by a motion contrary to the former one, called *expiration*.

It is, in ſome meaſure by means of the diaphragm, that we void the fæces at the anus, and empty the urinary bladder. Beſides theſe offices, the acts of coughing, ſneezing, ſpeaking, laughing, gaping, and ſighing, could not take place without its aſſiſtance; and the gentle preſſure which all the abdominal viſcera receive from its conſtant and regular motion, cannot fail to aſſiſt in the performance of the ſeveral functions which were aſcribed to thoſe viſcera.

Sect. V. *Of the Trachea.*

The trachea, or windpipe, is a cartilaginous and membranous canal, through which the air paſſes into the lungs. Its upper part, which is called the *larynx*, is compoſed of five cartilages. The uppermoſt of theſe cartilages is placed over the glottis or mouth of the larynx, and is called *epiglottis*, which has been before ſpoken of, as cloſing the paſſage to the lungs in the act of ſwallowing. At the ſides of the glottis are placed the two arytenoid cartilages, which are of a very complex figure, not eaſy to be deſcribed. The anterior and larger part of the larynx is made up of two cartilages; one of which is called *thyroides* or *ſcutiformis*, from its being ſhaped like a buckler; and the other *cricoides* or *annularis*, from its reſembling a ring. Both theſe cartilages may be felt immediately under the ſkin; at the fore part of the throat, and the thyroides, by its convexity, forms an eminence called *pomum adami*, which is uſually more conſiderable in the male than in the female ſubject. 119

All theſe cartilages are united to each other by means of very elaſtic ligamentous fibres; and are enabled, by the aſſiſtance of their ſeveral muſcles, to dilate or contract the paſſage of the larynx, and to perform that variety of motion which ſeems to point out the larynx as the principal organ of the voice; for when the air paſſes out through a wound in the trachea, it produces no ſound.

Theſe cartilages are moiſtened by a mucus, which ſeems to be ſecreted by minute glands ſituated near them. The upper part of the trachea is covered anteriorly and laterally by a conſiderable body, which is ſuppoſed to be of a glandular ſtructure, and from its ſituation near the thyroid cartilage is called the *thyroid gland;* though its excretory duct has not yet been diſcovered, or its real uſe aſcertained.

The glottis is interiorly covered by a very fine membrane, which is moiſtened by a conſtant ſupply of a watery fluid. From the larynx, the canal begins to take the name of *trachea* or *aſperia arteria*, and extends from thence as far down as the third or fourth vertebra of the back, where it divides into two branches, which are the right and left bronchial tube. Each of theſe bronchi (y) ramifies through the ſubſtance of that lobe of the lungs, to which it is diſtributed, by an infinite number of branches, which are formed of cartilages ſeparated from each other like thoſe of the trachea, by an intervening membranous and ligamentary ſubſtance. Each of theſe cartilages is of an angular figure; and as they become gradually leſs and leſs in

(x) Anatomical writers have uſually deſcribed the diaphragm as being made up of two muſcles united by a middle tendon; and theſe two portions or crura form what they ſpeak of as the *inferior muſcle*, ariſing from the ſides and fore part of the vertebræ.

(y) The right bronchial tube is uſually found to be ſomewhat ſhorter and thicker than the left; and M. Portal, who has publiſhed a memoir on the action of the lungs on the aorta in reſpiration, obſerves, that the left bronchial tube is cloſely contracted by the aorta; and from ſome experiments he is induced to conclude, that in the firſt reſpirations, the air only enters into the right lobe of the lungs. *Memoires de l'Academie Royale des Sciences*, 1769.

Thorax.

in their diameter, the lower ones are in ſome meaſure received into thoſe above them, when the lungs, after being inflated, gradually collapſe by the air being puſhed out from them in expiration. As the branches of the bronchi become more minute, their cartilages become more and more angular and membranous, till at length they are found to be perfectly membranous, and and laſt become inviſible.

The trachea is furniſhed with fleſhy or muſcular fibres; ſome of which paſs through its whole extent longitudinally, while the others are carried round it in a circular direction; ſo that by the contraction or relaxation of theſe fibres, it is enabled to ſhorten or lengthen itſelf, and likewiſe to dilate or contract the diameter of its paſſage.

The trachea and its branches, in all their ramifications, are furniſhed with a great number of ſmall glands which are lodged in their cellular ſubſtance, and diſcharge a mucous fluid on the inner ſurface of theſe tubes.

The cartilages of the trachea, by keeping it conſtantly open, afford a free paſſage to the air, which we are obliged to be inceſſantly reſpiring; and its membranous part, by being capable of contraction and dilatation, enables us to receive and expel the air in a greater or leſs quantity, and with more or leſs velocity, as may be required in ſinging or in declamation. This membranous ſtructure of the trachea poſteriorly ſeems likewiſe to aſſiſt in the deſcent of the food, by preventing that impediment to its paſſage down the œſophagus, which might be expected if the cartilages were complete rings.

The trachea receives its arteries from the carotid and ſubclavian arteries, and its veins paſs into the jugulars. Its nerves ariſe from the recurrent branch of the eighth pair, and from the cervical plexus.

Sect. VI. *Of the Lungs.*

120 The lungs fill the greater part of the cavity of the breaſt. They are of a ſoft and ſpongy texture, and are divided into two lobes, which are ſeparated from each other by the mediaſtinum, and are externally covered by a production of the pleura. Each of theſe is divided into two or three leſſer lobes; and we commonly find three in the right ſide of the cavity, and two in the left.

To diſcover the ſtructure of the lungs, it is required to follow the ramifications of the bronchi, which were deſcribed in the laſt ſection. Theſe becoming gradually more and more minute, at length terminate in the cellular ſpaces or veſicles, which make up the greateſt part of the ſubſtance of the lungs, and readily communicate with each other.

The lungs ſeem to poſſeſs but little ſenſibility. Their nerves, which are ſmall, and few in number, are derived from the intercoſtal and eighth pair. This laſt pair having reached the thorax, ſends off a branch on each ſide of the trachea, called the *recurrent*, which reaſcends at the back of the trachea, to which it furniſhes branches in its aſcent, as well as to the œſophagus, but it is chiefly diſtributed to the larynx and its muſcles. By dividing the recurrent and ſuperior laryngeal nerves at their origin, an animal is deprived of its voice.

Of the Thorax.

There are two ſeries of arteries which carry blood to the lungs: theſe are the arteriæ bronchiales, and the pulmonary artery.

The arteriæ bronchiales begin uſually by two branches; one of which commonly ariſes from the right intercoſtal, and the other from the trunk of the aorta: but ſometimes there are three of theſe arteries, and in ſome ſubjects only one. The uſe of theſe arteries is to ſerve for the nouriſhment of the lungs, and their ramifications are ſeen creeping everywhere on the branches of the bronchi. The blood is brought back from them by the bronchial vein into the vena azygos.

The pulmonary artery and vein are not intended for the nouriſhment of the lungs; but the blood in its paſſage through them is deſtined to undergo ſome changes, or to acquire certain eſſential properties (from the action of the air), which it has loſt in its circulation through the other parts of the body. The pulmonary artery receives the blood from the right ventricle of the heart; and dividing into two branches, accompanies the bronchi everywhere, by its ramifications through the lungs; and the blood is afterwards conveyed back by the pulmonary vein, which gradually forming a conſiderable trunk, goes to empty itſelf into the left ventricle of the heart; ſo that the quantity of blood which enters into the lungs, is perhaps greater than that which is ſent in the ſame proportion of time through all the other parts of the body.

Sect. VII. *Of Reſpiration.*

Respiration conſtitutes one of thoſe functions which 121
are properly termed *vital*, as being eſſential to life; for to live and to breathe are in fact ſynonymous terms. It conſiſts in an alternate contraction and dilatation of the thorax, by firſt inſpiring air into the lungs, and then expelling it from them in expiration.

It will perhaps be eaſy to diſtinguiſh and point out the ſeveral phenomena of reſpiration; but to explain their phyſical cauſe will be attended with difficulty: for it will naturally be inquired, how the lungs, when emptied of the air, and contracted by expiration, become again inflated, they themſelves being perfectly paſſive? How the ribs are elevated in oppoſition to their own natural ſituation? and why the diaphragm is contracted downwards towards the abdomen? Were we to aſſert that the air, by forcing its way into the cavity of the lungs, dilated them, and conſequently elevated the ribs and preſſed down the diaphragm, we ſhould ſpeak erroneouſly. What induces the firſt inſpiration, it is not eaſy to aſcertain; but after an animal has once reſpired, it would ſeem likely that the blood, after expiration, finding its paſſage through the lungs obſtructed, becomes a ſtimulus, which induces the intercoſtal muſcles and the diaphragm to contract, and enlarge the cavity of the thorax, in conſequence perhaps of a certain nervous influence, which we will not here attempt to explain. The air then ruſhes into the lungs; every branch of the bronchial tubes, and all the cellular ſpaces into which they open, become fully dilated; and the pulmonary veſſels being equally diſtended, the blood flows through them with eaſe. But as the ſtimulus which firſt occaſioned this dilatation ceaſes to operate, the muſcles gradually contract, the diaphragm riſes upwards again, and diminiſhes the cavity of the cheſt; the ribs

Of the Thorax.

ribs return to their former ſtate; and as the air paſſes out in expiration, the lungs gradually collapſe, and a reſiſtance to the paſſage of the blood again takes place. But the heart continuing to receive and expel the blood, the pulmonary artery begins again to be diſtended, the ſtimulus is renewed, and the ſame proceſs is repeated, and continues to be repeated, in a regular ſucceſſion during life: for though the muſcles of reſpiration, having a mixed motion, are (unlike the heart) in ſome meaſure dependent on the will, yet no human being, after having once reſpired, can live many moments without it. In an attempt to hold one's breath, the blood ſoon begins to diſtend the veins, which are unable to empty their contents into the heart; and we are able only, during a very little time, to reſiſt the ſtimulus to inſpiration. In drowning, the circulation ſeems to be ſtopped upon this principle; and in hanging, the preſſure made on the jugular veins, may cooperate with the ſtoppage of reſpiration in bringing on death.

Till within theſe few years phyſiologiſts were entirely ignorant of the uſe of reſpiration. It was at length diſcovered in part by the illuſtrious Dr Prieſtly. He found that the air expired by animals was phlogiſticated; and that the air was fitter for reſpiration, or for ſupporting animal life, in proportion as it was freer from the phlogiſtic principle. It had long been obſerved that the blood in paſſing through the lungs acquired a more florid colour. He therefore ſuſpected, that it was owing to its having imparted phlogiſton to the air: and he ſatisfied himſelf of the truth of this idea by experiments, which ſhowed, that the craſſamentum of extravaſated blood phlogiſticated air in proportion as it loſt its dark colour. He farther found, that blood thus reddened had a ſtrong attraction for phlogiſton; inſomuch that it was capable of taking it from phlogiſticated air, thereby becoming of a darker colour. From hence it appeared that the blood, in its circulation through the arterial ſyſtem, imbibes a conſiderable quantity of phlogiſton, which is diſcharged from it to the air in the lungs.

This diſcovery has ſince been proſecuted by two very ingenious phyſiologiſts, Dr Crawford and Mr Elliot. It had been ſhown by Profeſſors Black and Irvine, that different bodies have different capacities for containing fire. For example, that oil and water, when equally hot to the ſenſe and the thermometer, contain different proportions of that principle; and that unequal quantities of it are required, in order to raiſe thoſe ſubſtances to like temperatures. The inquiries of Dr Crawford and Mr Elliot tend to prove, that the capacities of bodies for containing fire are diminiſhed by the addition of phlogiſton, and increaſed by its ſeparation: the capacity of calx of antimony, for example, being greater than that of the antimony itſelf. Common air contains a great quantity of fire; combuſtible bodies very little. In combuſtion, a double elective attraction takes place; the phlogiſton of the body being transferred to the air, the fire contained in the air to the combuſtible body. But as the capacity of the latter is not encreaſed ſo much as that of the former is diminiſhed, only part of the extricated fire will be abſorbed by the body. The remainder therefore will raiſe the temperature of the compound; and hence we may account for the heat attending combuſtion. As the uſe of reſpiration is to dephlogiſticate the blood, it ſeems probable, that a like double elective attraction takes place in this proceſs; the phlogiſton of the blood being transferred to the air, and the fire contained in the air to the blood; but with this difference, that the capacities being equal, the whole of the extricated fire is abſorbed by the latter The blood in this ſtate circulating through the body, imbibes phlogiſton, and of courſe gives out its fire; part only of which is abſorbed by the parts furniſhing the phlogiſton, the remainder, as in combuſtion, becoming ſenſible; and is therefore the cauſe of the heat of the body, or what is called animal heat.

Of the Thorax.

In confirmation of this doctrine it may be obſerved, that the venous blood contains leſs fire than the arterial; combuſtible bodies leſs than incombuſtible ones; and that air contains leſs of this principle, according as it is rendered, by combination with phlogiſton, leſs fit for reſpiration (z).

In aſcending very high mountains, reſpiration is found to become ſhort and frequent, and ſometimes to be atttended with a ſpitting of blood. Theſe ſymptoms ſeem to be occaſioned by the air being too rare and thin to dilate the lungs ſufficiently; and the blood gradually accumulating in the pulmonary veſſels, ſometimes burſts through their coats and is brought up by coughing. This has likewiſe been accounted for in a different way, by ſuppoſing that the air contained in the blood, not receiving an equal preſſure from that of the atmoſphere, expands, and at length ruptures the very minute branches of the pulmonary veſſels; upon the ſame principle that fruits and animals put under the receiver of an air pump, are ſeen to ſwell as the outer air becomes exhauſted. But Dr Darwin of Litchfield has lately publiſhed ſome experiments, which ſeem to prove, that no air or elaſtic vapour does exiſt in the blood veſſels, as has been generally ſuppoſed; and he is induced to impute the ſpitting of blood which has ſometimes taken place in aſcending high mountains, to accident, or to violent exertions; as it never happens to animals that are put into the exhauſted receiver of an air pump, where the diminution of preſſure is many times greater than on the ſummit of the higheſt mountains.

Sect. VIII. *Of the Voice.*

Respiration has already been deſcribed as affording us many advantages; and next to that of life, its moſt important uſe ſeems to be that of forming the voice and ſpeech. The ancients, and almoſt all the moderns, have conſidered the organ of ſpeech as a kind of muſical inſtrument, which may be compared to a flute, to an hautboy, to an organ, &c. and they argue after the following manner: 122

The trachea, which begins at the root of the tongue, and goes to terminate in the lungs, may be compared

(z) See Crawford's Experiments and Obſervations on Animal Heat, and Elliot's Philoſophical Obſervations.

Of the Thorax.

to the pipe of an organ; the lungs dilating like bellows during the time of inſpiration; and as the air is driven out from them in expiration, it finds its paſſage ſtraitened by the cartilages of the larynx, againſt which it ſtrikes. As theſe cartilages are more or leſs elaſtic, they occaſion in their turn more or leſs vibration in the air, and thus produce the ſound of the voice; the variation in the ſound and tone of which depends on the ſtate of the glottis, which, when ſtraitened, produces an acute tone, and a grave one when dilated.

The late M. Ferein communicated to the French Academy of Sciences a very ingenious theory on the formation of the voice. He conſidered the organ of the voice as a *ſtring*, as well as a *wind*, inſtrument; ſo that what art has hitherto been unable to conſtruct, and what both the fathers Merſenne and Kircher ſo much wiſhed to ſee, M. Ferein imagined he had at length diſcovered in the human body. He obſerves, that there are at the edges of the glottis certain tendinous chords, placed horizontally acroſs it, which are capable of conſiderable vibration, ſo as to produce ſound, in the ſame manner as it is produced by the ſtrings of a violin or a harpſichord: and he ſuppoſes that the air, as it paſſes out from the lungs, acts as a bow on theſe ſtrings, while the efforts of the breaſt and lungs regulate its motion, and produce the variety of tones. So that according to this ſyſtem the variation in the voice is not occaſioned by the dilatation or contraction of the glottis, but by the diſtention or relaxation of theſe ſtrings, the ſound being more or leſs acute in proportion as they are more or leſs ſtretched out. Another writer on this ſubject ſuppoſes, that the organ of voice is a double inſtrument, which produces in uniſon two ſounds of a different nature; one by means of the air, and the other by means of the chords of the glottis. Neither of theſe ſyſtems, however, are univerſally adopted. They are both liable to inſuperable difficulties; ſo that the manner in which the voice is formed has never yet been ſatisfactorily aſcertained: we may obſerve, however, that the ſound produced by the glottis is not articulated. To effect this, it is required to paſs through the mouth, where it is differently modified by the action of the tongue, which is either puſhed againſt the teeth, or upwards towards the palate; detaining it in its paſſage, or permitting it to flow freely, by contracting or dilating the mouth.

Sect. IX. *Of Dejection.*

123 By dejection we mean the act of voiding the fæces at the anus; and an account of the manner in which this is conducted was reſerved for this part of the work, becauſe it ſeemed to require a knowledge of reſpiration to be perfectly underſtood.

The inteſtines were deſcribed as having a periſtaltic motion, by which the fæces were gradually advancing towards the anus. Now, whenever the fæces are accumulated in the inteſtinum rectum in a ſufficient quantity to become troubleſome, either by their weight or acrimony, they excite a certain uneaſineſs which induces us to go to ſtool.—To effect this, we begin by making a conſiderable inſpiration; in conſequence of which the diaphragm is carried downwards towards the lower belly; the abdominal muſcles are at the ſame time contracted in obedience to the will: and the inteſtines being compreſſed on all ſides, the reſiſtance of the *ſphincter* is overcome, and the fæces paſs out at the anus; which is afterwards drawn up by its longitudinal fibres, which are called *levatores ani*, and then by means of its *ſphincter* is again contracted: but it ſometimes happens, as in dyſenteries for inſtance, that the fæces are very liquid, and have conſiderable acrimony; and then the irritation they occaſion is more frequent, ſo as to promote their diſcharge without any preſſure from the diaphragm or abdominal muſcles; and ſometimes involuntarily, as is the caſe when the ſphincter becomes paralytic.

Of the Thorax.

Sect. X. *Of the Pericardium, and of the Heart and its Auricles.*

124 Pericardium.

The two membranous bags of the pleura, which were deſcribed as forming the mediaſtinum, recede one from the other, ſo as to afford a lodgment to a firm membranous ſac, in which the heart is ſecurely lodged; this ſac, which is the *pericardium*, appears to be compoſed of two tunics, united to each other by cellular membrane.—The outer coat, which is thick, and in ſome places of a tendinous complexion, is a production of the mediaſtinum; the inner coat, which is extremely thin, is reflected over the auricles and ventricles of the heart, in the ſame manner as the tunica conjunctiva, after lining the eyelids, is reflected over the eye.

This bag adheres to the tendinous part of the diaphragm, and contains a coagulable lymph, the *liquor pericardii*, which ſerves to lubricate the heart and facilitate its motions; and ſeems to be ſecreted and abſorbed in the ſame manner as it is in the other cavities of the body.

The arteries of the pericardium are derived from the phrenic, and its veins paſs into veins of the ſame name; its nerves are likewiſe branches of the phrenic.

The ſize of the pericardium is adapted to that of the heart, being uſually large enough to contain it looſely. As its cavity does not extend to the ſternum, the lungs cover it in inſpiration; and as it everywhere inveſts the heart, it effectually ſecures it from being injured by lymph, pus, or any other fluid, extravaſated into the cavities of the thorax.

125 Heart, and its auricles.

The heart is a hollow muſcle of a conical ſhape, ſituated tranſverſely between the two laminæ of the mediaſtinum, at the lower part of the thorax; having its baſis turned towards the right ſide, and its point or apex towards the left.—Its lower ſurface is ſomewhat flattened towards the diaphragm. Its baſis, from which the great veſſels originate, is covered with fat; and it has two hollow and fleſhy appendages, called *auricles*. —Round theſe ſeveral openings, the heart ſeems to be of a firm ligamentous texture, from which all its fibres ſeem to originate; and as they advance from thence towards the apex, the ſubſtance of the heart ſeems to become thinner.

The heart includes two cavities or *ventricles*, which are ſeparated from each other by a fleſhy ſeptum; one of theſe is called the *right*, and the other the *left*, *ventricle*; though perhaps, with reſpect to their ſituation, it would be more proper to diſtinguiſh them into the *anterior* and *poſterior ventricles*.

The

Of the Thorax.

The heart is exteriorly covered by a very fine membrane; and its ſtructure is perfectly muſcular or fleſhy, being compoſed of fibres which are deſcribed as paſſing in different directions; ſome as being extended longitudinally from the baſis to the apex; others, as taking an oblique or ſpiral courſe; and a third ſort as being placed in a tranſverſe direction (A).—Within the two ventricles we obſerve ſeveral furrows; and there are likewiſe tendinous ſtrings, which ariſe from fleſhy *columnæ* in the two cavities, and are attached to the valves of the auricles: That the uſe of theſe and the other valves of the heart may be underſtood, it muſt be obſerved, that four large veſſels paſs out from the baſis of the heart, viz. two arteries and two veins; and that each of theſe veſſels is furniſhed with a thin membranous production, which is attached all round to the borders of their ſeveral orifices, from whence hanging looſely down they appear to be divided into two or three diſtinct portions. But as their uſes in the arteries and veins are different, ſo are they differently diſpoſed. Thoſe of the arteries are intended to give way to the paſſage of the blood into them from the ventricles, but to oppoſe its return: and, on the contrary, the valves of the veins are conſtructed ſo as to allow the blood only to paſs into the heart. In conſequence of theſe different uſes, we find the valves of the pulmonary artery and of the aorta attached to the orifices of thoſe veſſels, ſo as to have their concave ſurfaces turned towards the artery; and their convex ſurfaces, which mutually meet together, being placed towards the ventricle, only permit the blood to paſs one way, which is into the arteries. There are uſually three of theſe valves belonging to the pulmonary artery, and as many to the aorta; and from their figure they are called *valvulæ ſemilunares*. The communication between the two great veins and the ventricles is by means of the two appendages or auricles into which the blood is diſcharged; ſo that the other valves which may be ſaid to belong to the veins, are placed in each ventricle, where the auricle opens into it. The valves in the right ventricle are uſually three in number, and are named *valvulæ tricuſpides;* but in the left ventricle we commonly obſerve only two, and theſe are the *valvulæ mitrales*. The membranes which form theſe valves in each cavity are attached ſo as to project ſomewhat forward; and both the *tricuſpides* and the *mitrales* are connected with the tendinous ſtrings, which were deſcribed as ariſing from the fleſhy *columnæ*. By the contraction of either ventricle the blood is driven into the artery which communicates with that ventricle; and theſe tendinous ſtrings being gradually relaxed as the ſides of the cavity are brought nearer to each other, the valves naturally cloſe the opening into the auricle, and the blood neceſſarily directs its courſe into the then only open paſſage, which is into the artery; but after this contraction the heart becomes relaxed, the tendinous ſtrings are again ſtretched out, and, drawing the valves of the auricle downwards, the blood is poured by the veins into the ventricle, from whence, by another contraction, it is again thrown into the artery, as will be deſcribed hereafter. The right ventricle is not quite ſo long, though ſomewhat larger, than the left; but the latter has more ſubſtance than the other; and this ſeems to be, becauſe it is intended to tranſmit the blood to the moſt diſtant parts of the body, whereas the right ventricle diſtributes it only to the lungs.

Of the Thorax.

The heart receives its nerves from the par vagum and the intercoſtals. The arteries which ſerve for its nouriſhment are two in number, and ariſe from the aorta. They ſurround in ſome meaſure the baſis of the heart, and from this courſe are called the *coronary arteries*. From theſe arteries the blood is returned by veins of the ſame name into the auricles, and even into the ventricles.

The muſcular bags called the *auricles* are ſituated at the baſis of the heart, at the ſides of each other; and, correſponding with the two ventricles, are like thoſe two cavities diſtinguiſhed into *right* and *left*. Theſe ſacs, which are anteriorly unequal, have externally a jagged appendix; which, from its having been compared to the extremity of an ear, has given them their name of *auricles*.

Sect. XI. *Angiology, or a Deſcription of the Blood Veſſels.*

The heart has been deſcribed as contracting itſelf, and throwing the blood from its two ventricles into the pulmonary artery and the aorta, and then as relaxing itſelf and receiving a freſh ſupply from two large veins, which are the pulmonary vein and the vena cava. We will now point out the principal diſtributions of theſe veſſels. 126

The *pulmonary artery* ariſes from the right ventricle by a large trunk, which ſoon divides into two conſiderable branches, which paſs to the right and left lobes of the lungs: each of theſe branches is afterwards divided and ſubdivided into an infinite number of branches and ramifications, which extend through the whole ſubſtance of the lungs; and from theſe branches the blood is returned by the veins, which, contrary to the courſe of the arteries, begin by very minute canals, and gradually become larger, forming at length four large trunks called *pulmonary veins*, which terminate in the *left auricle* by one common opening, from whence the blood paſſes into the *left ventricle*. From this ſame ventricle ariſes the *aorta* or *great artery*, which at its beginning is nearly an inch in diameter: it ſoon ſends off two branches, the *coronaries*, which go to be diſtributed to the heart and its auricles. After this, at or about the third or fourth vertebra of the back, it makes a conſiderable curvature; from this curvature (B) ariſe three arteries; one

(A) Authors differ about the courſe and diſtinctions of theſe fibres; and it ſeems right to obſerve, that the ſtructure of the heart being more compact than that of other muſcles, its fibres are not eaſily ſeparated.

(B) Anatomiſts uſually call the upper part of this curvature *aorta aſcendens;* and the other part of the artery to its diviſion at the iliacs, *aorta deſcendens;* but they differ about the place where this diſtinction is to be introduced; and it ſeems ſufficiently to anſwer every purpoſe, to ſpeak only of the aorta and its curvature.

Of the Thorax.

of which ſoon divides into two branches. The firſt two are the left ſubclavian and the left carotid, and the third is a common trunk to the right ſubclavian and right carotid; though ſometimes both the carotids ariſe diſtinctly from the aorta.

The two *carotids* aſcend within the ſubclavians, along the ſides of the trachea; and when they have reached the larynx, divide into two principal branches, the *internal* and *external carotid*. The firſt of theſe runs a little way backwards in a bending direction; and having reached the under part of the ear, paſſes through the canal in the os petroſum, and entering into the cavity of the cranium, is diſtributed to the brain and the membranes which envelope it, and likewiſe to the eye. The *external carotid* divides into ſeveral branches, which are diſtributed to the larynx, pharynx, and other parts of the neck; and to the jaws, lips, tongue, eyes, temples, and all the external parts of the head.

Each *ſubclavian* is likewiſe divided into a great number of branches. It ſends off the *vertebral artery*, which paſſes through the openings we ſee at the bottom of the tranſverſe proceſſes of the vertebræ of the neck, and in its courſe ſends off many ramifications to the neighbouring parts. Some of its branches are diſtributed to the ſpinal marrow, and after a conſiderable inflection it enters into the cranium, and is diſtributed to the brain. The ſubclavian likewiſe ſends off branches to the muſcles of the neck and ſcapula; and the mediaſtinum, thymus, pericardium, diaphragm, the breaſt, and the muſcles of the thorax, and even of the abdomen, derive branches from the ſubclavian, which are diſtinguiſhed by different names, alluding to the parts to which they are diſtributed; as the *mammary*, the *phrenic*, the *intercoſtal*, &c. But notwithſtanding the great number of branches which have been deſcribed as ariſing from the ſubclavian, it is ſtill a conſiderable artery when it reaches the *axilla*, where it drops its former name, which alludes to its paſſage under the clavicle, and is called the *axillary* artery; from which a variety of branches are diſtributed to the muſcles of the breaſt, ſcapula, and arm.—But its main trunk taking the name of *brachialis*, runs along on the inſide of the arm near the os humeri, till it reaches the joint of the fore arm, and then it divides into two branches. This diviſion, however, is different in different ſubjects; for in ſome it takes place higher up, and in others lower down. When it happens to divide above the joint, it may be conſidered as a happy diſpoſition in caſe of an accident by bleeding; for ſuppoſing the artery to be unfortunately punctured by the lancet, and that the hæmorrhage could only be ſtopped by making a ligature on the veſſel, one branch would remain unhurt, through which the blood would paſs uninterrupted to the fore arm and hand. One of the two branches of the brachialis plunges down under the flexor muſcles, and runs along the edge of the ulna; while the other is carried along the outer ſurface of the radius, and is eaſily felt at the wriſt, where it is only covered by the common integuments. Both theſe branches commonly unite in the palm of the hand, and form an arterial arch, from whence branches are detached to the fingers.

The *aorta*, after having given off at its curvature the carotids and ſubclavians which convey blood to all the upper parts of the body, deſcends upon the bodies of the vertebræ a little to the left, as far as the os ſacrum, where it drops the name of *aorta*, and divides into two conſiderable branches. In this courſe, from its curvature to its bifurcation, it ſends off ſeveral arteries in the following order: 1. One or two little arteries, firſt demonſtrated by Ruyſch as going to the bronchi, and called *arteriæ bronchiales Ruyſchii*. 2. The arteriæ œſophageæ. Theſe are commonly three or four in number. They ariſe from the fore part of the aorta, and are diſtributed chiefly to the œſophagus. 3. The inferior intercoſtal arteries, which are diſtributed between the ribs in the ſame manner as the arteries of the three or four ſuperior ribs are, which are derived from the ſubclavian. Theſe arteries ſend off branches to the medulla ſpinalis. 4. The diaphragmatic or inferior phrenic arteries, which go to the diaphragm, ſtomach, omentum, duodenum, pancreas, ſpleen, liver, and gall-bladder. 5. The cœliac, which ſends off the coronary ſtomachic, the ſplenic, and the hepatic artery. 6. The ſuperior meſenteric artery, which is diſtributed to the meſentery and ſmall inteſtines. 7. The emulgents, which go to the kidneys. 8. The arteries which are diſtributed to the glandulæ renales. 9. The ſpermatic. 10. The inferior meſenteric artery, which ramifies through the lower portion of the meſentery and the large inteſtines. A branch of this artery which goes to the rectum is called the *internal hæmorrhoidal*. 11. The lumbar arteries, and a very ſmall branch called the *ſacra*, which are diſtributed to the muſcles of the loins and abdomen, and to the os ſacrum and medulla ſpinalis.

Of the Thorax.

The trunk of the aorta, when it has reached the laſt vertebra lumborum, or the os ſacrum, drops the name of *aorta*, and ſeparates into two forked branches called the *iliacs*. Each of theſe ſoon divides into two branches; one of which is called the *internal iliac*, or *hypogaſtric artery*, and is diſtributed upon the contents of the pelvis and upon the muſcles on its outer ſide. One branch, called *pudenda communis*, ſends ſmall ramifications to the end of the rectum under the name of *hæmorrhoidales externæ*, and is afterwards diſtributed upon the penis. The other branch, the external iliac, after having given off the circumflex artery of the os ilium and the epigaſtric, which is diſtributed to the recti-muſcles, paſſes out of the abdomen under Poupart's ligament, and takes the name of *crural artery*. It deſcends on the inner part of the thigh cloſe to the os femoris, ſending off branches to the muſcles, and then ſinking deeper in the hind part of the thigh, reaches the ham, where it takes the name of *popliteal*; after this it ſeparates into two conſiderable branches; one of which is called the *anterior tibial artery*; the other divides into two branches, and theſe arteries all go to be diſtributed to the leg and foot.

The blood, which is thus diſtributed by the aorta to all parts of the body, is brought back by the veins, which are ſuppoſed to be continued from the ultimate branches of arteries; and uniting together as they approach the heart, at length form the large trunks, the vena cava aſcendens, and vena cava deſcendens.

All the veins which bring back the blood from the upper extremities, and from the head and breaſt, paſs into the vena cava deſcendens; and thoſe which return it from the lower parts of the body terminate in the

vena

Of the Thorax.

vena cava aſcendens; and theſe two cavas uniting together as they approach the heart, open by one common orifice into the left auricle.

It does not here ſeem to be neceſſary to follow the different diviſions of the veins as we did thoſe of the arteries; and it will be ſufficient to remark, that in general every artery is accompanied by its vein, and that both are diſtinguiſhed by the ſame name. But, like many other general rules, this too has its exceptions (c). The veins, for inſtance, which accompany the external and internal carotid, are not called the *carotid veins*, but the *external* and *internal jugular*.—In the thorax there is a vein diſtinguiſhed by a proper name, and this is the *azygos*, or *vena ſine pari*. This vein, which is a pretty conſiderable one, runs along by the right ſide of the vertebræ of the back, and is chiefly deſtined to receive the blood from the intercoſtals on that ſide, and from the lower half of thoſe on the left ſide, and to convey it into the vena cava deſcendens. In the abdomen we meet with a vein, which is ſtill a more remarkable one, and this is the *vena portæ*, which performs the office both of an artery and a vein. It is formed by a reunion of all the veins which come from the ſtomach, inteſtines, omentum, pancreas, and ſpleen, ſo as to compoſe one great trunk, which goes to ramify through the liver; and after having depoſited the bile, its ramifications unite, and bring back into the vena cava, not only the blood which the vena portæ had carried into the liver, but likewiſe the blood from the hepatic artery. Every artery has a vein which correſponds with it; but the trunks and branches of the veins are more numerous than thoſe of the arteries. The reaſons for this diſpoſition are perhaps not difficult to be explained; the blood in its courſe through the veins is much farther removed from the ſource and cauſe of its motion, which are in the heart, than it was when in the arteries; ſo that its courſe is conſequently leſs rapid, and enough of it could not poſſibly be brought back to the heart in the moment of its dilatation, to equal the quantity which is driven into the arteries from the two ventricles, at the time they contract; and the equilibrium, which is ſo eſſential to the continuance of life and health, would conſequently be deſtroyed, if the capacity of the veins did not exceed that of the arteries, in the ſame proportion that the rapidity of the blood's motion through the arteries exceeds that of its return through the veins.

A large artery ramifying through the body, and continued to the minute branches of veins, which gradually unite together to form a large trunk, may be compared to two trees united to each other at their tops; or rather as having their ramifications ſo diſpoſed that the two trunks terminate in one common point; and if we farther ſuppoſe, that both theſe trunks and their branches are hollow, and that a fluid is inceſſantly circulated through them, by entering into one of the trunks and returning through the other, we ſhall be enabled to conceive how the blood is circulated through the veſſels of the human body.

Of the Thorax.

Every trunk of an artery, before it divides, is nearly cylindrical, or of equal diameter through its whole length, and ſo are all its branches when examined ſeparately. But every trunk ſeems to contain leſs blood than the many branches do into which that trunk ſeparates; and each of theſe branches probably contains leſs blood than the ramifications do into which it is ſubdivided: and it is the ſame with the veins; the volume of their ſeveral ramifications, when conſidered together, being found to exceed that of the great trunk which they form by their union.

The return of the blood through the veins to the heart, is promoted by the action of the muſcles, and the pulſation of the arteries. And this return is likewiſe greatly aſſiſted by the *valves* which are to be met with in the veins, and which conſtitute one of the great diſtinctions between them and the arteries. Theſe valves, which are ſuppoſed to be formed by the inner coat of the veins, permit the blood to flow from the extremities towards the heart, but oppoſe its return. They are moſt frequent in the ſmaller veins. As the column of blood increaſes, they ſeem to become leſs neceſſary; and therefore in the vena cava aſcendens, we meet with only one valve, which is near its origin.

The arteries are compoſed of ſeveral tunics. Some writers enumerate five of theſe tunics; but perhaps we may more properly reckon only three, viz. the *nervous*, *muſcular*, and *cuticular* coats. The veins are by ſome anatomiſts deſcribed as having the ſame number of coats as the arteries; but as they do not ſeem to be irritable, we cannot with propriety ſuppoſe them to have a muſcular tunic. We are aware of Dr Verſchuir's experiments to prove that the jugular and ſome other veins poſſeſs a certain degree of irritability; but it is certain, that his experiments, repeated by others, have produced a different reſult; and even he himſelf allows, that ſometimes he was unable to diſtinguiſh any ſuch property in the veins. Both theſe ſeries of veſſels are nouriſhed by ſtill more minute arteries and veins, which are ſeen creeping over their coats and ramifying through their whole ſubſtance, and are called *vaſa vaſorum;* they have likewiſe many minute branches of nerves. *De Arteriarum et Venarum vi irritabili*, 4to.

The arteries are much ſtronger than the veins; and they ſeem to require this force, to be enabled to reſiſt the impetus with which the blood circulates through them, and to impel it on towards the veins.

When the heart contracts, it impels the blood into the arteries, and ſenſibly diſtends them; and theſe veſſels again contract, as the heart becomes relaxed to receive more blood from the auricles; ſo that the cauſe of the contraction and dilatation of the *arteries* ſeems to be eaſy to be underſtood, being owing in part to their own contractile power, and in part to the action of the heart; but in the *veins*, the effects of this impulſe not being ſo ſenſibly felt, and the veſſels themſelves having little or no contractile power, the blood ſeems to flow in a conſtant and equal ſtream: and this, together with its paſſing gradually from a ſmall channel into a larger one, ſeems to be the reaſon why the

veins

(c) In the extremities, ſome of the deep-ſeated veins, and all the ſuperficial ones, take a courſe different from that of the arteries.

Of the Thorax.

veins have no pulſatory motion, except the large ones near the heart; and in theſe it ſeems to be occaſioned by the motion of the diaphragm, and by the regurgitation of the blood in the *cavas*.

Sect. XII. *Of the Action of the Heart, Auricles, and Arteries.*

127 The heart, at the time it contracts, drives the blood from its ventricles into the arteries; and the arteries being thus filled and diſtended, are naturally inclined to contract the moment the heart begins to dilate, and ceaſes to ſupply them with blood. Theſe alternate motions of contraction and dilatation of the heart and arteries, are diſtinguiſhed by the names of *ſyſtole* and *diaſtole*. When the heart is in a ſtate of contraction or ſyſtole, the arteries are at that inſtant diſtended with blood, and in their diaſtole; and it is in this ſtate we feel their pulſatory motion, which we call the *pulſe*. When the heart dilates, and the arteries contract, the blood is impelled onwards into the veins, through which it is returned back to the heart. While the heart, however, is in its ſyſtole, the blood cannot paſs from the veins into the ventricles, but is detained in the auricles, which are two reſervoirs formed for this uſe, till the diaſtole, or dilatation of the heart, takes place; and then the diſtended auricles contract, and drive the blood into the ventricles: ſo that the auricles have an alternate ſyſtole and diaſtole as well as the heart.

Although both the ventricles of the heart contract at the ſame time, yet the blood paſſes from one to the other. In the ſame moment, for inſtance, that the left ventricle drives the blood into the aorta, the right ventricle impels it into the pulmonary artery, which is diſtributed through all the ſubſtance of the lungs. The blood is afterwards brought back into the left ventricle by the pulmonary vein, at the ſame time that the blood is returned by the cavas, into the right ventricle, from all the other parts of the body.

This ſeems to be the mode of action of the heart and its veſſels: but the cauſe of this action has, like all other intricate and intereſting ſubjects, been differently explained. It ſeems to depend on the ſtimulus made on the different parts of the heart by the blood itſelf, which, by its quantity and heat, or other properties (D), is perhaps capable of firſt exciting that motion, which is afterwards continued through life, independent of the will, by a regular return of blood to the auricles, in a quantity proportioned to that which is thrown into the arteries.

The heart poſſeſſes the *vis inſita*, or principle of irritability, in a much greater degree than any other muſcle of the body. The pulſe is quicker in young than in old ſubjects, becauſe the former are *cæt. par.* more irritable than the latter. Upon the ſame principle we may explain, why the pulſe is conſtantly quicker in weak than in robuſt perſons.

Sect. XIII. *Of the Circulation.*

Of the Thorax.

After what has been obſerved of the ſtructure and action of the heart and its auricles, and likewiſe of the arteries and veins, there ſeem to be but very few arguments required to demonſtrate the *circulation of the blood*, which has long ſince been eſtabliſhed as a medical truth. This circulation may be defined to be a perpetual motion of the blood, in conſequence of the action of the heart and arteries, which impel it through all the parts of the body, from whence it is brought back by the veins to the heart. 128

A very ſatisfactory proof of this circulation, and a proof eaſy to be underſtood, may be deduced from the different effects of preſſure on an artery and a vein. If a ligature, for inſtance, is paſſed round an artery, the veſſel ſwells conſiderably between the ligature and the heart; whereas if we tie up a vein, it only becomes filled between the extremity and the ligature, and this is what we every day obſerve in bleeding. The ligature we paſs round the arm on theſe occaſions, compreſſes the ſuperficial veins; and the return of the blood through them being impeded, they become diſtended. When the ligature is too looſe, the veins are not ſufficiently compreſſed, and the blood continues its progreſs towards the heart; and, on the contrary, when it is made too tight, the arteries themſelves become compreſſed; and the flow of the blood through them being impeded, the veins cannot be diſtended.

Another phenomenon, which effectually proves the circulation, is the loſs of blood that every living animal ſuſtains by opening only a ſingle artery of a moderate ſize; for it continues to flow from the wounded veſſel till the equilibrium is deſtroyed which is eſſential to life. This truth was not unknown to the ancients; and it ſeems ſtrange that it did not lead them to a knowledge of the circulation, as it ſufficiently proves, that all the other veſſels muſt communicate with that which is opened. Galen, who lived more than 1500 years ago, drew this concluſion from it; and if we farther obſerve, that he deſcribes (after Eraſiſtratus, who flouriſhed about 450 years before him) the ſeveral valves of the heart, and determines their diſpoſition and uſes, it will appear wonderful, that a period of near 2000 years ſhould afterwards elapſe before the true courſe of the blood was aſcertained. This diſcovery, for which we are indebted to the immortal Harvey, has thrown new lights on phyſiology and the doctrine of diſeaſes, and conſtitutes one of the moſt important periods of anatomical hiſtory.

Sect. XIV. *Of the Nature of the Blood.*

Blood, recently drawn from a vein into a baſon, would ſeem to be an homogeneous fluid of a red colour (E); but when ſuffered to reſt, it ſoon coagulates, and divides into two parts, which are diſtinguiſhed by the 129

(D) Dr Harvey long ago ſuggeſted, that the blood is poſſeſſed of a living principle; and Mr J. Hunter has lately endeavoured to revive this doctrine; in ſupport of which he has adduced many ingenious arguments. The ſubject is a curious one, and deſerves to be proſecuted as an inquiry which cannot but be intereſting to phyſiologiſts.

(E) The blood, as it flows through the arteries, is obſerved to be more florid than it is in the veins; and this redneſs is acquired in its paſſage through the lungs. Vid. Sect. VII.

Of the Thorax.

the names of *craſſamentum* and *ſerum*. The craſſamentum is the red coagulum, and the ſerum is the water in which it floats. Each of theſe may be again ſeparated into two others; for the craſſamentum, by being repeatedly waſhed in warm water, gives out all its red globules, and what remains appears to be compoſed of the coagulable lymph (F), which is a gelatinous ſubſtance, capable of being hardened by fire till it becomes perfectly horny: and if we expoſe the ſerum to a certain degree of heat, part of it will be found to coagulate like the white of an egg, and there will remain a clear and limpid water, reſembling urine both in its appearance and ſmell.

The ſerum and craſſamentum differ in their proportion in different conſtitutions; in a ſtrong perſon, the craſſamentum is in a greater proportion to the ſerum than in a weak one*; and the ſame difference is found to take place in diſeaſes (G).

* *Hewſon's Experim. Inq.* Part I.

Sect. XV. *Of Nutrition.*

130 The variety of functions which we have deſcribed as being inceſſantly performed by the living body, and the continual circulation of the blood through it, muſt neceſſarily occaſion a conſtant diſſipation of the ſeveral parts which enter into its compoſition. In ſpeaking of the inſenſible perſpiration, we obſerved how much was inceſſantly paſſing off from the lungs and the ſurface of the ſkin. The diſcharge by urine is likewiſe every day conſiderable; and great part of the bile, ſaliva, &c. are excluded by ſtool. But the ſolid, as well as the fluid parts of the body, require a conſtant renewal of nutritious particles. They are expoſed to the attrition of the fluids which are circulated through them; and the contraction and relaxation they repeat ſo many thouſand times in every day, would neceſſarily occaſion a diſſolution of the machine, if the renewal was not proportioned to the waſte.

It is eaſy to conceive how the chyle formed from the aliment is aſſimilated into the nature of blood, and repairs the loſs of the fluid parts of our body; but how the ſolids are renewed, has never yet been ſatisfactorily explained. The nutritious parts of the blood are probably depoſited by the arteries by exudation through their pores into the tela celluloſa; and as the ſolid parts of the body are in the embryo only a kind of jelly, which gradually acquires the degree of conſiſtence they are found to have when the body arrives at a more advanced age; and theſe ſame parts which conſiſt of bones, cartilages, ligaments, muſcles, &c. are ſometimes reduced again by diſeaſe to a gelatinous ſtate; we may, with ſome degree of probability, conſider the coagulable lymph as the ſource of nutrition.

Of the Thorax.

If the ſupply of nouriſhment exceeds the degree of waſte, the body increaſes; and this happens in infancy and in youth: for at thoſe periods, but more particularly the former one, the fluids bear a large proportion to the ſolids; and the fibres being ſoft and yielding, are proportionably more capable of extenſion and increaſe. But when the ſupply of nutrition only equals the waſte, we neither increaſe nor decreaſe; and we find this to be the caſe when the body has attained its full growth or *acme*: for the ſolids having then acquired a certain degree of firmneſs and rigidity, do not permit a farther increaſe of the body. But as we approach to old age, rigidity begins to be in exceſs, and the fluids (H) bear a much leſs proportion to the ſolids than before. The diſſipation of the body is greater than the ſupply of nouriſhment; many of the ſmaller veſſels become gradually impervious (I); and the fibres loſing their moiſture and their elaſticity, appear flaccid and wrinkled. The lilies and the roſes diſappear, becauſe the fluids by which they were produced can no longer reach the extremities of the capillary veſſels of the ſkin. As theſe changes take place, the nervous power being proportionably weakened, the irritability and ſenſibility of the body, which were formerly ſo remarkable, are greatly diminiſhed; and in advanced life, the hearing, the eye-ſight, and all the other ſenſes, become gradually impaired.

Sect. XVI. *Of the Glands and Secretions.*

131 The glands are commonly underſtood to be ſmall, roundiſh, or oval bodies, formed by the convolution of a great number of veſſels, and deſtined to ſeparate particular humours from the maſs of blood.

They are uſually divided into two claſſes; but it ſeems more

(F) It may not be improper to obſerve, that till of late the *coagulable lymph* has been confounded with the *ſerum* of the blood, which contains a ſubſtance that is likewiſe coagulable, though only when expoſed to heat, or combined with certain chemical ſubſtances; whereas the other coagulates ſpontaneouſly when expoſed to the air or to reſt.

(G) When the blood ſeparates into *ſerum* and *craſſamentum*, if the latter be covered with a cruſt of a whitiſh or buff colour, it has been uſually conſidered as a certain proof of the blood's being in a ſtate of too great viſcidity. This appearance commonly taking place in inflammatory diſeaſes, has long ſerved to confirm the theory which aſcribes the cauſe of inflammation to lentor and obſtructions. But from the late Mr Hewſon's experiments it appears, that when the action of the arteries is increaſed, the blood, inſtead of being more viſcid, is, on the contrary, more fluid than in the ordinary ſtate previous to inflammation; and that in conſequence of this, the coagulable lymph ſuffers the red globules, which are the heavieſt part of the blood, to fall down to the bottom before it coagulates: ſo that the craſſamentum is divided into two parts; one of which is found to conſiſt of the coagulable lymph alone (in this caſe termed the *buff*); and the other, partly of this and partly of the red globules.

(H) As the fluids become leſs in proportion to the ſolids, their acrimony is found to increaſe; and this may perhaps compenſate for the want of fluidity in the blood, by diminiſhing its coheſion.

(I) In infancy, the arteries are numerous and large in reſpect to the veins, and the lymphatic glands are larger than at any other time of life; whereas, in old age, the capacity of the venous ſyſtem exceeds that of the arteries, and the lymphatic ſyſtem almoſt diſappears.

Of the Thorax.

more proper to diſtinguiſh three kinds of glands, viz. the mucous, conglobate, and conglomerate.

The *mucous glands*, or follicles as they are moſt commonly called, are ſmall cylindrical tubes continued from the ends of arteries. In ſome parts of the body, as in the tonſils, for example, ſeveral of theſe follicles may be ſeen folded together in one common covering, and opening into one common ſinus. Theſe follicles are the veſſels that ſecrete and pour out mucus in the mouth, œſophagus, ſtomach, inteſtines, and other parts of the body.

The *conglobate glands* are peculiar to the lymphatic ſyſtem. Every lymphatic vein paſſes through a gland of this kind in its way to the thoracic duct. They are met with in different parts of the body, particularly in the axilla, groin, and meſentery, and are either ſolitary or in diſtinct cluſters.

The *conglomerate glands* are of much greater bulk than the conglobate, and ſeem to be an aſſemblage of many ſmaller glands. Of this kind are the liver, kidneys, &c. Some of them, as the pancreas, parotids, &c. have a granulated appearance. All theſe conglomerate glands are plentifully ſupplied with blood veſſels; but their nerves are in general very minute, and few in number. Each little granulated portion furniſhes a ſmall tube, which unites with other ſimilar ducts, to form the common excretory duct of the gland.

The principal glands, and the humours they ſecrete, have been already deſcribed in different parts of this work; and there only remains for us to examine the general ſtructure of the glands, and to explain the mechaniſm of ſecretion. On the firſt of theſe ſubjects two different ſyſtems have been formed; each of which has had, and ſtill continues to have, its adherents. One of theſe ſyſtems was advanced by Malpighi, who ſuppoſed that an artery entering into a gland ramifies very minutely through its whole ſubſtance; and that its branches ultimately terminate in a veſicular cavity or follicle, from whence the ſecreted fluid paſſes out through the excretory duct. This doctrine at firſt met with few opponents; but the celebrated Ruyſch, who firſt attempted minute injections with wax, afterwards diſputed the exiſtence of theſe follicles, and aſſerted, that every gland appears to be a continued ſeries of veſſels, which after being repeatedly convoluted in their courſe through its ſubſtance, at length terminate in the excretory duct. Anatomiſts are ſtill divided between theſe two ſyſtems: that of Malpighi, however, ſeems to be the beſt founded.

The mode of ſecretion has been explained in a variety of ways, and they are all perfectly hypothetical. In ſuch an inquiry, it is natural to aſk, how one gland conſtantly ſeparates a particular humour, while another gland ſecretes one of a very different nature from the blood? The bile, for inſtance, is ſeparated by the liver, and the urine by the kidneys. Are theſe ſecretions to be imputed to any particular diſpoſition in the fluids, or is their cauſe to be looked for in the ſolids?

It has been ſuppoſed, that every gland contains within itſelf a fermenting principle, by which it is enabled to change the nature of the blood it receives, and to endue it with a particular property. Thus, according to this ſyſtem, the blood, as it circulates through the kidneys, becomes mixed with the fermenting principle of thoſe glands, and a part of it is converted into urine; and again in the liver, in the ſalival and other glands, the bile, the ſaliva, and other juices, are generated from a ſimilar cauſe. But it ſeems to be impoſſible for any liquor to be confined in a place expoſed to the circulation, without being carried away by the torrent of blood, every part of which would be equally affected; and this ſyſtem of fermentation has long been rejected as vague and chimerical. But as the cauſe of ſecretion continued to be looked for in the fluids, the former ſyſtem was ſucceeded by another, in which recourſe was had to the analogy of the humours. It was obſerved, that if paper be moiſtened with water, and oil and water be afterwards poured upon it, that the water only will be permitted to paſs through it; but that, on the other hand, if the paper has been previouſly ſoaked in oil inſtead of water, the oil only, and not the water, will be filtered through it. Theſe obſervations led to a ſuppoſition, that every ſecretory organ is originally furniſhed with a humour analogous to that which it is afterwards deſtined to ſeparate from the blood; and that in conſequence of this diſpoſition, the ſecretory veſſels of the liver, for inſtance, will only admit the bilious particles of the blood, while all the other humours will be excluded. This ſyſtem is an ingenious one, but the difficulties with which it abounds are unanſwerable: for oil and water are immiſcible; whereas the blood, as it is circulated through the body, appears to be a homogeneous fluid. Every oil will paſs through a paper moiſtened only with one kind of oil; and wine, or ſpirits mixed with water, will eaſily be filtered through a paper previouſly ſoaked in water. Upon the ſame principle, all our humours, though differing in their other properties, yet agreeing in that of being perfectly miſcible with each other, will all eaſily paſs through the ſame filtre.—But theſe are not all the objections to this ſyſtem. The humours which are ſuppoſed to be placed in the ſecretory veſſels for the determination of ſimilar particles from the blood, muſt be originally ſeparated without any analagous fluid; and that which happens once, may as eaſily happen always. Again, It ſometimes happens, from a vitious diſpoſition, that humours are filtered through glands which are naturally not intended to afford them a paſſage: and when this once has happened, it ought, according to this ſyſtem, to be expected always to do ſo: whereas this is not the caſe; and we are, after all, naturally led to ſeek for the cauſe of ſecretion in the ſolids. It does not ſeem right to aſcribe it to any particular figure of the ſecretory veſſels; becauſe the ſoft texture of thoſe parts does not permit them to preſerve any conſtant ſhape, and our fluids ſeem to be capable of accommodating themſelves to every kind of figure. Some have imputed it to the difference of diameter in the orifices of the different ſecretory veſſels. To this doctrine objections have likewiſe been raiſed; and it has been argued, that the veſſels of the liver, for inſtance, would upon this principle, afford a paſſage not only to the bile, but to all the other humours of leſs conſiſtence with it. In reply to this objection, it has been ſuppoſed, that ſecondary veſſels exiſt, which originate from the firſt, and permit all the humours thinner than the bile to paſs through them.

Each of theſe hypotheſes is probably very remote from the truth.

EXPLANATION

EXPLANATION of PLATE XXX.

This Plate repreſents the Heart in ſitu, all the large Arteries and Veins, with ſome of the Muſcles, &c.

Muscles, &c.—Superior Extremity.—a, Maſſeter. b, Complexus. c, Digaſtricus. d, Os hyoides. e, Thyroid gland. f, Levator ſcapulæ. g, Cucullaris. hh, The clavicles cut. i, The deltoid muſcle. k, Biceps flexor cubiti cut. l, Coraco-brachialis. m, Triceps extenſor cubiti. n, The heads of the pronator teres, flexor carpi radialis, and flexor digitorum ſublimis, cut. o, The flexor carpi ulnaris cut at its extremity. p, Flexor digitorum profundus. q, Supinator radii longus, cut at its extremity. r, Ligamentum carpi tranſverſale. s, Extenſores carpi radiales. t, Latiſſimus dorſi. u, Anterior edge of the ſerratus anticus major. vv, The inferior part of the diaphragm. ww, Its interior edge cut. xx, The kidneys. y, Tranſverſus abdominis. z, Os ilium.

Inferior Extremity.—*a*, Pſoas magnus. *b*, Iliacus internus. *c*, The fleſhy origin of the tenſor vaginæ femoris. *dd*, The oſſa pubis cut from each other. *e*, Muſculus pectineus cut from its origin. *f*, Short head of the triceps adductor femoris cut. *g*, The great head of the triceps. *h*, The long head cut. *i*, Vaſtus internus. *k*, Vaſtus externus. *l*, Crureus. *m*, Gemellus. *n*, Soleus. *o*, Tibia. *p*, Peronæus longus. *q*, Peronæus brevis. *r*, Fibula.

Heart and Blood Vessels.—A, The heart, with the coronary arteries and veins. B, The right auricle of the heart. C, The aorta aſcendens. D, The left ſubclavian artery. E, The left carotid artery. F, The common trunk which ſends off the right ſubclavian and right carotid arteries. G, The carotis externa. H, Arteria facialis, which ſends off the coronary arteries of the lips. I, Arteria temporalis profunda. K, Aorta deſcendens. LL, The iliac arteries,—which ſend off MM, The femoral or crural arteries. *N. B.* The other arteries in this figure have the ſame diſtribution as the veins of the ſame name:—And generally, in the anatomical plates, the deſcription to be found on the one ſide points out the ſame parts in the other. 1, The frontal vein. 2, The facial vein. 3, Vena temporalis profunda. 4, Vena occipitalis. 5, Vena jugularis externa. 6, Vena jugularis interna, covering the arteria carotis communis. 7, The vaſcular arch on the palm of the hand, which is formed by 8, the radial artery and vein, and, 9, the ulnar artery and vein. 10 10, Cephalic vein. 11, Baſilic vein, that on the right ſide, cut. 12, Median vein. 13, The humeral vein, which, with the median, covers the humeral artery. 14 14, The external thoracic or mammary arteries and veins. 15, The axillary vein, covering the artery. 16 16, The ſubclavian veins, which, with (66) the jugulars, form, 17, The vena cava ſuperior. 18, The cutaneous arch of veins on the fore part of the foot. 19, The vena tibialis antica, covering the artery. 20, The vena profunda femoris, covering the artery. 21, The upper part of the vena ſaphena major. 22, The femoral vein. 23 23, The iliac veins. 24 24, Vena cava inferior. 25 25, The renal veins covering the arteries. 26 26, The diaphragmatic veins.

CHAP. V. OF THE BRAIN AND NERVES.

Sect. I. *Of the Brain and its Integuments.*

132 THE bones of the cranium were deſcribed in the oſteological part of this work, as encloſing the brain and defending it from external injury: but they are not

133 Integuments of the brain. its only protection; for when we make a horizontal ſection through theſe bones, we find this maſs everywhere ſurrounded by two membranes (k), the dura and pia mater.—The firſt of theſe lines the interior ſurface of the cranium, to which it everywhere adheres ſtrongly (l), but more particularly at the ſutures, and at the many foramina through which veſſels paſs between it and the pericranium. The *dura mater* (m) is perfectly ſmooth and inelaſtic, and its inner ſurface is conſtantly bedewed with a fine pellucid fluid, which everywhere ſeparates it from the pia mater. The dura mater ſends off

(k) The Greeks called theſe membranes *meninges*; but the Arabians, ſuppoſing them to be the ſource of all the other membranes of the body, afterwards gave them the name of *dura* and *pia mater*; by which they are now uſually diſtinguiſhed.

(l) In young ſubjects this adheſion is greater than in adults; but even then, in the healthy ſubject, it is nowhere eaſily ſeparable, without breaking through ſome of the minute veſſels by means of which it is attached to the bone.

(m) This membrane is commonly deſcribed as conſiſting of two laminæ; of which the external one is ſuppoſed to perform the office of perioſteum internum to the cranium, while the internal one forms the folds and proceſſes of the dura mater. In the natural ſtate, however, no ſuch ſeparation is apparent; like other membranes, we may indeed divide it, not into two only, but many laminæ; but this diviſion is artificial, and depends on the dexterity of the anatomiſt.

Of the Brain and Nerves.

off ſeveral conſiderable proceſſes, which divide the brain into ſeparate portions, and prevent them from compreſſing each other. Of theſe proceſſes there is one ſuperior and longitudinal, called the *falx* or *falciform proceſs*, from its reſemblance to a ſcythe. It ariſes from the ſpine of the os frontis, near the criſta galli, and extending along in the direction of the ſagittal ſuture, to beyond the lambdoidal ſuture, divides the brain into two hemiſpheres. A little below the lambdoidal ſuture, it divides into two broad wings or expanſions called the *tranſverſe* or *lateral proceſſes*, which prevent the lobes of the cerebrum from preſſing on the cerebellum. Beſides theſe there is a fourth, which is ſituated under the tranſverſe proceſſes, and being continued to the ſpine of the occiput, divides the cerebellum into two lobes.

The blood, after being diſtributed through the cavity of the cranium by means of the arteries, is returned, as in the other parts of the body, by veins which all paſs on to certain channels ſituated behind theſe ſeveral proceſſes.

Theſe canals or ſinuſes communicate with each other, and empty themſelves into the internal jugular veins, which convey the blood into the vena cava. They are in fact triangular veins, running through the ſubſtance of the dura mater, and, like the proceſſes, are diſtinguiſhed into *longitudinal* and *lateral;* and where theſe three meet, and where the fourth proceſs paſſes off, we obſerve a fourth ſinus, which is called *torcular;* Herophilus, who firſt deſcribed it, having ſuppoſed that the blood at the union of theſe two veins, is, as it were, in a preſs.

Beſides theſe four canals, which were known to the ancients, modern anatomiſts enumerate many others, by giving the appellation of *ſinuſes* to other veins of the dura mater, which for the moſt part empty themſelves into ſome of thoſe we have juſt now deſcribed. There are the inferior longitudinal ſinus, the ſuperior and inferior petrous ſinuſes, the cavernous ſinuſes, the circular ſinus, and the anterior and poſterior occipital ſinuſes.

Theſe ſinuſes or veins, by being conveyed through a thick denſe membrane, firmly ſuſpended, as the dura mater is, within the cranium, are leſs liable to rupture; at the ſame time they are well ſupported, and by running everywhere along the inner ſurface of the bones, they are prevented from preſſing on the ſubſtance of the brain. To prevent too great a dilatation of them, we find filaments (called *chordæ Williſii*, from their having been firſt noticed by Willis) ſtretched acroſs their cavities; and the oblique manner in which the veins from the brain run through the ſubſtance of the brain into theſe channels, ſerves the purpoſe of a valve, which prevents the blood from turning back into the ſmaller and weaker veſſels of the brain.

The *pia mater* is a much ſofter and finer membrane than the dura mater; being exceedingly delicate, tranſparent, and vaſcular. It inveſts every part of the brain, and ſends off an infinite number of elongations, which inſinuate themſelves between the convolutions, and even into the ſubſtance of the brain. This membrane is compoſed of two laminæ; of which the exterior one is named *tunica arachnoidea* from its thinneſs, which is equal to that of a ſpider's web. Theſe two laminæ are intimately adherent to each other, at the upper part of the brain, but are eaſily ſeparable at the baſis of the brain, and through the whole length of the medulla ſpinalis. The external layer, or tunica arachnoidea, appears to be ſpread uniformly over the ſurface of the brain, but without entering into its furrows as the inner layer does; the latter being found to inſinuate itſelf between the convolutions, and even into the interior cavities of the brain. The blood veſſels of the brain are diſtributed through it in their way to that organ, and are therefore divided into very minute ramifications, before they penetrate the ſubſtance of the brain.

Of the Brain and Nerves.

134 The brain.

There are ſeveral parts included under the general denomination of *brain*. One of theſe, which is of the ſofteſt conſiſtence, and fills the greateſt part of the cavity of the cranium, is the *cerebrum*, or *brain* properly ſo called. Another portion, which is ſeated in the inferior and poſterior part of the head, is the *cerebellum;* and a third, which derives its origin from both theſe, is the *medulla oblongata*.

135 Cerebrum.

The *cerebrum* is a medullary maſs of a moderate conſiſtence, filling up exactly all the upper part of the cavity of the cranium, and divided into two hemiſpheres by the falx of the dura mater. Each of theſe hemiſpheres is uſually diſtinguiſhed into *an interior*, *a middle*, and *a poſterior lobe*. The firſt of theſe is lodged on the orbital proceſſes of the os frontis; the middle lobes lie in the middle foſſæ of the baſis of the cranium, and the poſterior lobes are placed on the tranſverſe ſeptum of the os occipitis, immediately over the cerebellum, from which they are ſeparated by the lateral proceſſes of the dura mater. Theſe two portions afford no diſtinguiſhing mark of ſeparation; and on this account Haller, and many other modern anatomiſts, omit the diſtinction of the middle lobe, and ſpeak only of the anterior and poſterior lobes of the brain.

The cerebrum appears to be compoſed of two diſtinct ſubſtances. Of theſe, the exterior one, which is of a grayiſh or aſh colour, is called the *cortex*, and is ſomewhat ſofter than the other, which is very white, and is called *medulla*, or *ſubſtantia alba*.

After having removed the falx, and ſeparated the two hemiſpheres from each other, we perceive a white convex body, the corpus calloſum, which is a portion of the medullary ſubſtance, uniting the two hemiſpheres to each other, and not inveſted by the cortex. By making a horizontal inciſion into the brain, on a level with this corpus calloſum, we diſcover two oblong cavities, named the *anterior* or *lateral ventricles*, one in each hemiſphere. Theſe two ventricles, which communicate with each other by a hole immediately under the plexus choroides, are ſeparated laterally by a very fine medullary partition, called *ſeptum lucidum*, from its thinneſs and tranſparency. The lower edge of this ſeptum is fixed to the fornix, which is a kind of medullary arch (as its name implies) ſituated under the corpus calloſum, and nearly of a triangular ſhape. Anteriorly the fornix ſends off two medullary chords, called its *anterior crura;* which ſeem to be united to each other by a portion of medullary ſubſtance, named *commiſſura anterior cerebri*. Theſe crura diverging from one another, are loſt at the outer ſide of the lower and fore part of the third ventricle. Poſteriorly the fornix is formed into two other crura, which unite with

Of the Brain and Nerves.

with two medullary protuberances called *pedes hippocampi*, and ſometimes *cornua ammonis*, that extend along the back part of the lateral ventricles. The concave edge of the pedes hippocampi is covered by a medullary lamina, called *corpus fimbriatum*.

Neither the edges of the fornix, nor its poſterior crura, can be well diſtinguiſhed, till we have removed the plexus choroides. This is a production of the pia mater, which is ſpread over the lateral ventricles. Its looſe edges are collected, ſo as to appear like a vaſcular band on each ſide.

When we have removed this plexus, we diſcover ſeveral other protuberances included in the lateral ventricles. Theſe are the corpora ſtriata, the thalami nervorum opticorum, the tubercula quadrugemina, and the pineal gland.

The *corpora ſtriata* are two curved oblong eminences, that extend along the anterior part of the lateral ventricles. They derive their name from their ſtriated appearance, which is owing to an intermixture of the cortical and medullary ſubſtances of the brain. The *thalami nervorum opticorum*, are ſo called, becauſe the optic nerves ariſe chiefly from them, and they are likewiſe compoſed both of the cortex and medulla. They are ſeparated from the corpora ſtriata only by a kind of medullary chord, the geminum centrum ſemicirculare. The thalami are nearly of an oval ſhape, and are ſituated at the bottom of the upper cavity of the lateral ventricles. They are cloſely united, and at their convex part ſeem to become one body.

Anteriorly, in the ſpace between the thalami, we obſerve an orifice by which the lateral ventricles communicate, and another leads down from this, under the different appellations of *foramen commune anterius*, *vulva*, *iter ad infundibulum*, but more properly *iter ad tertium ventriculum*; and the ſeparation of the thalami from each other poſteriorly, forms another opening or interſtice called *anus*. This has been ſuppoſed to communicate with the third ventricle; but it does not, the bottom of it being ſhut up by the pia mater. The back part of the anus is formed by a kind of medullary band, which connects the thalami to each other, and is called *commiſſura poſterior cerebri*.

Behind the thalami and commiſſura poſterior, we obſerve a ſmall, ſoft, grayiſh, and oval body, about the ſize of a pea. This is the glandula pinealis; it is deſcribed by Galen under the name of *conarion*, and has been rendered famous by Deſcartes, who ſuppoſed it to be the ſeat of the ſoul. Galen ſeems formerly to have entertained the ſame opinion. Some modern writers have, with as little reaſon, imagined that the ſoul is placed in the corpus calloſum.

The pineal gland reſts upon four remarkable eminences, diſpoſed in pairs, and ſeated immediately below it. Theſe tubercles, which by the ancients were called *teſtes* and *nates*, have, ſince the time of Winſlow, been more commonly named *tubercula quadrugemina*.

Under the thalami we obſerve another cavity, the third ventricle, which terminates anteriorly in a ſmall medullary canal, the infundibulum, that leads to the glandula pituitaria. It has been doubted, whether the infundibulum is really hollow; but ſome late experiments on this part of the brain * by Profeſſor Murray of Upſal, clearly prove it to be a medullary canal, ſurrounded by both laminæ of the pia mater. After freezing the brain, this channel was found filled with ice; and De Haen tells † us, he found it dilated, and filled with a calcareous matter (N).

Of the Brain and Nerves.

* *Diſp. de Infundibulo Cerebri.*

† *Ratio Med.* tom. vi. p. 271.

The ſoft ſpongy body in which the infundibulum terminates, was by the ancients ſuppoſed to be of a glandular ſtructure, and deſtined to filter the ſeroſity of the brain. Spigelius pretended to have diſcovered its excretory duct, but it ſeems certain that no ſuch duct exiſts. It is of an oblong ſhape, compoſed, as it were of two lobes. In ruminant animals it is much larger than in man.

From the poſterior part of the third ventricle, we ſee a ſmall groove or channel, deſcending obliquely backwards. This channel, which is called the *aqueduct of Sylvius*, though it was known to the ancients, opens into another cavity of the brain, placed between the cerebellum and medulla oblongata, and called the *fourth ventricle*.

136 Cerebellum.

The *cerebellum*, which is divided into two lobes, is commonly ſuppoſed to be of a firmer texture than the cerebrum; but the truth is, that in the greater number of ſubjects, there appears to be no ſenſible difference in the conſiſtence of theſe two parts. It has more of the cortical than of the medullary ſubſtance in its compoſition.

The furrow that divides the two lobes of the cerebellum leads anteriorly to a proceſs, compoſed of medullary and cortical ſubſtances, covered by the pia mater; and which, from its being divided into numerous furrows, reſembling the rings of the earth worm, is named *proceſſus vermiformis*. This proceſs forms a kind of ring in its courſe between the lobes.

The ſurface of the cerebellum does not afford thoſe circumvolutions which appear in the cerebrum; but inſtead of theſe, we obſerve a great number of minute furrows, running parallel to each other, and nearly in a tranſverſe direction. The pia mater inſinuates itſelf into theſe furrows.

When we cut into the ſubſtance of the cerebellum, from above downwards, we find the medullary part running in a kind of ramifying courſe, and exhibiting an appearance that has gotten the name of *arbor vitæ*. Theſe ramifications unite to form a medullary trunk; the middle, anterior, and moſt conſiderable part of which forms two proceſſes, the crura cerebelli, which unite with the crura cerebri, to form the medulla oblongata. The reſt furniſhes two other proceſſes, which loſe themſelves under the nates, and thus unite the lobes of the cerebellum to the poſterior part of the cerebrum. Under the nates we obſerve a tranſverſe medullary line, or linea alba, running from one of theſe proceſſes to the other; and between them we find a very thin medullary lamina, covered with the pia mater, which the generality of anatomiſts have (though ſeemingly without reaſon) conſidered as a valve formed for cloſing the communication between the fourth ven-

(N) The under part of it, however, appears to be impervious; at leaſt no injection that can be depended on has been made to paſs from it into the glandula pituitaria without laceration of parts.

Of the Brain and Nerves.

tricle and the aquæductus Sylvii. Vieuſſens named it *valvula major cerebri*.

137 Medulla oblongata.

The *medulla oblongata* is ſituated in the middle, lower, and poſterior part of the cranium, and may be conſidered as a production or continuation of the whole medullary ſubſtance of the cerebrum and cerebellum, being formed by the union of two conſiderable medullary proceſſes of the cerebrum, called *crura cerebri*, with two other ſmaller ones from the cerebellum, which were juſt now ſpoken of under the name of *crura cerebelli*.

The crura cerebri ariſe from the middle and lower part of each hemiſphere. They are ſeparated from each other at their origin, but are united below, where they terminate in a middle protuberance, the *pons Varolii*, ſo called, becauſe Varolius compared it to a bridge. This name, however, can convey no idea of its real appearance. It is, in fact, nothing more than a medullary protuberance, nearly of a ſemiſpherical ſhape, which unites the crura cerebri to thoſe of the cerebellum.

Between the crura cerebri, and near the anterior edge of the pons Varolii, are two tubercles, compoſed externally of medullary, and internally of cineritious ſubſtance, to which Euſtachius firſt gave the name of *eminentiæ mamillares*.

Along the middle of the poſterior ſurface of the medulla oblongata, where it forms the anterior part of the fourth ventricle, we obſerve a kind of furrow which runs downwards and terminates in a point. About an inch above the lower extremity of this fiſſure, ſeveral medullary filaments are to be ſeen running towards it on each ſide in an oblique direction, ſo as to give it the appearance of a writing pen; hence it is called *calamus ſcriptorius*.

From the poſterior part of the pons Varolii, the medulla oblongata deſcends obliquely backwards; at its fore part, immediately behind the pons Varolii, we obſerve two pair of eminences, which were deſcribed by Euſtachius, but received no particular appellation till the time of Vieuſſens, who gave them the names of *corpora olivaria* and *corpora pyramidalia*. The former are the outermoſt, being placed one on each ſide. They are nearly of an oval ſhape, and are compoſed of medulla, with ſtreaks of cortical ſubſtance. Between theſe are the corpora pyramidalia, each of which terminates in a point. In the human ſubject theſe four eminences are ſometimes not eaſily diſtinguiſhed.

138 Medulla ſpinalis.

The *medulla ſpinalis*, or *ſpinal marrow*, which is the name given to the medullary chord that is extended down the vertebral canal, from the great foramen of the occipital bone to the bottom of the laſt lumbar vertebra, is a continuation of the medulla oblongata. Like the other parts of the brain, it is inveſted by the dura and pia mater. The firſt of theſe, in its paſſage out of the cranium, adheres to the foramen of the os occipitis. Its connexion with the ligamentary ſubſtance that lines the cavity of the ſpine, is only by means of cellular membrane; but between the ſeveral vertebræ, where the nerves paſs out of the ſpine, it ſends off prolongations, which adhere ſtrongly to the vertebral ligaments. Here, as in the cranium, the dura mater has its ſinuſes or large veins. Theſe are two in number, and are ſeen running on each ſide of the medullary column, from the foramen magnum of the os occipitis to the lower part of the os ſacrum. They communicate together by ramifying branches at each vertebra, and terminate in the vertebral, intercoſtal, and ſacral veins.

Of the Brain and Nerves.

The pia mater is connected with the dura mater by means of a thin tranſparent ſubſtance, which from its indentations between the ſpinal nerves has obtained the name of *ligamentum denticulatum*. It is ſomewhat firmer than the tunica arachnoidea, but in other reſpects reſembles that membrane. Its uſe is to ſupport the ſpinal marrow, that it may not affect the medulla oblongata by its weight.

The ſpinal marrow itſelf is externally of a white colour; but upon cutting into it we find its middle part compoſed of a darker coloured maſs, reſembling the cortex of the brain. When the marrow has reached the firſt lumbar vertebra, it becomes extremely narrow, and at length terminates in an oblong protuberance; from the extremity of which the pia mater ſends off a prolongation or ligament, reſembling a nerve, that perforates the dura mater, and is fixed to the os coccygis.

The medulla ſpinalis gives riſe to 30 or 31 pair of nerves, but they are not all of the ſame ſize, nor do they all run in the ſame direction. The upper ones are thinner than the reſt, and are placed almoſt tranſverſely: as we deſcend we find them running more and more obliquely downwards, till at length their courſe is almoſt perpendicular, ſo that the lowermoſt nerves exhibit an appearance that is called *cauda equina*, from its reſemblance to a horſe's tail.

The arteries that ramify through the different parts of the brain are derived from the internal carotid and from the vertebral arteries. The medulla ſpinalis is ſupplied by the anterior and poſterior ſpinal arteries, and likewiſe receives branches from the cervical, the inferior and ſuperior intercoſtal, the lumbar, and the ſacral arteries.

Sect. II. *Of the Nerves.*

139 The nerves are medullary chords, differing from each other in ſize, colour, and conſiſtence, and deriving their origin from the medulla oblongata and medulla ſpinalis. There are 39, and ſometimes 40, pair of theſe nerves; nine (o) of which originate from the medulla oblongata, and 30 or 31 from the medulla ſpinalis. They appear to be perfectly inelaſtic, and likewiſe to poſſeſs no irritability. If we irritate muſcular fibres, they immediately contract; but nothing of this ſort happens if we irritate a nerve. They carry with them a covering from the pia mater; but derive no tunic from the dura mater, as hath been generally, though erroneouſly, ſuppoſed, ever ſince the time of Galen

(o) It has been uſual to deſcribe ten pair of nerves as ariſing from the medulla oblongata; but as the tenth pair ariſe in the ſame manner as the other ſpinal nerves, Santorini, Heiſter, Haller, and others, ſeem very properly to have claſſed them among the nerves of the ſpine.

Of the Brain and Nerves.

Galen (p), the outer covering of the nerves being in fact nothing more than cellular membrane. This covering is very thick where the nerve is expoſed to the action of muſcles; but where it runs through a bony canal, or is ſecure from preſſure, the cellular tunic is extremely thin, or altogether wanting. We have inſtances of this in the portio mollis of the auditory nerve, and in the nerves of the heart.

By elevating, carefully and gently, the brain from the baſis of the cranium, we find the firſt nine pair ariſing in the following order: 1. The nervi olfactorii, diſtributed through the pituitary membrane, which conſtitutes the organ of ſmell. 2. The optici, which go to the eyes, where they receive the impreſſions of viſible objects. 3. The oculorum motores, ſo called becauſe they are diſtributed to the muſcles of the eye. 4. The pathetici, diſtributed to the ſuperior oblique muſcles of the eyes, the motion of which is expreſſive of certain paſſions of the ſoul. 5. The nerves of this pair ſoon divide into three principal branches, and each of theſe has a different name. Its upper diviſion is the ophthalmicus, which is diſtributed to various parts of the eyes, eyelids, forehead, noſe, and integuments of the face. The ſecond is called the *maxillaris ſuperior*, and the third *maxillaris inferior;* both which names allude to their diſtribution. 6. The abductores; each of theſe nerves is diſtributed to the abductor muſcle of the eye, ſo called, becauſe it helps to draw the globe of the eye from the noſe. 7. The auditorii (q), which are diſtributed through the organs of hearing. 8. The par vagum, which derives its name from the great number of parts, to which it gives branches both in the thorax and abdomen. 9. The linguales, or hypogloſſi, which are diſtributed to the tongue, and appear to contribute both to the organ of taſte and to the motions of the tongue (r).

It has already been obſerved, that the ſpinal marrow ſends off 30 or 31 pair of nerves; theſe are chiefly diſtributed to the exterior parts of the trunk and to the extremities. They are commonly diſtinguiſhed into the *cervical*, *dorſal*, *lumbar*, and *ſacral nerves*. The cervical, which paſs out from between the ſeveral vertebræ of the neck, are eight (s) in number; the dorſal, twelve; the lumbar, five; and the ſacral, five or ſix; the number of the latter depending on the number of holes in the os ſacrum. Each ſpinal nerve at its origin is compoſed of two faſciculi of medullary fibres. One of theſe faſciculi ariſes from the anterior, and the other from the poſterior, ſurface of the medulla. Theſe faſciculi are ſeparated by the ligamentum denticulatum; after which we find them contiguous to one another. They then perforate the dura mater, and unite to form a conſiderable knot or ganglion. Each of theſe ganglions ſends off two branches; one anterior, and the other poſterior. The anterior branches communicate with each other at their coming out of the ſpine, and likewiſe ſend off one, and ſometimes more branches, to aſſiſt in the formation of the intercoſtal nerve.

Of the Brain and Nerves.

The knots or ganglions of the nerves juſt now ſpoken of, are not only to be met with at their exit from the ſpine, but likewiſe in various parts of the body. They occur in the nerves of the medulla oblongata, as well as in thoſe of the ſpine. They are not the effects of diſeaſe, but are to be met with in the ſame parts of the ſame nerves, both in the fœtus and adult. They are commonly of an oblong ſhape, and of a grayiſh colour, ſomewhat inclined to red, which is perhaps owing to their being extremely vaſcular. Internally we are able to diſtinguiſh ſomething like an intermixture of the nervous filaments.

Some writers have conſidered them as ſo many little brains; Lanciſi fancied he had diſcovered muſcular fibres in them, but they are certainly not of an irritable nature. A late writer, Dr Johnſtone*, imagines they are intended to deprive us of the power of the will over certain parts, as the heart, for inſtance: but if this hypotheſis were well founded, we ſhould meet with them only in nerves leading to involuntary muſcles; whereas it is certain, that the voluntary muſcles receive their nerves through ganglions. Dr Monro, from obſerving the accurate intermixture of the minute nerves which compoſe them, conſiders them as new ſources of nervous energy †.

* *Eſſay on the Uſe of the Ganglions of the Nerves.*

The

† *Obſervations on the Nervous Syſtem.*

(p) Baron Haller and Profeſſor Zinn ſeem to have been the firſt who demonſtrated, that the dura mater is reflected upon and adheres to the perioſteum at the edges of the foramina that afford a paſſage to the nerves out of the cranium and vertebral canal, or is ſoon loſt in the cellular ſubſtance.

(q) This pair, ſoon after its entrance into the meatus auditorius internus, ſeparates into two branches. One of theſe is of a very ſoft and pulpy conſiſtence, is called the *portio mollis* of the ſeventh pair, and is ſpread over the inner part of the ear. The other paſſes out through the aqueduct of Fallopius in a firm chord, which is diſtinguiſhed as the portio dura, and is diſtributed to the external ear and other parts of the neck and face.

(r) Heiſter has ſummed up the uſes of theſe nine pair of nerves in the two following Latin verſes:

"*Olfaciens, cernens, oculoſque movens, patienſque,*
"*Guſtans, abducens, audienſque, vaganſque, loquenſque.*"

(s) Beſides theſe, there is another pair called *acceſſorii*, which ariſes from the medulla ſpinalis at its beginning; and aſcending through the great foramen of the os occipitis into the cranium, paſſes out again cloſe to the eighth pair, with which, however, it does not unite; and it is afterwards diſtributed chiefly to the muſcles of the neck, back, and ſcapula. In this courſe it ſends off filaments to different parts, and likewiſe communicates with ſeveral other nerves. Phyſiologiſts are at a loſs how to account for the ſingular origin and courſe of theſe nervi acceſſorii. The ancients conſidered them as branches of the eighth pair, diſtributed to muſcles of the ſcapula: Willis likewiſe conſidered them as appendages to that pair, and on that account named them *acceſſorii*. They are ſometimes called the *ſpinal* pair; but as this latter name is applicable to all the nerves of the ſpine indiſcriminately, it ſeems better to adopt that given by Willis.

Of the Brain and Nerves.

The nerves, like the blood veſſels, in their courſe through the body, communicate with each other; and each of theſe communications conſtitutes what is called a *plexus*, from whence branches are again detached to different parts of the body. Some of theſe are conſtant and conſiderable enough to be diſtinguiſhed by particular names, as the *ſemilunar plexus*, the *pulmonary plexus*, the *hepatic*, the *cardiac*, &c.

It would be foreign to the purpoſe of this work to follow the nerves through all their diſtributions; but it may be remembered, that in deſcribing the different viſcera, mention was made of the nerves diſtributed to them. There is one pair, however, called the *intercoſtal*, or *great ſympathetic nerve*, which ſeems to require particular notice, becauſe it has an almoſt univerſal connexion and correſpondence with all the other nerves of the body. Authors are not perfectly agreed about the origin of the intercoſtal; but it may perhaps not improperly be deſcribed, as beginning from filaments of the fifth and ſixth pair; it then paſſes out of the cranium, through the bony canal of the carotid, from whence it deſcends laterally cloſe to the bodies of the vertebræ, and receives branches from almoſt all the vertebral nerves; forming almoſt as many ganglions in its courſe through the thorax and abdomen. It ſends off an infinite number of branches to the viſcera in thoſe cavities, and forms ſeveral plexus with the branches of the eighth pair or par vagum.

That the nerves are deſtined to convey the principles of motion and ſenſibility to the brain from all parts of the ſyſtem, there can be no doubt; but how theſe effects are produced, no one has ever yet been able to determine. The inquiry has been a conſtant ſource of hypotheſis in all ages, and has produced ſome ingenious ideas, and many erroneous poſitions, but without having hitherto afforded much ſatisfactory information.

Of the Brain and Nerves.

Some phyſiologiſts have conſidered a trunk of nerves as a ſolid chord, capable of being divided into an infinite number of filaments, by means of which the impreſſions of feeling are conveyed to the ſenſorium commune. Others have ſuppoſed it to be a canal, which afterwards ſeparates into more minute channels; or, perhaps, as being an aſſemblage of many very ſmall and diſtinct tubes, connected to each other, and thus forming a cylindrical chord. They who contend for their being ſolid bodies, are of opinion, that feeling is occaſioned by vibration; ſo that, for inſtance, according to this ſyſtem, by pricking the finger, a vibration would be occaſioned in the nerve, diſtributed through its ſubſtance; and the effects of this vibration, when extended to the ſenſorium, would be an excital of pain. But the inelaſticity, the ſoftneſs, the connexion, and the ſituation of the nerves, are ſo many proofs that vibration has no ſhare in the cauſe of feeling.

Others have ſuppoſed, that in the brain and ſpinal marrow a very ſubtle fluid is ſecreted, and from thence conveyed through the imperceptible tubes, which they conſider as exiſting in the nerves. They have further ſuppoſed, that this very ſubtle fluid, to which they have given the name of *animal ſpirits*, is ſecreted in the cortical ſubſtance of the brain and ſpinal marrow, from whence it paſſes through the medullary ſubſtance. This, like the other ſyſtem, is founded altogether on hypotheſis; but it ſeems to be a hypotheſis derived from much more probable principles, and there are many ingenious arguments to be brought in its ſupport.

EXPLANATION of PLATE XXXI.

Fig. 1. Repreſents the Inferior part of the Brain; —the Anterior part of the whole ſpine, including the Medulla Spinalis;—with the origin and large portions of all the Nerves.

AA, The anterior lobes of the cerebrum. BB, The lateral lobes of the cerebrum. CC, The two lobes of the cerebellum. D, Tuber annulare. E, The paſſage from the third ventricle to the infundibulum. F, The medulla oblongata, which ſends off the medulla ſpinalis through the ſpine. GG, That part of the os occipitis which is placed above (HH) the tranſverſe proceſſes of the firſt cervical vertebra. II, &c. The ſeven cervical vertebræ, with their intermediate cartilages. K K, &c. The twelve dorſal vertebræ, with their intermediate cartilages. LL, &c. The five lumbar vertebræ, with their intermediate cartilages. M, the os ſacrum. N, The os coccygis.

Nerves.—11, The firſt pair of nerves, named *olfactory*, which go to the noſe. 2 2, The ſecond pair, named *optic*, which goes to form the tunica retina of the eye. 3 3, The third pair, named *motor oculi*; it ſupplies moſt of the muſcles of the eyeballs. 4 4, The fourth pair, named *pathetic*,—which is wholly ſpent upon the muſculus trochlearis of the eye. 5 5, The fifth pair divides into three branches.—The firſt, named *ophthalmic*, goes to the orbit, ſupplies the lachrymal gland, and ſends branches out to the forehead and noſe.—The ſecond, named *ſuperior maxillary*, ſupplies the teeth of the upper jaw, and ſome of the muſcles of the lips.—The third, named *inferior maxillary*, is ſpent upon the muſcles and teeth of the lower jaw, tongue, and muſcles of the lips. 6 6, The ſixth pair, which, after ſending off the beginning of the intercoſtal or great ſympathetic, is ſpent upon the abductor oculi. 7 7, The ſeventh pair, named *auditory*, divides into two branches.—The largeſt, named *portio mollis*, is ſpent upon the internal ear.—The ſmalleſt, *portio dura*, joins to the fifth pair within the internal ear by a reflected branch from the ſecond of the fifth; and within the tympanum, by a branch from the third of the fifth, named *chorda tympani*.—Vid. fig. 3, near B. 88, &c. The eighth pair, named *par vagum*,—which accompanies the intercoſtal, and is ſpent upon the tongue, larynx, pharynx, lungs, and abdominal viſcera. 9 9, The ninth pair, which are ſpent upon the tongue. 10 10, &c. The intercoſtal, or great ſympathetic, which is ſeen from the ſixth pair to the bottom of the pelvis on each ſide of the ſpine, and joining with all the nerves of the ſpine; in its progreſs ſupplying the heart, and, with the par vagum, the contents of the abdomen and pelvis. 11 11, The acceſſorius, which is ſpent upon the ſternocleido-maſtoidæus and trapezius muſcles

Of the Brain and Nerves.

muſcles. 12 12, The firſt cervical nerves; 13 13, The ſecond cervical nerves; both ſpent upon the muſcles that lie on the neck, and teguments of the neck and head. 14 14, The third cervical nerves, which, after ſending off (15 15, &c.) the phrenic nerves to the diaphragm, ſupply the muſcles and teguments that lie on the ſide of the neck and top of the ſhoulder. 16 16, The brachial plexus, formed by the fourth, fifth, ſixth, ſeventh cervicals, and firſt dorſal nerves,—which ſupply the muſcles, and teguments of the ſuperior extremity. 17 17, The twelve dorſal, or proper intercoſtal nerves, which are ſpent upon the intercoſtal muſcles and ſome of the large muſcles which lie upon the thorax. 18 18, The five lumbar pairs of nerves, which ſupply the lumbar and abdominal muſcles, and ſome of the teguments and muſcles of the inferior extremity. 19 19, The ſacro-ſciatic, or poſterior crural nerve, formed by the two inferior lumbar, and three ſuperior of the os ſacrum. This large nerve ſupplies the greateſt part of the muſcles and teguments of the inferior extremity. 20, The ſtomachic plexus, formed by the eighth pair. 21 21, Branches of the ſolar or cæliac plexus, formed by the eighth pair and intercoſtals, which ſupply the ſtomach and chylopoietic viſcera. 22 22, Branches of the ſuperior and inferior meſenteric plexuſes, formed by the eighth pair and intercoſtals, which ſupply the chylopoietic viſcera, with part of the organs of urine and generation. 23 23, Nerves which accompany the ſpermatic cord. 24 24, The hypogaſtric plexus, which ſupplies the organs of urine and generation within the pelvis.

Of the Brain and Nerves.

FIG. 2, 3, 4, 5. Show different views of the Inferior part of the Brain, cut perpendicularly through the Middle—with the Origin and large portions of all the Nerves which paſs out through the Bones of the Cranium,—and the three firſt Cervicals.

A, The anterior lobe. B, The lateral lobe of the cerebrum. C, One of the lobes of the cerebellum. D, Tuber annulare. E, Corpus pyramidale, in the middle of the medulla oblongata. F, The corpus olivare, in the ſide of the medulla oblongata. G, The medulla oblongata. H, The medulla ſpinalis.

NERVES.—1 2 3 4 5 6 7 8 and 9, Pairs of nerves. 10 10, Nervus acceſſorius, which comes from—11, 12, and 13, the three firſt cervical nerves.

CHAP. VI. OF THE SENSES, AND THEIR ORGANS.

140 IN treating of the ſenſes, we mean to confine ourſelves to the external ones of *touch*, *taſte*, *ſmelling*, *hearing*, and *viſion*. The word *ſenſe*, when applied to theſe five, ſeems to imply not only the ſenſation excited in the mind by certain impreſſions made on the body, but likewiſe the organ deſtined to receive and tranſmit theſe impreſſions to the ſenſorium. Each of theſe organs being of a peculiar ſtructure, is ſuſceptible only of particular impreſſions, which will be pointed out as we proceed to deſcribe each of them ſeparately.

SECT. I. *Of Touch.*

141 THE ſenſe of touch may be defined to be the faculty of diſtinguiſhing certain properties of bodies by the feel. In a general acceptation, this definition might perhaps not improperly be extended to every part of the body poſſeſſed of ſenſibility (T), but it is commonly confined to the nervous papillæ of the cutis, or true ſkin, which, with its appendages, and their ſeveral uſes, have been already deſcribed.

The exterior properties of bodies, ſuch as their ſolidity, moiſture, inequality, ſmoothneſs, dryneſs, or fluidity, and likewiſe their degree of heat, ſeem all to be capable of making different impreſſions on the papillæ, and conſequently of exciting different ideas in the ſenſorium commune. But the organ of touch, like all the other ſenſes, is not equally delicate in every part of the body, or in every ſubject; being in ſome much more exquiſite than it is in others.

SECT. II. *Of Taſte.*

THE ſenſe of taſte is ſeated chiefly in the tongue; the 142
ſituation and figure of which are ſufficiently known.

On the upper ſurface of this organ we may obſerve a great number of papillæ, which, on account of their difference in ſize and ſhape, are commonly divided into three claſſes. The largeſt are ſituated towards the baſis of the tongue. Their number commonly varies from ſeven to nine, and they ſeem to be mucous follicles. Thoſe of the ſecond claſs are ſomewhat ſmaller, and of a cylindrical ſhape. They are moſt numerous about the middle of the tongue. Thoſe of the third claſs are very minute, and of a conical ſhape. They are

(T) In the courſe of this article, mention has often been made of the ſenſibility or inſenſibility of different parts of the body: it will therefore, perhaps, not be amiſs to obſerve in this place, that many parts which were formerly ſuppoſed to poſſeſs the moſt exquiſite ſenſe, are now known to have but little or no feeling, at leaſt in a ſound ſtate; for in an inflamed ſtate, even the bones, the moſt inſenſible parts of any, become ſuſceptible of the moſt painful ſenſations. This curious diſcovery is due to the late Baron Haller. His experiments prove, that the bones, cartilages, ligaments, tendons, epidermis, and membranes (as the pleura, pericardium, dura and pia mater, perioſteum, &c.), may in a healthy ſtate be conſidered as inſenſible. As ſenſibility depends on the brain and nerves, of courſe different parts will poſſeſs a greater or leſs degree of feeling, in proportion as they are ſupplied with a greater or ſmaller number of nerves. Upon this principle it is, that the ſkin, muſcles, ſtomach, inteſtines, urinary bladder, ureters, uterus, vagina, penis, tongue, and retina, are extremely ſenſible, while the lungs and glands have only an obſcure degree of feeling.

Of the Senſes.

are very numerous on the apex and edges of the tongue, and have been ſuppoſed to be formed by the extremities of its nerves.

We obſerve a line, the *linea linguæ mediana*, running along the middle of the tongue, and dividing it as it were into two portions. Towards the baſis of the tongue, we meet with a little cavity, named by Morgagni *foramen cæcum*, which ſeems to be nothing more than a common termination of ſome of the excretory ducts of mucous glands ſituated within the ſubſtance of the tongue.

We have already obſerved, that this organ is everywhere covered by the cuticle, which, by forming a reduplication, called the *frænum*, at its under part, ſerves to prevent the too great motion of the tongue, and to fix it in its ſituation. But, beſides this attachment, the tongue is connected, by means of its muſcles and membranous ligaments, to the lower jaw, the os hyoides, and the ſtyloid proceſſes.

The principal arteries of the tongue are the linguales, which ariſe from the external carotid. Its veins empty themſelves into the external jugulars. Its nerves ariſe from the fifth, eighth, and ninth pair.

The variety of taſtes ſeems to be occaſioned by the different impreſſions made on the papillæ by the food. The different ſtate of the papillæ with reſpect to their moiſture, their figure, or their covering, ſeems to produce a conſiderable difference in the taſte, not only in different people, but in the ſame ſubject, in ſickneſs and in health. The great uſe of the taſte ſeems to be to enable us to diſtinguiſh wholeſome and ſalutary food from that which is unhealthy; and we obſerve that many quadrupeds, by having their papillæ (u) very large and long, have the faculty of diſtinguiſhing flavours with infinite accuracy.

Sect. III. *Of Smelling.*

143 The ſenſe of ſmelling, like the ſenſe of taſte, ſeems intended to direct us to a proper choice of aliment, and is chiefly ſeated in the noſe, which is diſtinguiſhed into its external and internal parts. The ſituation and figure of the former of theſe do not ſeem to require a definition. It is compoſed of bones and cartilages, covered by muſcular fibres and by the common integuments. The bones make up the upper portion, and the cartilages the lower one. The ſeptum narium, like the noſe, is likewiſe in part bony, and in part cartilaginous. Theſe bones and their connexions were deſcribed in the oſteology.

The internal part of the noſe, beſides the oſſa ſpongioſa, has ſix cavities or ſinuſes, the maxillary, the frontal, and the ſphenoid, which were all deſcribed with the bones of the head. They all open into the noſtrils; and the noſe likewiſe communicates with the mouth, larynx, and pharynx, poſteriorly behind the velum palati.

All theſe ſeveral parts, which are included in the internal diviſion of the noſe, viz. the inner ſurface of the noſtrils, the lamellæ of the oſſa ſpongioſa and the ſinuſes, are lined by a thick and very vaſcular membrane, which, though not unknown to the ancients, was firſt well deſcribed by Schneider*, and is therefore now commonly named *membrana pituitaria Schneideri*. This membrane is truly the organ of ſmelling; but its real ſtructure does not yet ſeem to be perfectly underſtood. It appears to be a continuation of the cuticle, which lines the inner ſurface of the mouth. In ſome parts of the noſe it is ſmooth and firm, and in others it is looſe and ſpongy. It is conſtantly moiſtened by a mucous ſecretion; the finer parts of which are carried off by the air we breathe, and the remainder, by being retained in the ſinuſes, acquires conſiderable conſiſtence. The manner in which this mucus is ſecreted has not yet been ſatisfactorily aſcertained; but it ſeems to be by means of mucous follicles.

Of the Senſes.

* *De Catarrho*, lib. iii.

Its arteries are branches of the internal maxillary and internal carotid. Its veins empty themſelves into the internal jugulars. The firſt pair of nerves, the olfactory, are ſpread over every part of it, and it likewiſe receives branches from the fifth pair.

After what has been ſaid of the pituitary membrane, it will not be difficult to conceive how the air we draw in at the noſtrils, being impregnated with the effluviâ of bodies, excites in us that kind of ſenſation we call *ſmelling*. As theſe effluvia, from their being exceedingly light and volatile, cannot be capable in a ſmall quantity of making any great impreſſion on the extremities of the olfactory nerves, it was neceſſary to give conſiderable extent to the pituitary membrane, that by this means a greater number of odoriferous particles might be admitted at the ſame time. When we wiſh to take in much of the effluvia of any thing, we naturally cloſe the mouth, that all the air we inſpire may paſs through the noſtrils; and at the ſame time, by means of the muſcles of the noſe, the noſtrils are dilated, and a greater quantity of air is drawn into them.

In many quadrupeds, the ſenſe of ſmelling is much more extenſive and delicate than it is in the human ſubject; and in the human ſubject it ſeems to be more perfect the leſs it is vitiated by a variety of ſmells. It is not always in the ſame ſtate of perfection, being naturally affected by every change of the pituitary membrane, and of the lymph with which that membrane is moiſtened.

Sect. IV. *Of Hearing.*

144 Before we undertake to explain the manner in which we are enabled to receive the impreſſions of ſound, it will be neceſſary to deſcribe the *ear*, which is the *organ of hearing*. It is commonly diſtinguiſhed into external and internal. The former of theſe diviſions includes all that we are able to diſcover without diſſection, and the meatus auditorius, as far as the tympanum; and the latter, all the other parts of the ear.

The *external ear* is a cartilaginous funnel, covered by the common integuments, and attached, by means of its ligaments and muſcles, to the temporal bone.

Although

(u) Malpighi's deſcription of the papillæ, which has been copied by many anatomical writers, ſeems to have been taken chiefly from the tongues of ſheep.

Of the Senſes.

Although capable only of a very obſcure motion, it is found to have ſeveral muſcles. Different parts of it are diſtinguiſhed by different names; all its cartilaginous part is called *ala* or *wing*, to diſtinguiſh it from the ſoft and pendent part below, called the *lobe*. Its outer circle or border is called *helix*, and the ſemicircle within this, *antihelix*. The moveable cartilage placed immediately before the meatus auditorius, which it may be made to cloſe exactly, is named *tragus*; and an eminence oppoſite to this at the extremity of the antihelix, is called *antitragus*. The concha is a conſiderable cavity formed by the extremities of the helix and antihelix. The meatus auditorius, which at its opening is cartilaginous, is lined with a very thin membrane, which is a continuation of the cuticle from the ſurface of the ear.

In this canal we find a yellow wax, which is ſecreted by a number of minute glands or follicles, each of which has an excretory duct. This ſecretion, which is at firſt of an oily conſiſtence, defends the membrane of the tympanum from the injuries of the air; and, by its bitterneſs, prevents minute inſects from entering into the ear. But when from neglect or diſeaſe it accumulates in too great a quantity, it ſometimes occaſions deafneſs. The inner extremity of the meatus is cloſed by a very thin tranſparent membrane, the membrana tympani, which is ſet in a bony circle like the head of a drum. In the laſt century Rivinus, profeſſor at Leipſic, fancied he had diſcovered a hole in this membrane, ſurrounded by a ſphincter, and affording a paſſage to the air, between the external and internal ear. Cowper, Heiſter, and ſome other anatomiſts, have admitted this ſuppoſed foramen, which certainly does not exiſt. Whenever there is any opening in the membrana tympani, it may be conſidered as accidental. Under the membrana tympani runs a branch of the fifth pair of nerves, called *chorda tympani*; and beyond this membrane is the cavity of the tympanum, which is about ſeven or eight lines wide, and half ſo many in depth; it is ſemiſpherical, and everywhere lined by a very fine membrane. There are four openings to be obſerved in this cavity. It communicates with the mouth by means of the Euſtachian tube. This canal, which is in part bony and in part cartilaginous, begins by a very narrow opening at the anterior and almoſt ſuperior part of the tympanum, increaſing in ſize as it advances towards the palate of the mouth, where it terminates by an oval opening. This tube is everywhere lined by the ſame membrane that covers the inſide of the mouth. The real uſe of this canal does not ſeem to have been hitherto ſatisfactorily aſcertained; but ſound would ſeem to be conveyed through it to the membrana tympani, deaf perſons being often obſerved to liſten attentively with their mouths open. Oppoſite to this is a minute paſſage, which leads to the ſinuoſities of the maſtoid proceſs; and the two other openings, which are in the internal proceſs of the os petroſum, are the feneſtra ovalis, and feneſtra rotunda, both of which are covered by a very fine membrane.

There are three diſtinct bones in the cavity of the tympanum; and theſe are the malleus, incus, and ſtapes. Beſides theſe there is a fourth, which is the *os orbiculare* conſidered by ſome anatomiſts as a proceſs of the ſtapes, which is neceſſarily broken off by the violence we are obliged to uſe in getting at theſe bones; but when accurately conſidered, it ſeems to be a diſtinct bone.

The *malleus* is ſuppoſed to reſemble a hammer, being larger at one extremity, which is its head, than it is at the other, which is its handle. The latter is attached to the membrana tympani, and the head of the bone is articulated with the incus.

The *incus*, as it is called from its ſhape, though it ſeems to have leſs reſemblance to an anvil than to one of the dentes molares with its roots widely ſeparated from each other, is diſtinguiſhed into its body and its legs. One of its legs is placed at the entry of the canal which leads to the maſtoid proceſs; and the other, which is ſomewhat longer, is articulated with the ſtapes, or rather with the os orbiculare, which is placed between them.

The third bone is very properly named *ſtapes*, being perfectly ſhaped like a ſtirrup. Its baſis is fixed into the feneſtra ovalis, and its upper part is articulated with the os orbiculare. What is called the *feneſtra rotunda*, though perhaps improperly, as it is more oval than round, is obſerved a little above the other, in an eminence formed by the os petroſum, and is cloſed by a continuation of the membrane that lines the inner ſurface of the tympanum. The ſtapes and malleus are each of them furniſhed with a little muſcle the ſtapedeus and tenſor tympani. The firſt of theſe, which is the ſmalleſt in the body, ariſes from a little cavern in the poſterior and upper part of the cavity of the tympanum; and its tendon, after paſſing through a hole in the ſame cavern, is inſerted at the back part of the head of the ſtapes. This muſcle, by drawing the ſtapes obliquely upwards, aſſiſts in ſtretching the membrana tympani.

The tenſor tympani (x), or internus mallei as it is called by ſome writers, ariſes from the cartilaginous extremity of the Euſtachian tube, and is inſerted into the back part of the handle of the malleus, which it ſerves to pull inwards, and of courſe helps to ſtretch the membrana tympani.

The labyrinth is the only part of the ear which remains to be deſcribed. It is ſituated in the os petroſum, and is ſeparated from the tympanum by a partition which is everywhere bony, except at the two feneſtræ. It is compoſed of three parts; and theſe are the veſtibulum, the ſemicircular canals, and the cochlea.

The *veſtibulum* is an irregular cavity, much ſmaller than the tympanum, ſituated nearly in the centre of the os petroſum, between the tympanum, the cochlea, and the ſemicircular canals. It is open on the ſide of the tympanum by means of the feneſtra ovalis, and communicates with the upper portion of the cochlea by an oblong

(x) Some anatomiſts deſcribe three muſcles of the malleus; but only this one ſeems to deſerve the name of muſcle; what are called the *externus* and *obliquus mallei* ſeeming to be ligaments rather than muſcles.

Of the Senſes.

oblong foramen, which is under the feneſtra ovalis, from which it is ſeparated only by a very thin partition.

Each of the three *ſemicircular canals* forms about half a circle of nearly a line in diameter, and running each in a different direction, they are diſtinguiſhed into *vertical*, *oblique*, and *horizontal*. Theſe three canals open by both their extremities into the veſtibulum; but the vertical and the oblique being united together at one of their extremities, there are only five orifices to be ſeen in the veſtibulum.

The *cochlea* is a canal which takes a ſpiral courſe, not unlike the ſhell of a ſnail. From its baſis to its apex it makes two turns and a half; and is divided into two canals by a very thin lamina or ſeptum, which is in part bony and in part membranous, in ſuch a manner that theſe two canals only communicate with each other at the point. One of them opens into the veſtibulum, and the other is covered by the membrane that cloſes the feneſtra rotunda. The bony lamella which ſeparates the two canals is exceedingly thin, and fills about two-thirds of the diameter of the canal. The reſt of the ſeptum is compoſed of a moſt delicate membrane, which lines the whole inner ſurface of the cochlea, and ſeems to form this diviſion in the ſame manner as the two membranous bags of the pleura, by being applied to each other, form the mediaſtinum.

Every part of the labyrinth is furniſhed with a very delicate perioſteum, and filled with a watery fluid, ſecreted as in other cavities. This fluid tranſmits to the nerves the vibrations it receives from the membrane cloſing the feneſtra rotunda, and from the baſis of the ſtapes, where it reſts on the feneſtrum ovale. When this fluid is collected in too great a quantity, or is compreſſed by the ſtapes, it is ſuppoſed to eſcape through two minute canals or aqueducts, lately deſcribed by Dr Cotunni *, an ingenious phyſician at Naples. One of theſe aqueducts opens into the bottom of the veſtibulum, and the other into the cochlea, near the feneſtra rotunda. They both paſs through the os petroſum, and communicate with the cavity of the cranium where the fluid that paſſes through them is abſorbed; and they are lined by a membrane which is ſuppoſed to be a production of the dura mater.

* *De Aquæductibus Auris Humanæ Internæ*, 8vo. 1760.

The arteries of the external ear come from the temporal and other branches of the external carotid, and its veins paſs into the jugular. The internal ear receives branches of arteries from the baſilary and carotids, and its veins empty themſelves into the ſinuſes of the dura mater, and into the internal jugular.

The portio mollis of the ſeventh pair is diſtributed through the cochlea, the veſtibulum, and the ſemicircular canals; and the portio dura ſends off a branch to the tympanum, and other branches to the external ear and parts near it.

The *ſenſe of hearing*, in producing which all the parts we have deſcribed aſſiſt, is occaſioned by a certain modulation of the air collected by the funnel-like ſhape of the external ear, and conveyed through the meatus auditorius to the membrana tympani. That ſound is propagated by means of the air, is very eaſily proved by ringing a bell under the receiver of an air pump; the ſound it affords being found to diminiſh gradually as the air becomes exhauſted, till at length it ceaſes to be heard at all. Sound moves through the air with infinite velocity; but the degree of its motion ſeems to depend on the ſtate of the air, as it conſtantly moves faſter in a denſe and dry, than it does in a moiſt and rarefied air.

Of the Senſes.

That the air vibrating on the membrana tympani communicates its vibration to the different parts of the labyrinth, and by means of the fluid contained in this cavity affects the auditory nerve ſo as to produce ſound, ſeems to be very probable; but the ſituation, the minuteneſs, and the variety of the parts which compoſe the ear, do not permit much to be advanced with certainty concerning their mode of action.

Some of theſe parts ſeem to conſtitute the immediate organ of hearing, and theſe are all the parts of the veſtibulum: but there are others which ſeem intended for the perfection of this ſenſe, without being abſolutely eſſential to it. It has happened, for inſtance, that the membrana tympani, and the little bones of the ear, have been deſtroyed by diſeaſe, without depriving the patient of the ſenſe of hearing (Y).

Sound is more or leſs loud in proportion to the ſtrength of the vibration; and the variety of ſounds ſeems to depend on the difference of this vibration; for the more quick and frequent it is, the more acute will be the ſound, and *vice verſa*.

Before we conclude this article, it will be right to explain certain phenomena, which will be found to have a relation to the organ of hearing.

Every body has, in conſequence of particular ſounds, occaſionally felt that diſagreeable ſenſation which is uſually called *ſetting the teeth on edge*: and the cauſe of this ſenſation may be traced to the communication which the portio dura of the auditory nerve has with the branches of the fifth pair that are diſtributed to the teeth, being probably occaſioned by the violent tremor produced in the membrana tympani by theſe very acute ſounds. Upon the ſame principle we may explain the ſtrong idea of ſound which a perſon has who holds a vibrating ſtring between his teeth.

The humming which is ſometimes perceived in the ear, without any exterior cauſe, may be occaſioned either by an increaſed action of the arteries in the ears, or by convulſive contractions of the muſcles of the malleus and ſtapes, affecting the auditory nerve in ſuch a manner as to produce the idea of ſound. An ingenious philoſophical writer * has lately diſcovered, that there are ſounds liable to be excited in the ear by irritation, and without any aſſiſtance from the vibrations of the air.

* *Elliot's Philoſophical Obſervations on the Senſes of Viſion and Hearing*, 8vo.

SECT.

(Y) This obſervation has led to a ſuppoſition, that a perforation of this membrane may in ſome caſes of deafneſs be uſeful; and Mr Cheſelden relates, that ſome years ago, a malefactor was pardoned, on condition that he ſhould ſubmit to this operation; but the public clamour raiſed againſt it was ſo great, that it was thought right not to perform it.

Sect. V. *Of Viſion* †.

† See *Optics*, p. 142.

The eyes, which conſtitute the organ of viſion, are ſituated in two bony cavities named *orbits*, where they are ſurrounded by ſeveral parts, which are either intended to protect them from external injury, or to aſſiſt in their motion.

The globe of the eye is immediately covered by two eyelids or palpebræ, which are compoſed of muſcular fibres, covered by the common integuments, and lined by a very fine and ſmooth membrane, which is from thence extended over part of the globe of the eye, and is called *tunica conjunctiva*. Each eyelid is cartilaginous at its edge; and this border, which is called *tarſus*, is furniſhed with a row of hairs named *cilia* or *eyelaſhes*.

The cilia ſerve to protect the eye from inſects and minute bodies floating in the air, and likewiſe to moderate the action of the rays of light in their paſſage to the retina. At the roots of theſe hairs there are ſebaceous follicles, firſt noticed by Meibomius, which diſcharge a glutinous liniment. Sometimes the fluid they ſecrete has too much viſcidity, and the eyelids become glued to each other.

The upper border of the orbit is covered by the eyebrows or ſupercilia, which by means of their two muſcles are capable of being brought towards each other, or of being carried upwards. They have been conſidered as ſerving to protect the eyes, but they are probably intended more for ornament than utility (z).

The orbits, in which the eyes are placed, are furniſhed with a good deal of fat, which affords a ſoft bed on which the eye performs its ſeveral motions. The inner angle of each orbit, or that part of it which is near the noſe, is called *canthus major*, or the *great angle*; and the outer angle, which is on the oppoſite ſide of the eye, is the *canthus minor*, or *little angle*.

The little reddiſh body which we obſerve in the great angle of the eyelids, and which is called *caruncula lachrymalis*, is ſuppoſed to be of a glandular ſtructure, and, like the follicles of the eyelids, to ſecrete an oily humour. But its ſtructure and uſe do not ſeem to have been hitherto accurately determined. The ſurface of the eye is conſtantly moiſtened by a very fine limpid fluid called the *tears*, which is chiefly, and perhaps wholly, derived from a large gland of the conglomerate kind, ſituated in a ſmall depreſſion of the os frontis near the outer angle of the eye. Its excretory ducts pierce the tunica conjunctiva juſt above the cartilaginous borders of the upper eyelids. When the tears were ſuppoſed to be ſecreted by the caruncle, this gland was called *glandula innominata*; but now that its ſtructure and uſes are aſcertained, it very properly has the name of *glandula lachrymalis*. The tears poured out by the ducts of this gland are, in a natural and healthy ſtate, inceſſantly ſpread over the ſurface of the eye, to keep it clear and tranſparent by means of the eyelids, and as conſtantly paſs out at the oppoſite corner of the eye or inner angle, through two minute orifices, the puncta lachrymalia (a); being determined into theſe little openings by a reduplication of the tunica conjunctiva, ſhaped like a creſcent, the two points of which anſwer to the puncta. This reduplication is named *membrana*, or *valvula ſemilunaris*. Each of theſe puncta is the beginning of a ſmall excretory tube, through which the tears paſs into a little pouch or reſervoir, the ſacculus lachrymalis, which lies in an excavation formed partly by the naſal proceſs of the os maxillare ſuperius, and partly by the os unguis. The lower part of this ſac forms a duct called the *ductus ad nares*, which is continued through a bony channel, and opens into the noſe, through which the tears are occaſionally diſcharged (b).

The motions of the eye are performed by ſix muſcles; four of which are ſtraight and two oblique. The ſtraight muſcles are diſtinguiſhed by the names of *elevator*, *depreſſor*, *adductor*, and *abductor*, from their ſeveral uſes in elevating and depreſſing the eye, drawing it towards the noſe, or carrying it from the noſe towards the temple. All theſe four muſcles ariſe from the bottom of the orbit, and are inſerted by flat tendons into the globe of the eye. The oblique muſcles are intended for the more compound motions of the eye. The firſt of theſe muſcles, the obliquus ſuperior, does not, like the other four muſcles we have deſcribed, ariſe from the bottom of the orbit, but from the edge of the foramen that tranſmits the optic nerve, which ſeparates the origin of this muſcle from that of the others. From this beginning it paſſes in a ſtraight line towards a very ſmall cartilaginous ring, the ſituation of which is marked in the ſkeleton by a little hollow in the internal orbitar proceſſes of the os frontis. The tendon of the muſcle, after paſſing through this ring, is inſerted into the upper part of the globe of the eye, which it ſerves to draw forwards, at the ſame time turning the pupil downwards.

The obliquus inferior ariſes from the edge of the orbit, under the opening of the ductus lachrymalis; and is inſerted ſomewhat poſteriorly into the outer ſide of the globe, ſerving to draw the eye forwards and turn the pupil upwards. When either of theſe two muſcles act ſeparately, the eye is moved on its axis; but when they act together, it is compreſſed both above and below. The eye itſelf, which is now to be deſcribed, with its tunics, humours, and component parts, is nearly of a ſpherical figure. Of its tunics, the conjunctiva has been already deſcribed as a partial covering, reflected from the inner ſurface of the eyelids over the anterior portion of the eye. What has been

(z) It is obſervable, that the eyebrows are peculiar to the human ſpecies.

(a) It ſometimes happens, that this very pellucid fluid, which moiſtens the eye, being poured out through the excretory ducts of the lachrymal gland faſter than it can be carried off through the puncta, trickles down the cheek, and is then ſtrictly and properly called *tears*.

(b) When the ductus ad nares becomes obſtructed in conſequence of diſeaſe, the tears are no longer able to paſs into the noſtrils; the ſacculus lachrymalis becomes diſtended; and inflammation, and ſometimes ulceration, taking place, conſtitute the diſeaſe called *fiſtula lachrymalis*.

Of the Senſes.

named *albuginea* cannot properly be conſidered as a coat of the eye, being in fact nothing more than the tendons of the ſtraight muſcles ſpread over ſome parts of the ſclerotica.

The immediate tunics of the eye, which are to be demonſtrated when its partial coverings, and all the other parts with which it is ſurrounded, are removed, are the ſclerotica, cornea, choroides, and retina.

The *ſcletorica*, which is the exterior coat, is everywhere white and opaque, and is joined at its anterior edge to another, which has more convexity than any other part of the globe, and being exceedingly tranſparent is called *cornea* (c). Theſe two parts are perfectly different in their ſtructure; ſo that ſome anatomiſts ſuppoſe them to be as diſtinct from each other as the glaſs of a watch is from the caſe into which it is fixed. The ſclerotica is of a compact fibrous ſtructure; the cornea, on the other hand, is compoſed of a great number of laminæ united by cellular membrane. By macerating them in boiling water, they do not ſeparate from each other, as ſome writers have aſſerted; but the cornea ſoon ſoftens, and becomes of a glutinous conſiſtence.

The ancients ſuppoſed the ſclerotica to be a continuation of the dura mater. Morgagni and ſome other modern writers are of the ſame opinion; but this point is diſputed by Winſlow, Haller, Zinn, and others. The truth ſeems to be, that the ſclerotica, though not a production of the dura mater, adheres intimately to that membrane.

The *choroides* is ſo called becauſe it is furniſhed with a great number of veſſels. It has likewiſe been named *uvea*, on account of its reſemblance to a grape. Many modern anatomical writers have conſidered it as a production of the pia mater. This was likewiſe the opinion of the ancients; but the ſtrength and thickneſs of the choroides, when compared with the delicate ſtructure of the pia mater, are ſufficient proofs of their being two diſtinct membranes.

The choroides has of late generally been deſcribed as conſiſting of two laminæ; the innermoſt of which has been named after Ruyſch, who firſt deſcribed it. It is certain, however, that Ruyſch's diſtinction is ill founded, at leaſt with reſpect to the human eye, in which we are unable to demonſtrate any ſuch ſtructure, although the tunica choroides of ſheep and ſome other quadrupeds may eaſily be ſeparated into two layers.

The choroides adheres intimately to the ſclerotica round the edge of the corna; and at the place of this union we may obſerve a little whitiſh areola, named *ligamentum ciliare*, though it is not of a ligamentous nature.

They who ſuppoſe the choroides to be compoſed of two laminæ, deſcribe the external one as terminating in the ligamentum ciliare, and the internal one as extending farther to form the iris, which is the circle we are able to diſtinguiſh through the cornea; but this part is of a very different ſtructure from the choroides; ſo that ſome late writers have perhaps not improperly conſidered the iris as a diſtinct membrane. It derives its name from the variety of its colours, and is perforated in its middle. This perforation, which is called the *pupil* or *ſight* of the eye, is cloſed in the fœtus by a very thin vaſcular membrane. This membrana pupillaris commonly diſappears about the ſeventh month.

Of the Senſes.

On the under ſide of the iris we obſerve many minute fibres, called *ciliary proceſſes*, which paſs in radii or parallel lines from the circumference to the centre. The contraction and dilatation of the pupil are ſuppoſed to depend on the action of theſe proceſſes. Some have conſidered them as muſcular, but they are not of an irritable nature; others have ſuppoſed them to be filaments of nerves; but their real ſtructure has never yet been clearly aſcertained.

Beſides theſe ciliary proceſſes, anatomiſts uſually ſpeak of the circular fibres of the iris, but no ſuch ſeem to exiſt.

The poſterior ſurface of the iris, the ciliary proceſſes, and part of the tunica choroides, are covered with a black mucus for the purpoſes of accurate and diſtinct viſion; but the manner in which it is ſecreted, has not been determined.

Immediately under the tunica choroides we find the third and inner coat, called the *retina*, which ſeems to be merely an expanſion of the pulpy ſubſtance of the optic nerve, extending to the borders of the cryſtalline humour.

The greateſt part of the globe of the eye, within theſe ſeveral tunics, is filled by a very tranſparent and gelatinous humour of conſiderable conſiſtence, which from its ſuppoſed reſemblance to fuſed glaſs, is called the *vitreous humour*. It is inveſted by a very fine and delicate membrane, called *tunica vitrea*, and ſometimes *arachnoides*.—It is ſuppoſed to be compoſed of two laminæ; one of which dips into its ſubſtance, and by dividing the humour into cells adds to its firmneſs. The fore part of the vitreous humour is a little hollowed, to receive a very white and tranſparent ſubſtance of a firm texture, and of a lenticular and ſomewhat convex ſhape, named the *cryſtalline humour*. It is included in a capſula, which ſeems to be formed by a ſeparation of the two laminæ of the tunica vitrea.

The fore part of the eye is filled by a very thin and tranſparent fluid, named the *aqueous humour*, which occupies all the ſpace between the cryſtalline and the prominent cornea.—That part of the choroides which is called the *iris*, and which comes forward to form the pupil, appears to be ſuſpended as it were in this humour, and has occaſioned this portion of the eye to be diſtinguiſhed into two parts. One of theſe, which is the little ſpace between the anterior ſurface of the cryſtalline and the iris, is called the *poſterior chamber*; and the other, which is the ſpace between the iris and the cornea, is called the *anterior chamber* of the eye (d).

Both

(c) Some writers, who have given the name of *cornea* to all this outer coat, have named what is here and moſt commonly called *ſclerotica*, *cornea opaca*; and its anterior and tranſparent portion, *cornea lucida*.

(d) We are aware that ſome anatomiſts, particularly Lieutaud, are of opinion, that the iris is everywhere in cloſe contact with the cryſtalline, and that it is of courſe right to ſpeak only of one chamber of the eye; but as this

Of the Senſes.

Both theſe ſpaces are completely filled with the aqueous humour (E).

The eye receives its arteries from the internal carotid, through the foramina optica; and its veins paſs through the foramina lacera, and empty themſelves into the lateral ſinuſes. Some of the ramifications of theſe veſſels appear on the inner ſurface of the iris, were they are ſeen to make very minute convolutions, which are ſufficiently remarkable to be diſtinguiſhed by the name of *circulus arterioſus*, though perhaps improperly, as they are chiefly branches of veins.

The optic nerve paſſes in at the poſterior part of the eye, in a conſiderable trunk, to be expanded for the purpoſes of viſion, of which it is now univerſally ſuppoſed to be the immediate ſeat. But Meſſrs Mariotte and Mery contended, that the choroides is the ſeat of this ſenſe; and the ancients ſuppoſed the cryſtalline to be ſo. Beſides the optic, the eye receives branches from the third, fourth, fifth, and ſixth pair of nerves.

The humours of the eye, together with the cornea, are calculated to refract and converge the rays of light in ſuch a manner as to form at the bottom of the eye a diſtinct image of the object we look at; and the point where the rays meet is called the *focus* of the eye. On the retina, as in a *camera obſcura*, the object is painted in an inverted poſition; and it is only by habit that we are enabled to judge of its true ſituation, and likewiſe of its diſtance and magnitude. To a young gentleman who was born blind, and who was couched by Mr Cheſelden, every object (as he expreſſed himſelf) ſeemed to touch his eyes as what he felt did his ſkin; and he thought no objects ſo agreeable as thoſe which were ſmooth and regular, although for ſome time he could form no judgment of their ſhape, or gueſs what it was in any of them that was pleaſing to him.

Of the Senſes.

In order to paint objects diſtinctly on the retina, the cornea is required to have ſuch a degree of convexity, that the rays of light may be collected at a certain point, ſo as to terminate exactly on the retina.—If the cornea is too prominent, the rays, by diverging too ſoon, will be united before they reach the retina, as is the caſe with near-ſighted people or *myopes;* and on the contrary, if it is not ſufficiently convex, the rays will not be perfectly united when they reach the back part of the eye; and this happens to long-ſighted people or *preſbi*, being found conſtantly to take place as we approach to old age, when the eye gradually flattens (F). Theſe defects are to be ſupplied by means of glaſſes. He who has too prominent an eye, will find his viſion improved by means of a concave glaſs; and upon the ſame principles, a convex glaſs will be found uſeful to a perſon whoſe eye is naturally too flat.

EXPLANATION OF PLATE XXXII.

FIG. 1. ſhows the Lachrymal Canals, after the Common Teguments and Bones have been cut away.

a, The lachrymal gland. b, The two puncta lachrymalia, from which the two lachrymal canals proceed to c, the lachrymal ſac. d, The large lachrymal duct. e, Its opening into the noſe. f, The caruncula lachrymalis. g, The eyeball.

FIG. 2. An interior View of the Coats and Humours of the Eye.

aaaa, The tunica ſclerotica cut in four angles, and turned back. bbbb, The tunica choroides adhering to the inſide of the ſclerotica, and the ciliary veſſels are ſeen paſſing over—cc, The retina, which covers the vitreous humour. dd, The ciliary proceſſes, which were continued from the choroid coat. ee, The iris. f, The pupil.

FIG. 3. ſhows the Optic Nerves, and Muſcles of the Eye.

aa, The two optic nerves before they meet. b, The two optic nerves conjoined. c, The right optic nerve. d, Muſculus attollens palpebræ ſuperioris. e, Attollens oculi. f, Abductor. gg, Obliquus ſuperior, or trochlearis. h, Adductor. i, The eyeball.

FIG. 4. ſhows the Eyeball with its Muſcles.

a, The optic nerve. b, Muſculus trochlearis. c, Part of the os frontis, to which the trochlea or pulley is fixed, through which,—d, The tendons of the trochlearis paſs. e, Attollens oculi. f, Adductor oculi. g, Abductor oculi. h, Obliquus inferior. i, Part of the ſuperior maxillary bone to which it is fixed. k, The eyeball.

FIG. 5. repreſents the Nerves and Muſcles of the Right Eye, after part of the Bones of the Orbit have been cut away.

A, The eyeball. B, The lachrymal gland. C, Muſculus abductor oculi. D, Attollens. E, Levator palpebræ ſuperioris. F, Depreſſor oculi. G, Adductor. H, Obliquus ſuperior, with its pulley. I, Its inſertion into the ſclerotic coat. K, Part of the obliquus inferior. L, The anterior part of the os frontis cut.

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this does not appear to be the caſe, the ſituation of the iris and the two chambers of the eye are here deſcribed in the uſual way.

(E) When the cryſtalline becomes opaque, ſo as to prevent the paſſage of the rays of light to the retina, it conſtitutes what is called a *cataract;* and the operation of couching conſiſts in removing the diſeaſed cryſtalline from its bed in the vitreous humour. In this operation the cornea is perforated, and the aqueous humour eſcapes out of the eye, but it is conſtantly renewed again in a very ſhort time. The manner, however, in which it is ſecreted has not yet been determined.

(F) Upon this principle, they, who in their youth are near-ſighted, may expect to ſee better as they advance in life, as their eyes gradually become more flat.

Of the Senſes.

cut. M, the criſta galli of the ethmoid bone. N, The poſterior part of the ſphenoid bone. O, Tranſverſe ſpinous proceſs of the ſphenoid bone. P, The carotid artery, denuded where it paſſes through the bones. Q, The carotid artery within the cranium. R, The ocular artery.

Nerves.—aa, The optic nerve. b, The third pair.—c, Its joining with a branch of the firſt branch of the fifth pair, to form l, the lenticular ganglion,—which ſends off the ciliary nerves, d. ee, The fourth pair. f, The trunk of the fifth pair. g, The firſt branch of the fifth pair, named ophthalmic.—h, The frontal branch of it. i, Its ciliary branches, along with which the naſal twig is ſent to the noſe. k, Its branch to the lachrymal gland. l, The lenticular ganglion: m, The ſecond branch of the fifth pair, named ſuperior maxillary. n, The third branch of the fifth pair, named inferior maxillary. o, The ſixth pair of nerves,—which ſends off, p, the beginning of the great ſympathetic. q, The remainder of the ſixth pair, ſpent on c, the abductor oculi.

Fig. 6. repreſents the Head of a Youth, where the upper part of the Cranium is ſawed off,—to ſhow the Upper Part of the Brain, covered by the Pia Mater, the veſſels of which are minutely filled with wax.

AA, The cut edges of the upper part of the cranium. B, The two tables and intermediate diploë. BB, The two hemiſpheres of the cerebrum. CC, The inciſure made by the falx. D, Part of the tentorium cerebello ſuper expanſum. E, Part of the falx, which is fixed to the criſta galli.

Fig. 7. repreſents the parts of the External Ear, with the Parotid Gland and its Duct.

aa, The helix. b, The antihelix. c, The antitragus. d, The tragus. e, The lobe of the ear. f, The cavitas innominata. g, The ſcapha. h, The concha. ii, The parotid gland. k, A lymphatic gland, which is often found before the tragus. l, The duct of the parotic gland. m, Its opening into the mouth.

Of the Senſes.

Fig. 8. A View of the Poſterior Part of the External Ear, Meatus Auditorius, Tympanum, with its Small Bones, and Euſtachian tube of the Right Side.

a, The back part of the meatus, with the ſmall ceruminous glands. b, The incus. c, Malleus. d, The chorda tympani. e, Membrana tympani. f, The Euſtachian tube. g, Its mouth from the fauces.

Fig. 9. repreſents the Anterior Part of the Right External Ear, the Cavity of the Tympanum—its Small Bones, Cochlea, and Semicircular Canals.

a, The malleus. b, Incus with its long leg, reſting upon the ſtapes. c, Membrana tympani. d, e, The Euſtachian tube, covered by part of—ff, the muſculus circumflexus palati. 1, 2, 3, The three ſemicircular canals. 4, The veſtible. 5, The cochlea. 6, The portio mollis of the ſeventh pair of nerves.

Fig. 10. ſhows the Muſcles which compoſe the fleſhy ſubſtance of the Tongue.

aa, The tip of the tongue, with ſome of the papillæ minimæ. b, The root of the tongue. c, Part of the membrane of the tongue, which covered the epiglottis. dd, Part of the muſculus hyo-gloſſus. e, The lingualis. f, Genio-gloſſus. gg, Part of the ſtylo-gloſſus.

PART II.

COMPARATIVE ANATOMY.

HAVING fully examined and deſcribed the ſtructure of man, we are now to take a view of that of the inferior animals, and to conſider in what the reſt of animated nature differs from man.

145 Comparative anatomy, was formerly, as we have ſhewn in the hiſtory, much more cultivated than that of the human body; but when the prejudices of bigotry and ignorance ſubſided, and allowed human diſſection to be more freely exerciſed, the ſtudy of this ſpecies of anatomy was almoſt entirely neglected. Of late, however, it has attracted the attention of ſeveral of the moſt eminent naturaliſts and anatomiſts, particularly of Monro, Hunter, Vicq d'Azyr, and Cuvier, from whoſe labours it has received conſiderable improvement, and has attained a degree of accuracy and an extent of application, which render it an object of inquiry highly intereſting to the philoſopher and the phyſician.

146 Many advantages are derived from the ſtudy of comparative anatomy. Firſt, It furniſhes us with a ſufficient knowledge of the ſeveral parts of animals, to prevent our being impoſed on by thoſe authors who have deſcribed and delineated many organs from brutes as belonging to the human body. That this is of importance, is evinced by examining the works of ſome of the earlieſt and greateſt maſters of anatomy, who, for want of human ſubjects, have often taken their deſcriptions from other animals; Galen is notoriouſly faulty in this reſpect, and the great Veſalius, though he juſtly reproves Galen, has fallen into the ſame error, as is plain from his delineations of the kidneys, the uterus, the muſcles of the eye, and other parts. Nor is antiquity only chargeable with this, ſince in Willis's *Anatomia Cerebri* (the plates of which were reviſed by that accurate anatomiſt Dr Lower) there are ſeveral of the figures taken from different brutes, eſpecially from the dog, beſides what he acknowledges for ſuch.

147 Secondly, It helps us to underſtand ſeveral paſſages in the ancient writers on medicine, eſpecially Hippocrates and Galen, who have taken many of their deſcriptions from brutes and reaſoned from them.

Thirdly, It affords one of the beſt aſſiſtants and moſt certain guides in the ſtudy of natural hiſtory; and the beſt

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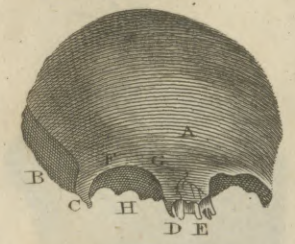

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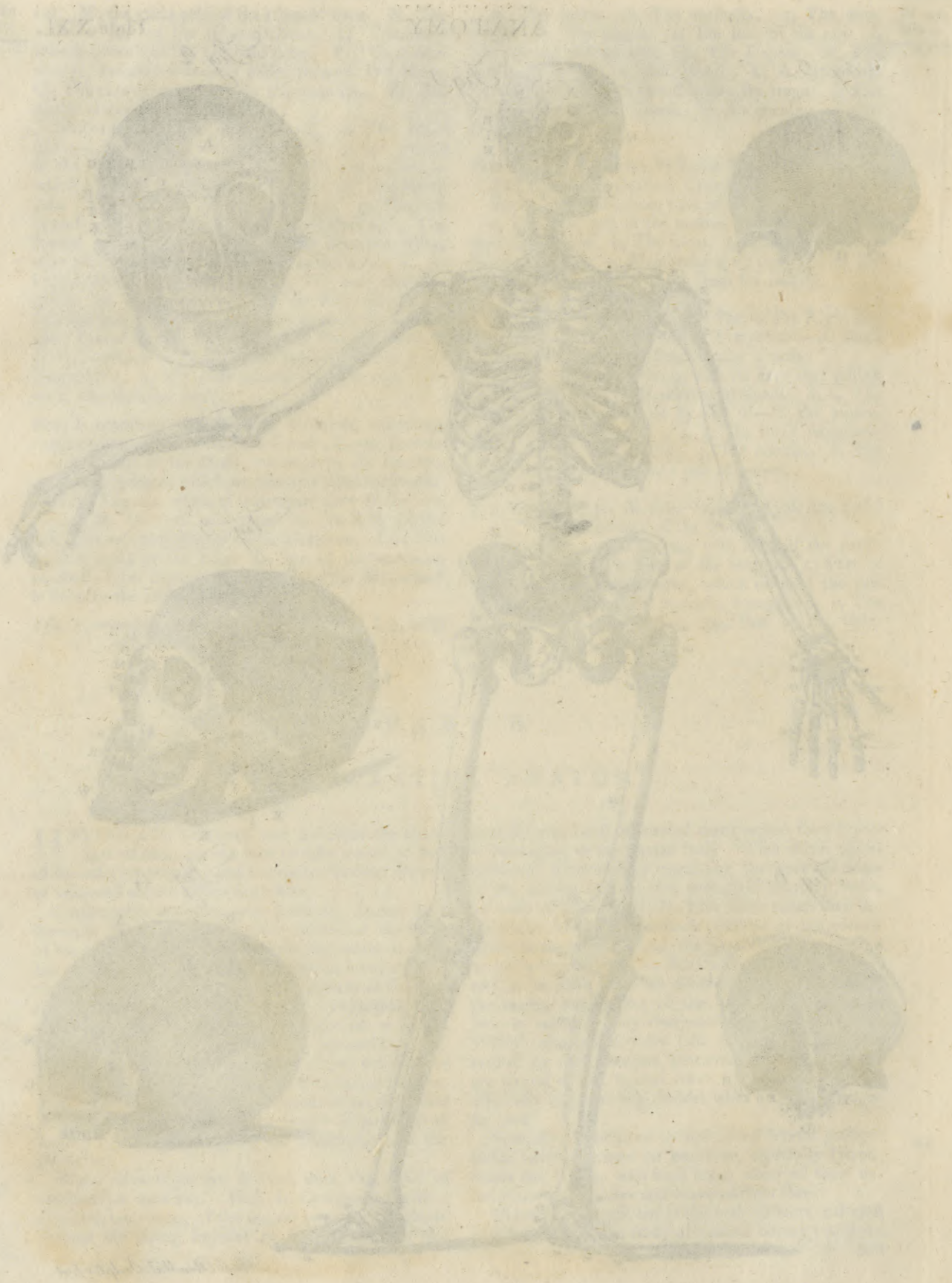

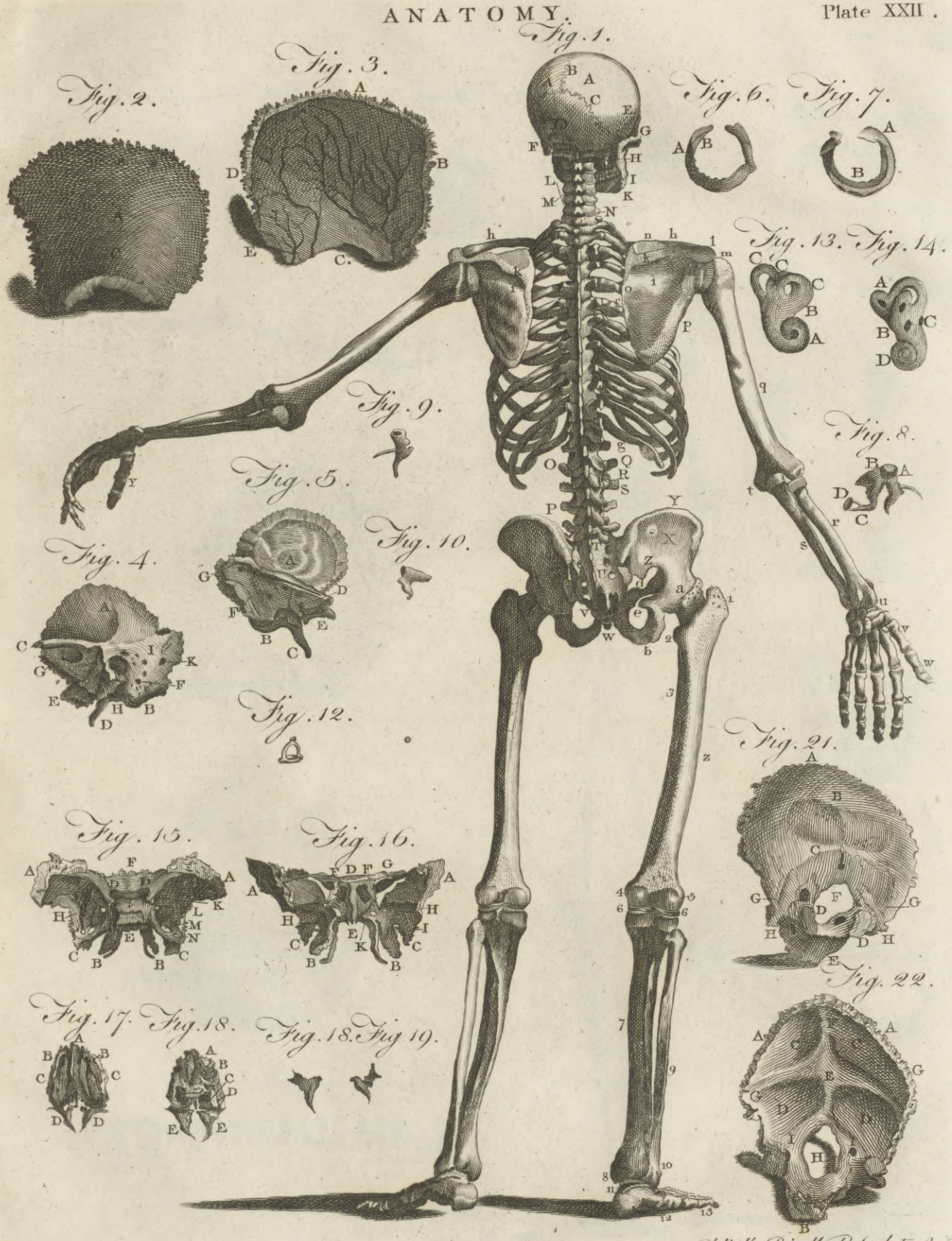

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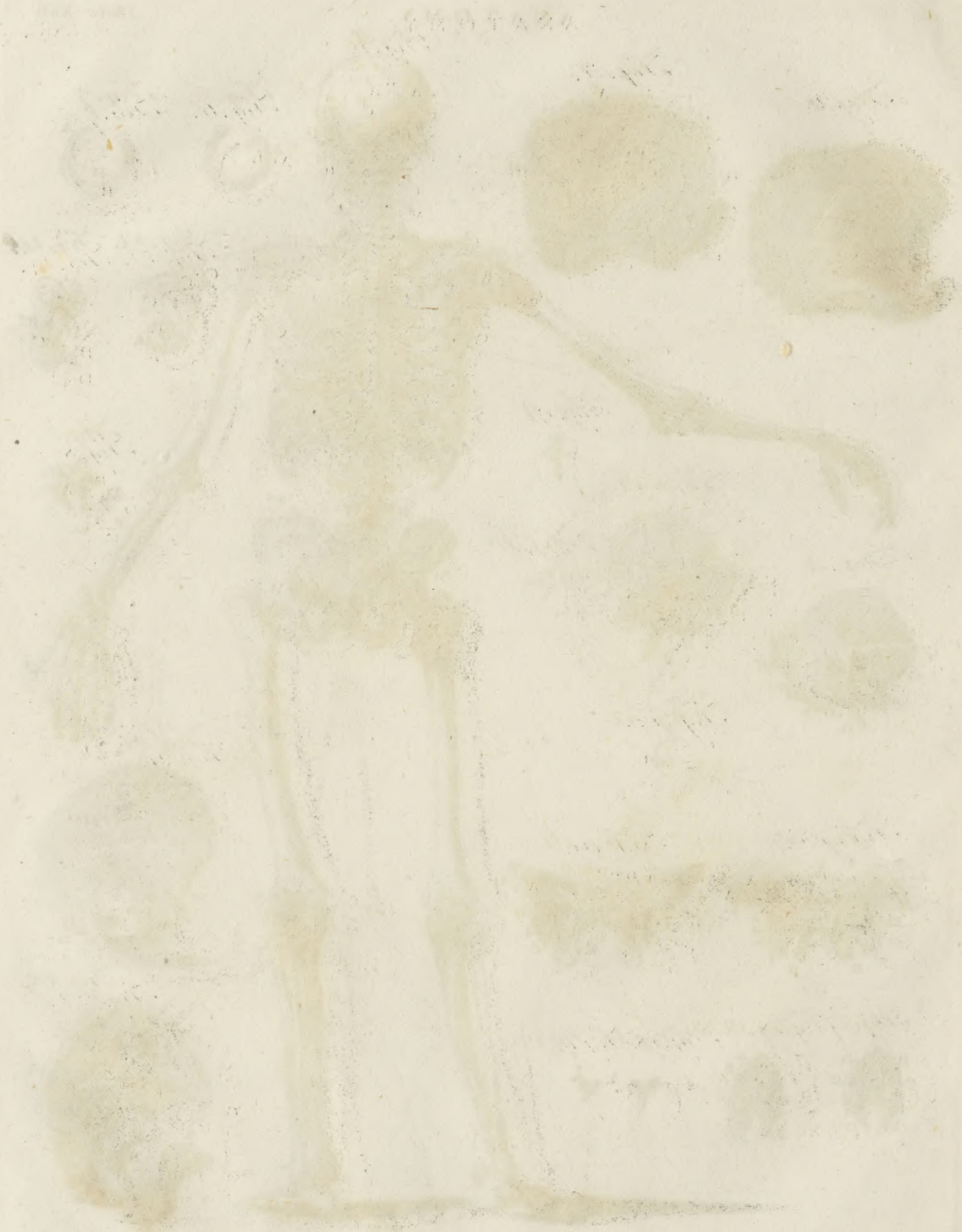

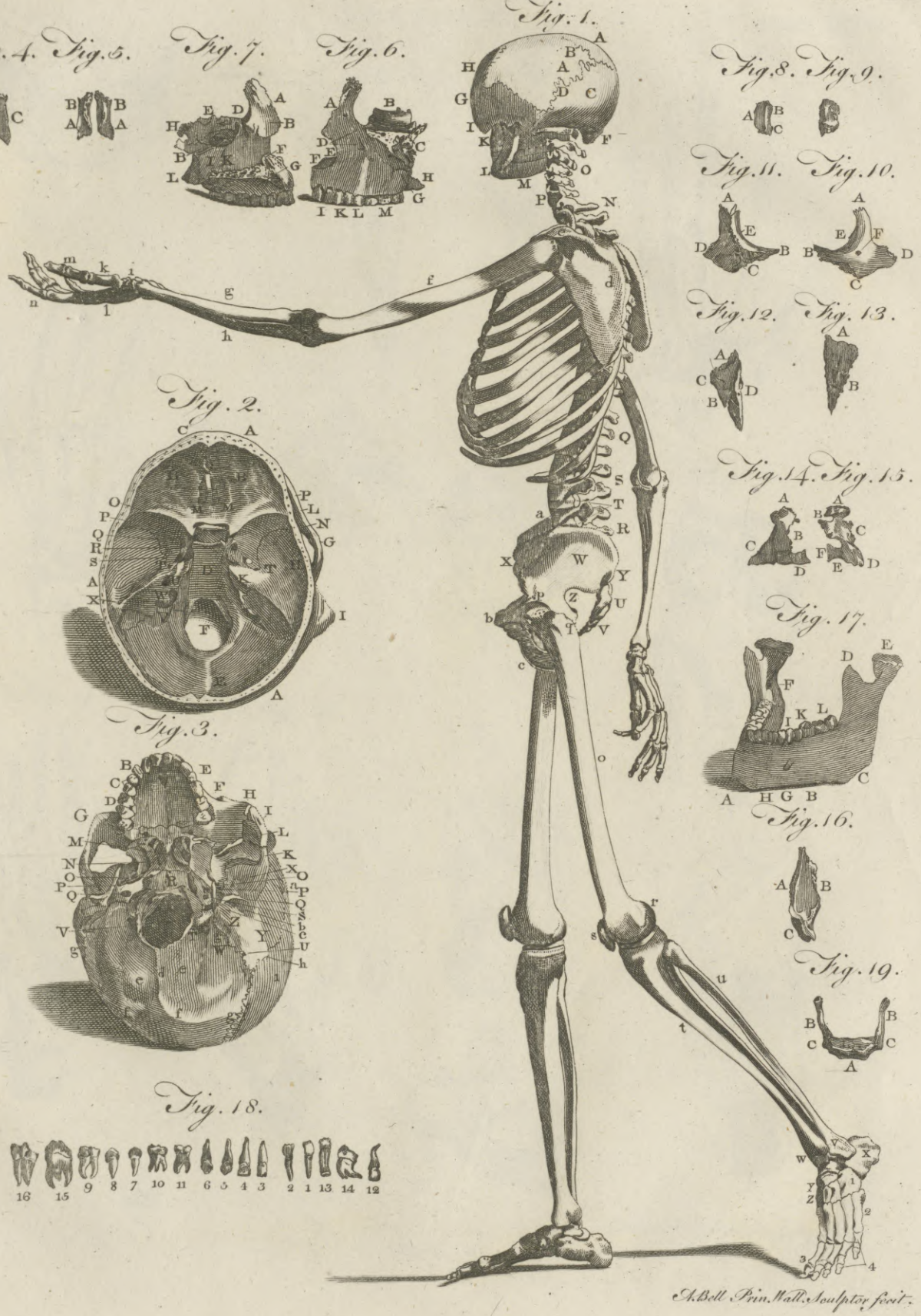
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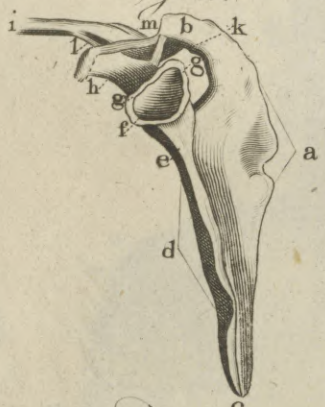

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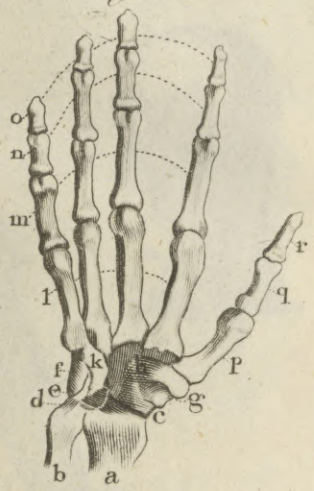

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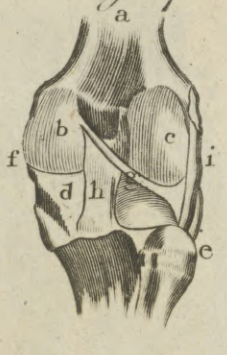

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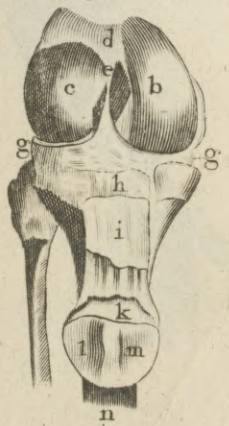

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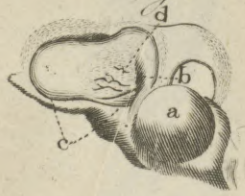

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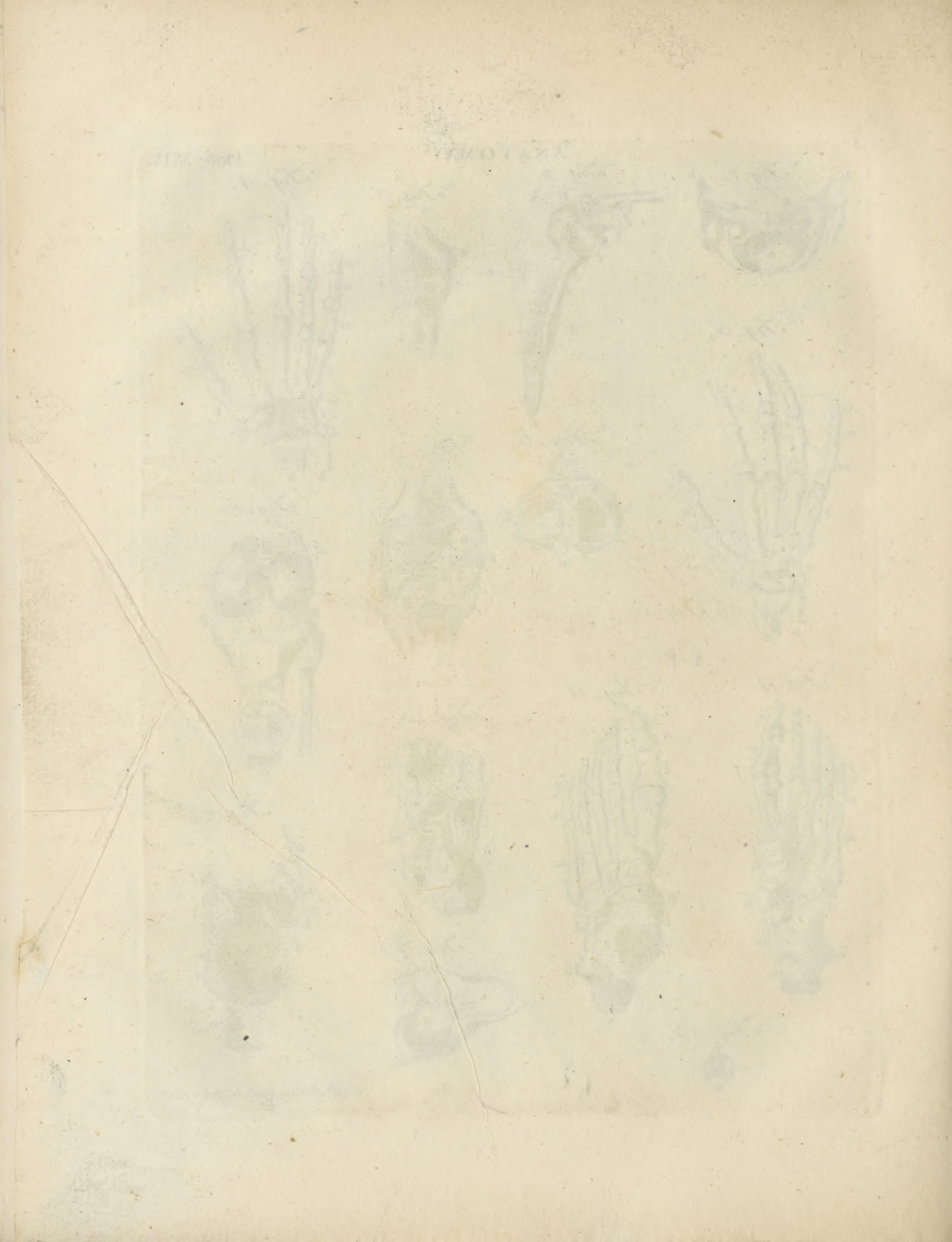

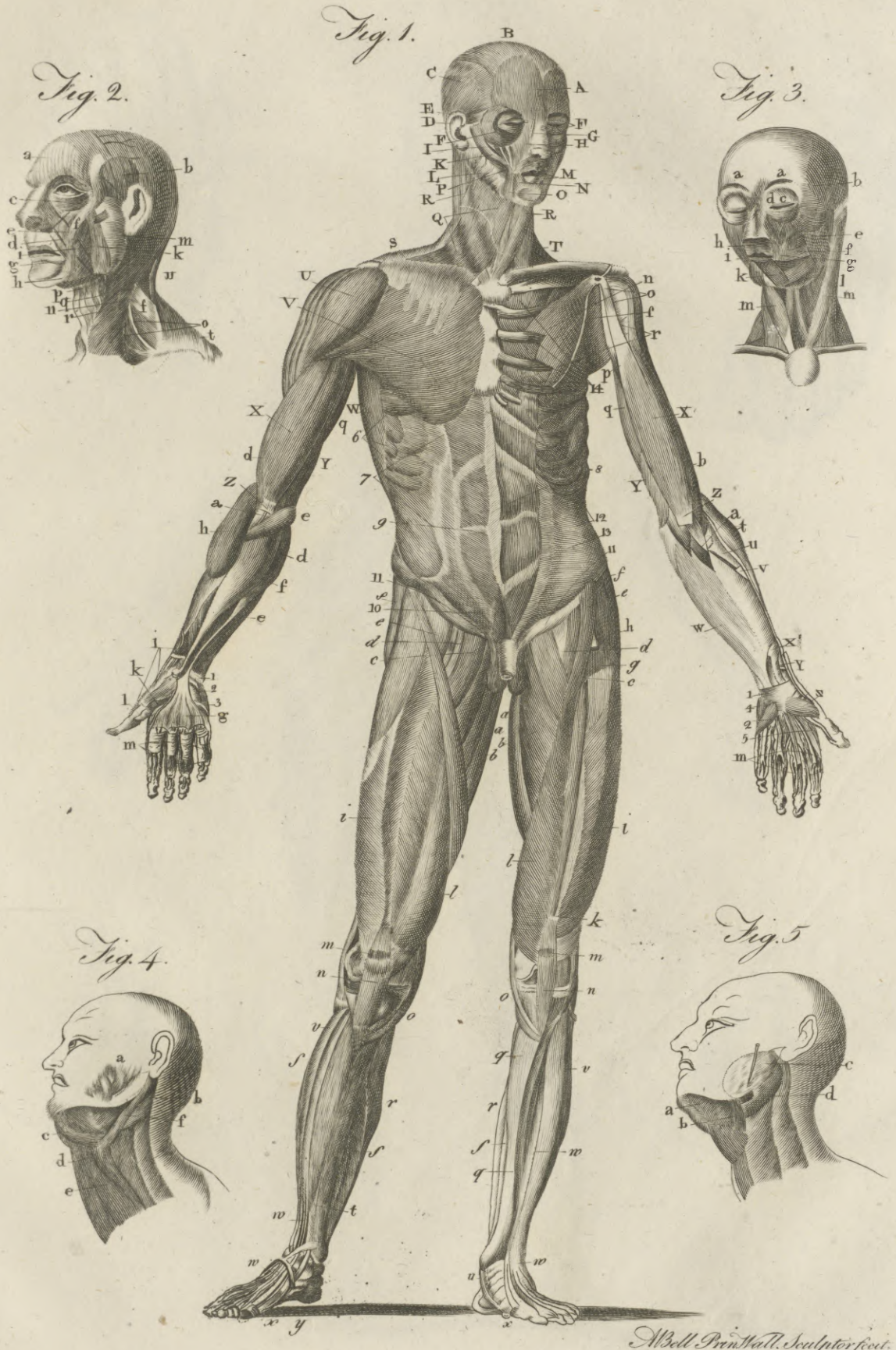
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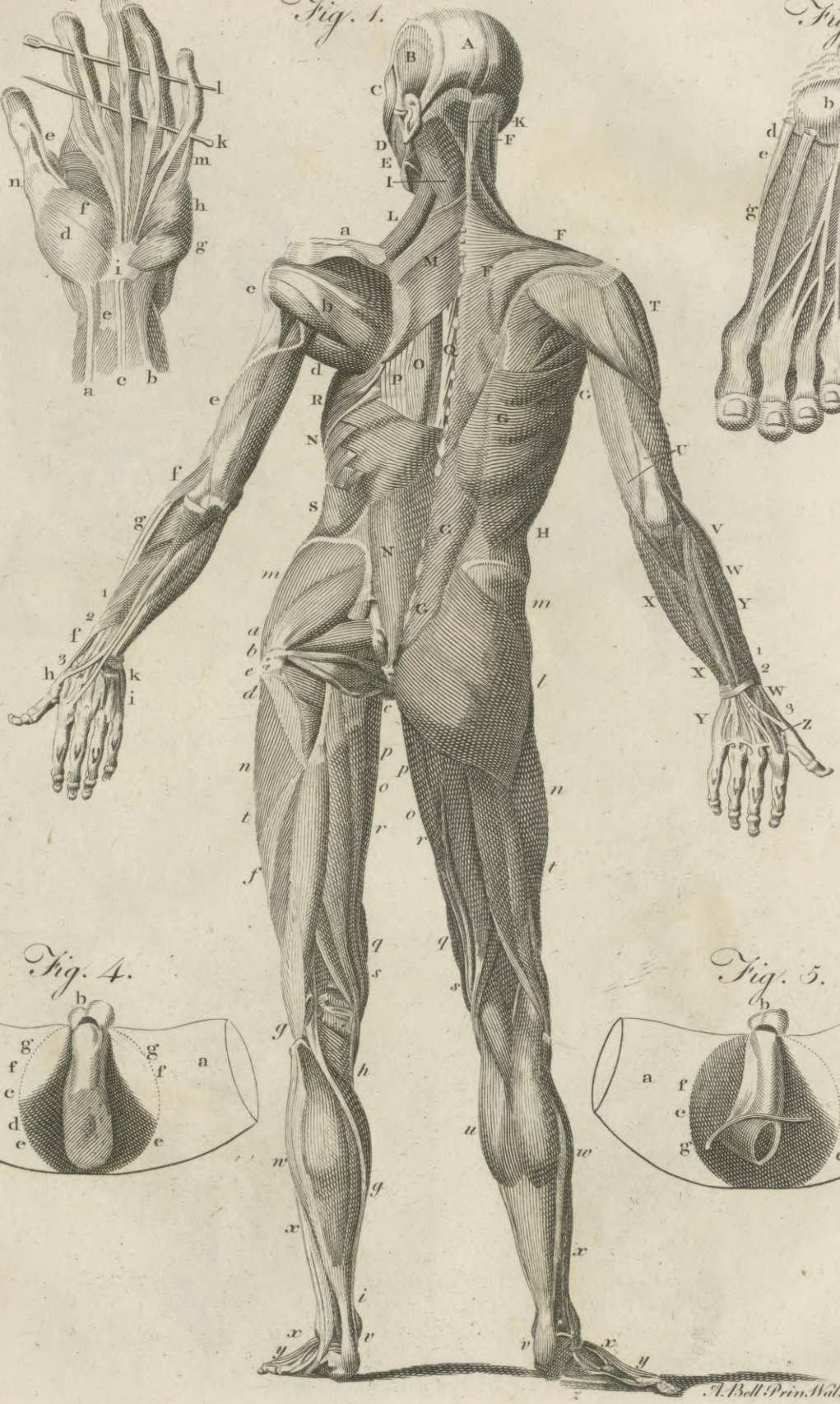

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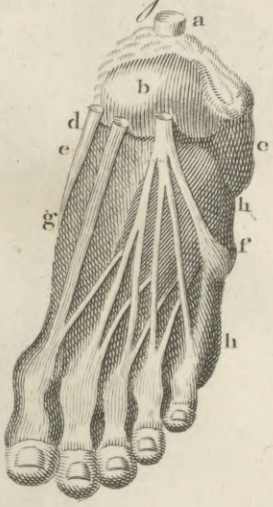

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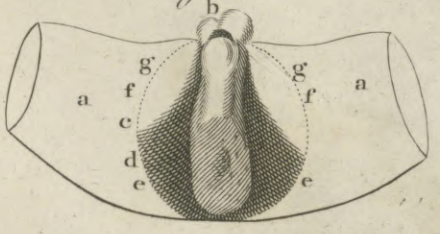

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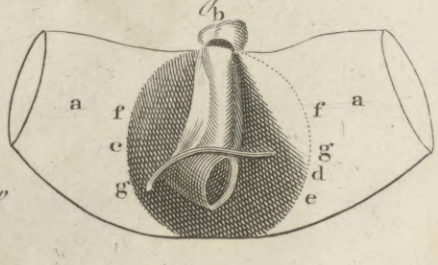

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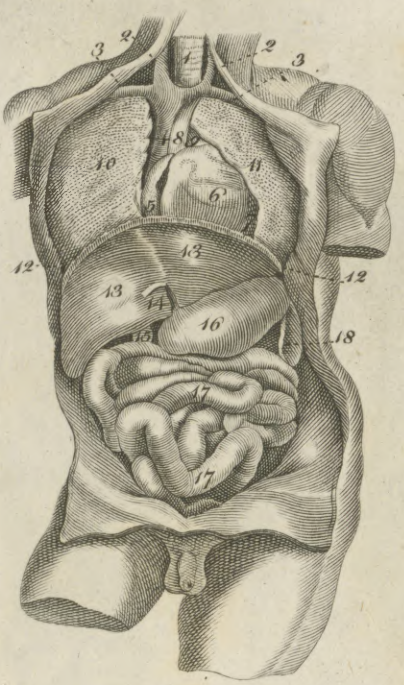

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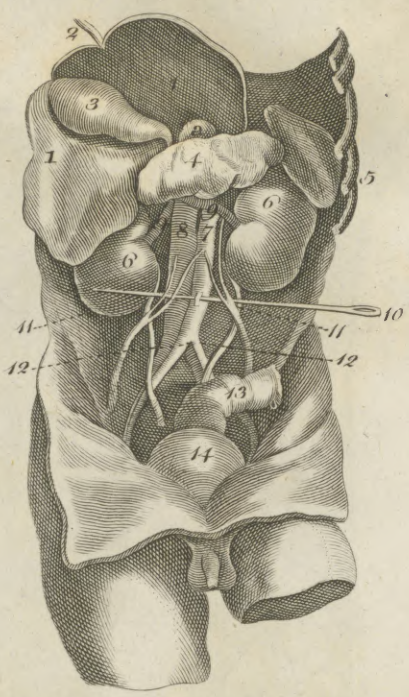

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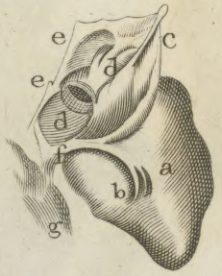

Fig. 5.

A.B.M. Prin. Mal. Sculptor fecit

Fig. 1.

Fig. 3.

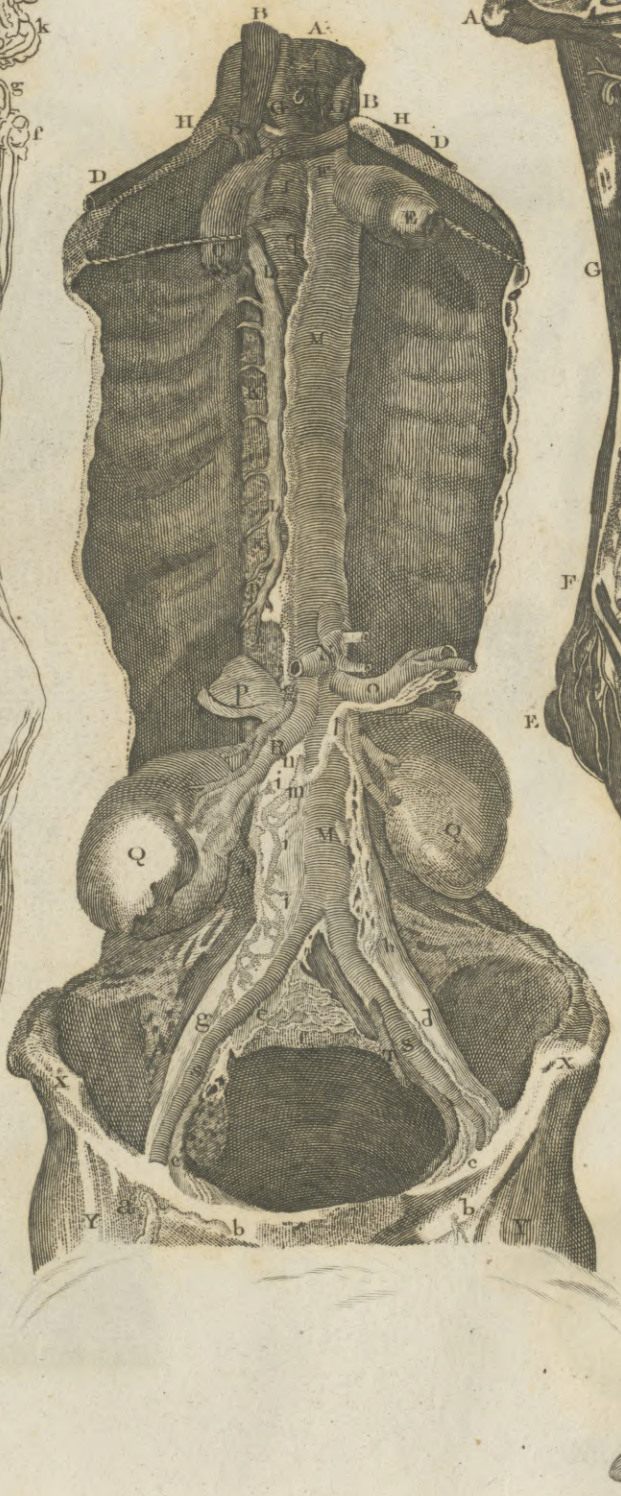

Fig. 2.

A. Bell's Prin. Hist. Sculptor fecit.

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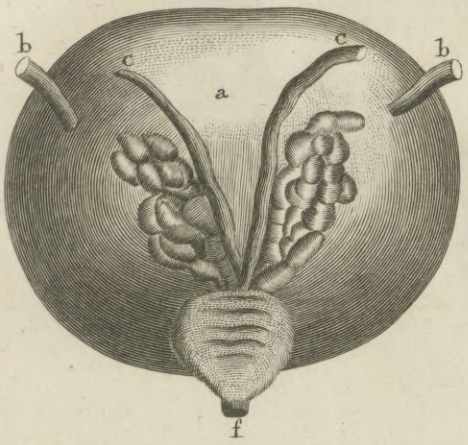

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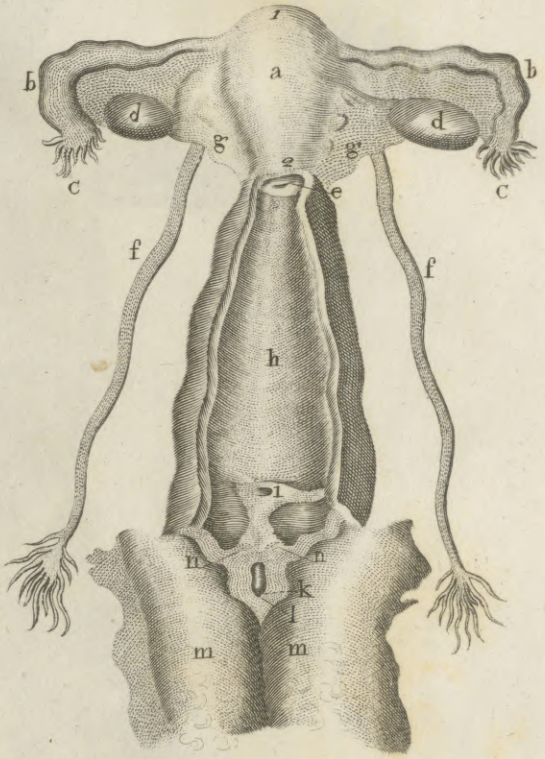

Fig. 2.

Fig. 5.

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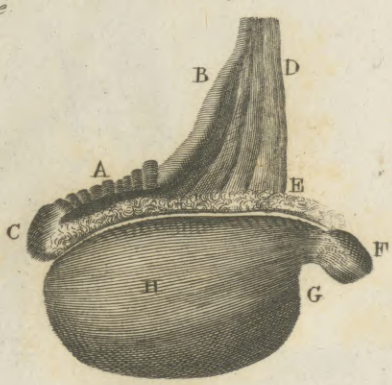

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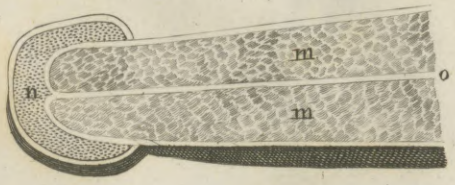
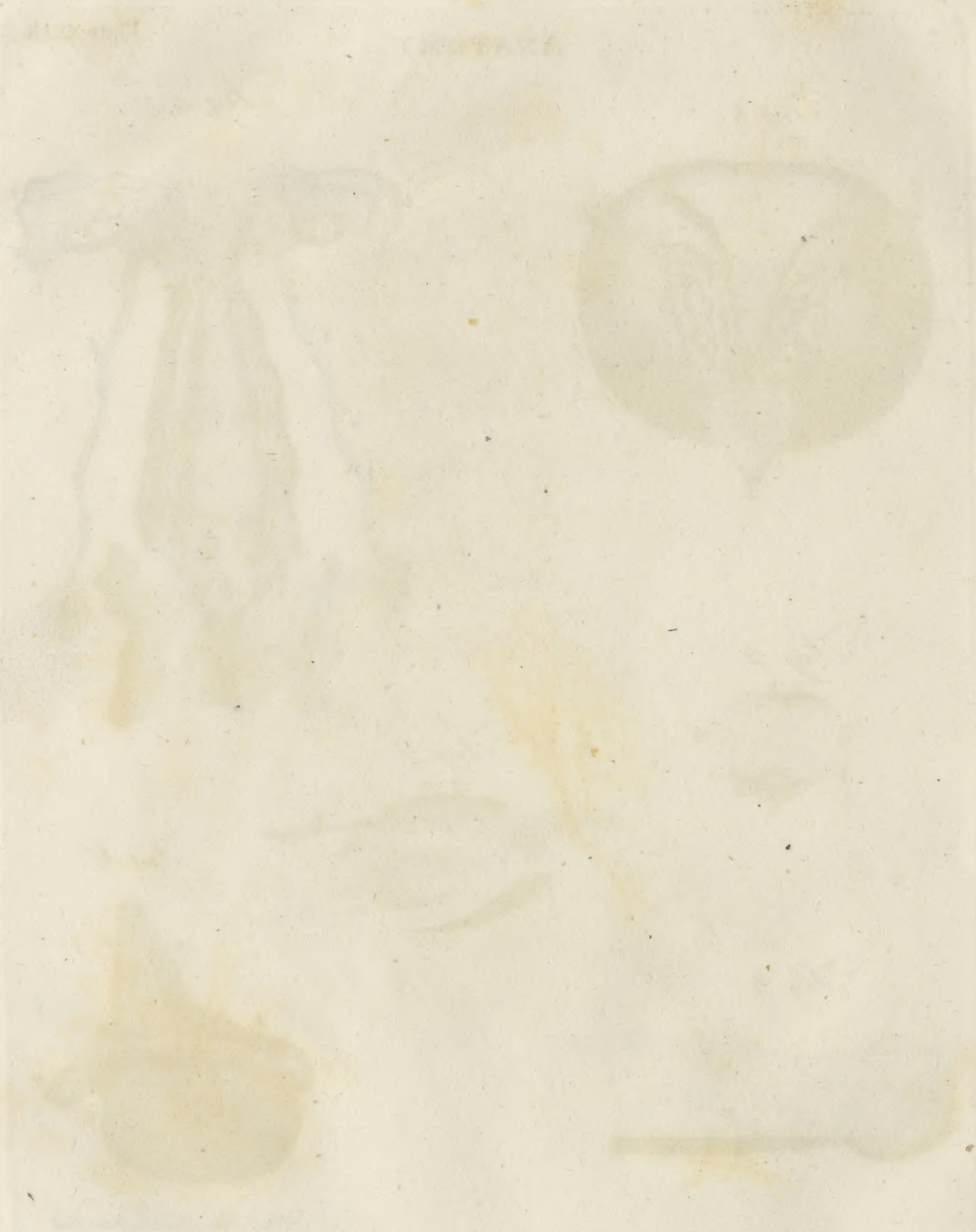
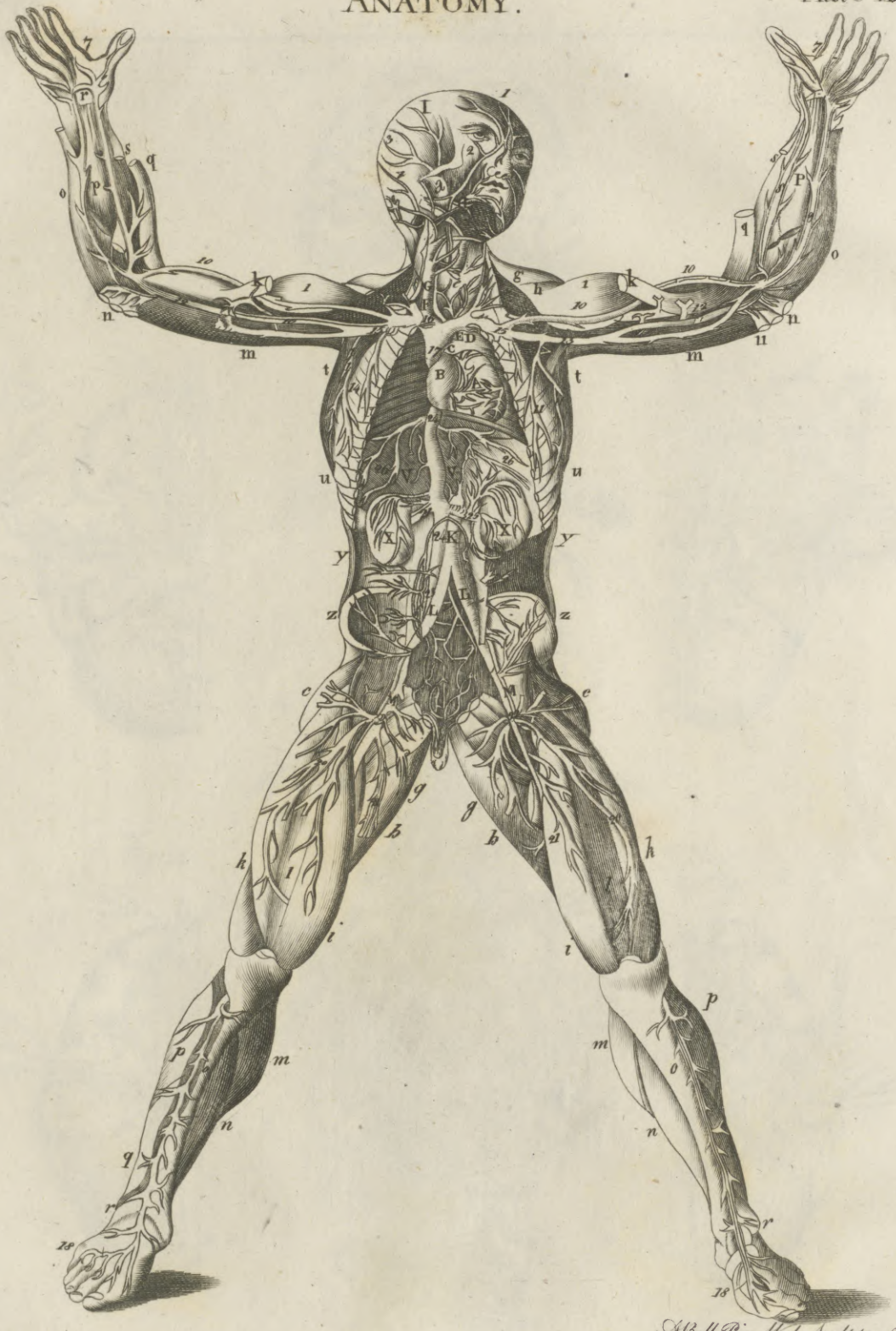
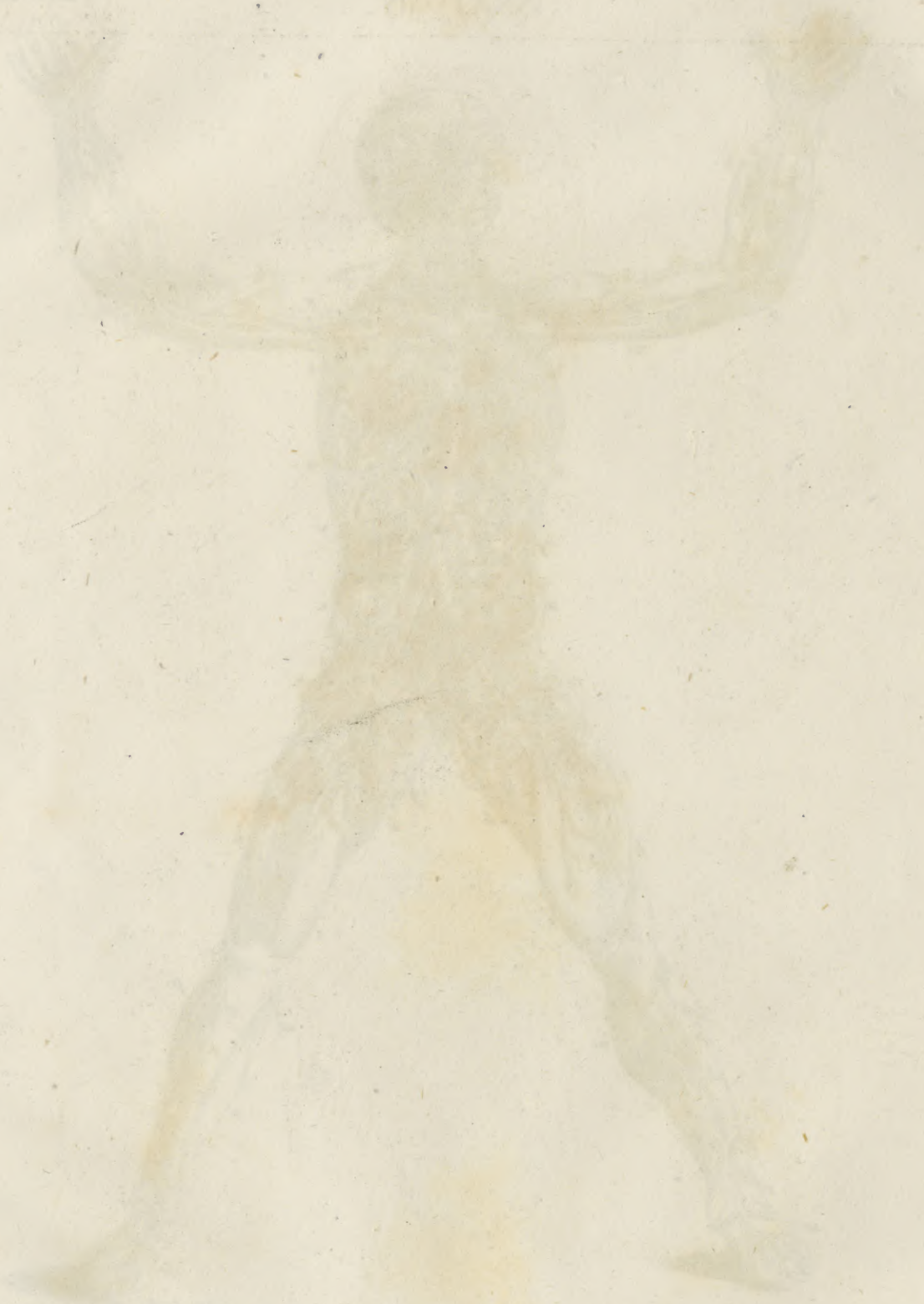


A Bell Prin. Wal. Sculptor fecit.





A Bell Pin. Wal. Sculptor fecit.



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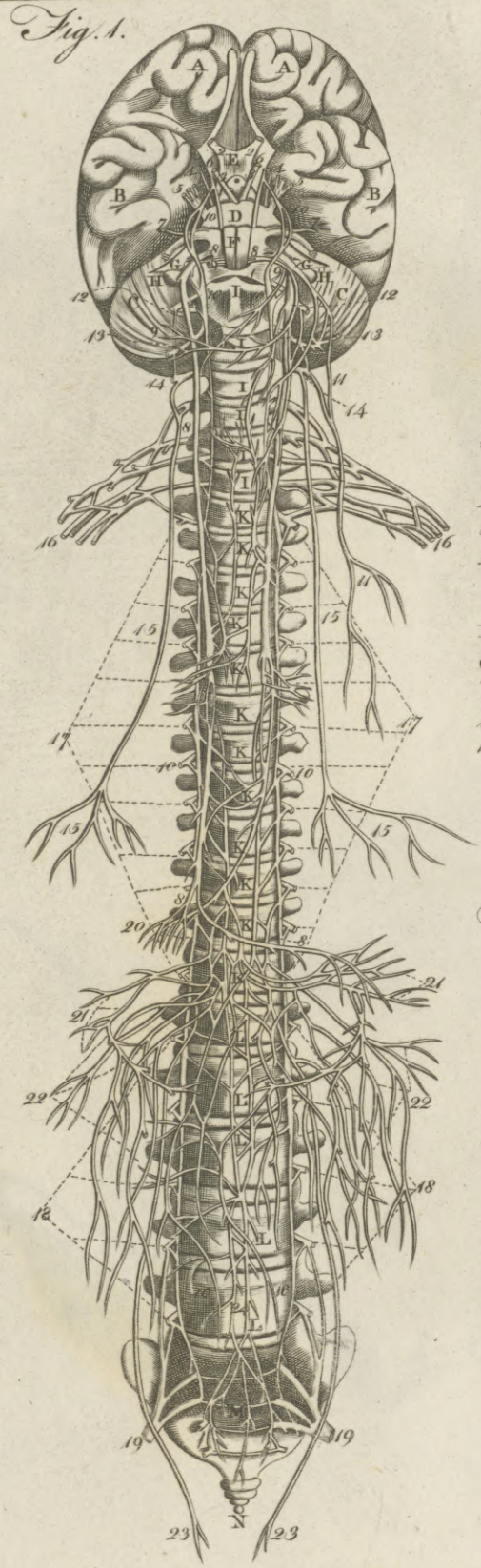

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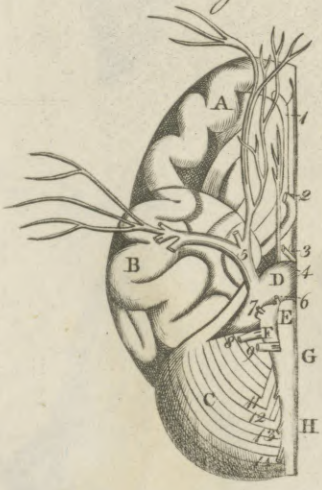

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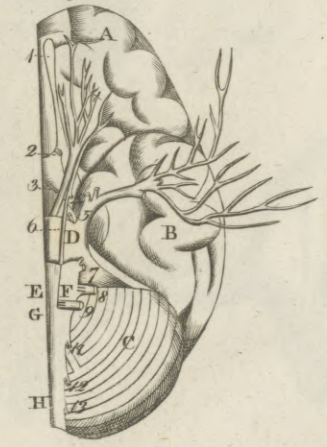

A Bell Prin. Wal. Sculptor fecit

Fig. 3.

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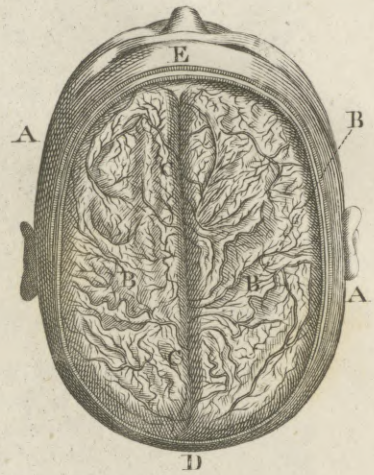

Fig. 2.

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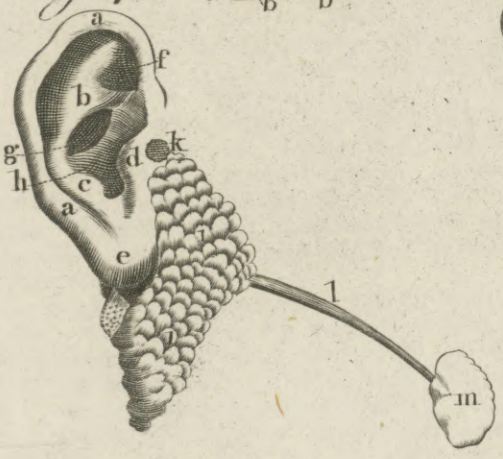

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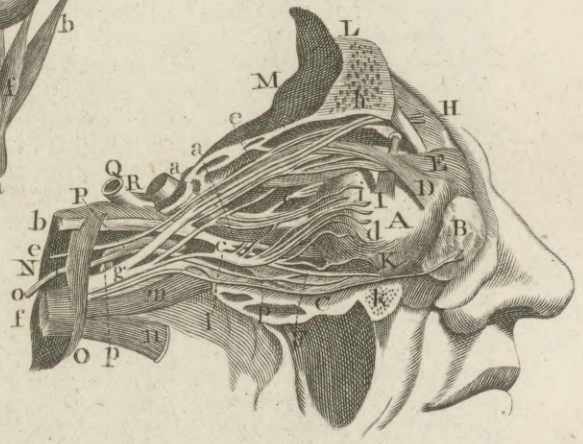

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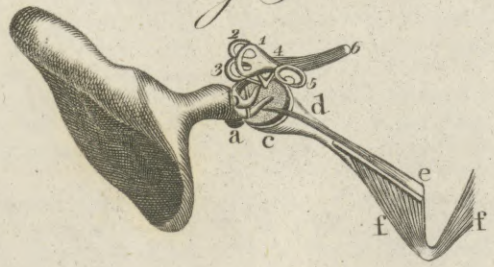

Fig. 8.

A. Bell. Prin.r Wal.s Sculptor fecit.

General variations, &c.

beſt and moſt ſcientific methods of arranging the ſeveral claſſes of organized beings, are founded on their anatomical ſtructure.

Fourthly, From comparing the organization of man with that of other animals, we derive conſiderable aid in our phyſiological reſearches, as many functions of the animal economy can be but imperfectly underſtood, without comparing in various claſſes the organs which are ſubſervient to them. From a want of this comparative view, there have ariſen among anatomiſts many diſputes, which a more enlarged acquaintance with this ſubject has decided.

To theſe advantages of comparative anatomy, we may add, that it may be practiſed at all times and in all places; and this enables thoſe, who from prejudice or delicacy, are withheld from the ſtudy of anatomy on the human ſubject, to acquire at an eaſy rate a knowledge of this uſeful ſcience, ſufficient for the uſual purpoſes of a liberal education.

In the view which we are here to take of comparative anatomy, it is by no means our intention to enter into a particular detail of the ſtructure of the ſeveral ſpecies, or even genera of animals. We propoſe, however, to conſider pretty fully the diverſities of organization exhibited by the ſeveral claſſes, and to exemplify theſe by ſome well-known individuals of each. We ſhall thus, we truſt, render the ſubject intereſting to the general reader, for whom this article is calculated, rather than for profeſſional men; and enable the naturaliſt, the veterinary ſtudent, the ſportſman, and the artiſt, to profit by our labours. But before entering on the particular comparative view of the ſeveral claſſes, we think it proper to premiſe a few general obſervations on the variations which appear in the organization and functions of animals, on the relations which take place among theſe variations, and the arrangement of animals founded on them.

General variations, &c.

148

CHAP. I. GENERAL VARIATIONS IN THE ORGANIZATION AND FUNCTIONS.

149 THE moſt obvious and ſimple function of an animal is motion, and we therefore begin with the organs by which this is produced. All animals are furniſhed with muſcles, or muſcular fibres, but a great proportion of them have nothing analogous to bone. In thoſe which have bones, there are two ſtriking diſtinctions; in one diviſion they are ſituated within the muſcles, forming an internal articulated ſkeleton; in the other they form an external ſcaly or ſhelly covering, within which the muſcles are included.

Thoſe animals which are furniſhed with articulated ſkeletons, conſtituting what is called a *vertebral column*, are denominated vertebral animals. Of theſe there are four orders, the mammalia, birds, fiſhes, and reptiles. All other animals, comprehending the molluſca, inſects, worms, and zoophytes, may be called *invertebral animals*.

150 The general differences in the organs of ſenſation are much leſs ſimple; they may be conſidered as reſpecting the internal nervous ſyſtem, and the organs of the external ſenſes. With reſpect to the former, ſome animals appear to have no nervous ſyſtem, as the zoophytes; another claſs has all of this internal ſyſtem except the brain, ſituated in the ſame cavity with the viſcera, as the molluſca, inſects, and ſome of the articulated worms; the third and moſt complete claſs, have the common origin of the nerves ſituated in a cavity, diſtinct from that of the viſcera, within the vertebral column; this comprehends all the vertebral animals. The two firſt claſſes have the ganglia or nervous knots, (Vid. GANGLIA, *Anatomy*) forming protuberances in the general nervous cord, as is the caſe with inſects and ſome articulated worms; or have them only within the larger cavities, as the molluſca: the laſt diviſion have them either on the ſides of the cord, or within the cavities, or both.

151 The external ſenſes differ in number and energy; all the vertebral animals agree with man in having five ſenſes. Of the invertebral animals, all appear to poſſeſs ſmell, taſte, and feeling; moſt of the molluſca and inſects, as far as is yet known, are without hearing; and the molluſca who want heads, the larvæ of ſome inſects, many of the articulated worms, and all the zoophytes, are not poſſeſſed of ſight. The energy of the ſenſes varies very conſiderably in different claſſes, and in different individuals; ſome, as moſt of the dogs, the vulture, and moſt of the ſarcophaga, or animals which prey on carrion, have the ſenſe of ſmelling extremely acute, and in theſe the membrane lining the naſal cavities appears to be proportionally more extended than in others. Some excel in the ſenſe of feeling, particularly man and the monkey tribe, in whom the extremities are moſt divided, moſt delicate, and furniſhed with the moſt minute ramifications of the ſuperficial nerves. Man, and thoſe animals who, like man, have the power of moving the head in all directions, poſſeſs a great extent of viſion, both as to circuit and diſtance; and theſe have two eyes ſunk and fixed within the head: others, as moſt inſects, which are to ſee minute objects near at hand, have either ſeveral eyes, or at leaſt eyes containing ſeveral lenſes. But the differences which appear in theſe organs will be fully noticed in comparing the ſeveral claſſes.

152 The organs of digeſtion furniſh us with two great diſtinctions. Some animals, as moſt of the zoophytes, have only one opening to the alimentary canal, which ſerves both for the taking in of aliment, and the rejection of the excrement; in all others this canal has two diſtinct openings, at a greater or leſs diſtance from each other, according as the convolutions of this canal are more or leſs numerous. Another difference which has conſiderable influence on the nature of the aliment, adapted to the ſeveral ſpecies is, that ſome animals have the mouth furniſhed with teeth or other hard bodies, for the purpoſe of breaking down ſolids, and that others want theſe organs. In the latter caſe, the animal if its mouth be large, can ſwallow its food entire, or if its mouth be in the form of a tube, can only ſuck in fluid ſubſtances. The nature of the bodies which the animal is to maſticate, is alſo influenced by the form of the teeth: thus ſome animals have only teeth formed for cutting and tearing, and therefore can only ſubſiſt on fleſh, or are carnivorous; others have chiefly grinding teeth, calculated only for bruiſing herbs and grain, and

General variations, &c.

and these are herbivorous; a third class have both, and are omnivorous. This difference of aliment is attended with a correspondent difference in the structure of the alimentary canal, as to its greater or smaller length, the number of stomachs, &c.

153 The chyle formed from the aliment by the action of these organs, is carried to its place of destination in one of two ways; it either exudes through the sides of the alimentary canal, or it is absorbed by particular vessels, by which it is conveyed into the general circulation. The former takes place in the zoophytes, and according to Cuvier in most insects, which appear to possess no proper circulating vessels. The latter is the case in the mollusca, and in all the vertebral animals; but these have the blood red and the chyle white, while those have all the fluids of the same whitish colour. Of the vertebral animals too, the chyle is opake in some, as the mammalia, and transparent like the lymph in others, as in birds, fishes, and reptiles.

154 In the organs of circulation several very important distinctions take place.

Some appear to have no circulating system, as insects and zoophytes. In those which possess circulating organs, some have a double circulation, or in them all the veinous blood passes through the lungs, before it again enter the arterial system, as man, mammalia, birds, fishes, and many of the mollusca; others have only a single circulation, or in these a great part of the veinous blood re-enters the arterial system, without passing through the lungs, as in reptiles. The structure and position of the heart is different in various classes. In some it is double, one part serving for circulating the blood through the lungs, and the other for distributing it through the rest of the body; and in this case the parts may be united, as in man, the mammalia, and birds, or they may be distinct, as in the cuttle-fish. In others the heart is single, or consists of one ventricle, which may be situated either at the base of the general artery, as in snails and some other mollusca, or at the base of the pulmonary artery, as in fishes.

155 The organs of respiration display striking varieties, ist according to the element which is to serve as the medium: if this be air, it is received into the interior of the respiratory organs; if it be water, it merely glides over the surface of lamellæ, which have been named branchiæ, as in fishes, and many of the mollusca, or of fringes, as in some worms. The air may be admitted into the body by one opening or by many. The former is the case with all animals who have proper lungs: the tube which receives the air is subdivided into numerous branches, terminating in cells, which are reunited, usually, into two masses, which the animal can at pleasure compress or dilate. In insects, which respire through many openings, the air-vessels are most minutely ramified, so as to admit the air to every part of the body, and these animals are said to respire by tracheæ. Lastly, The zoophytes, with the exception of the echinodermata, appear to have no respiratory organs.

156 There are only two general differences in the organs of voice, and these respect the position of the glottis, where the sound is formed. In birds, this is situated at the base of the windpipe, where this divides into two branches going to the lungs; in quadrupeds and reptiles, it is placed at the commencement of the windpipe, at the root of the tongue. Only these three classes have a glottis; in others sounds are produced by various mechanical means, by which the external air, or that contained within some part of their bodies, is set in rapid motion.

General variations, &c.

157 The differences which take place in the organs of generation are of two kinds, as they relate to the action itself, and to the consequences of this action. In a few animals, which mostly belong to the zoophytes, there is no copulation, but the young grows upon the body of the parent, like a shoot upon a tree: others propagate only by copulation, and are of course of two sexes; these, however, may be distinct in different animals, or united in the same; this last only takes place in the mollusca and in the zoophytes; all the vertebral animals and insects have the sexes distinct.

In hermaphrodite animals each individual can generate alone, as the bivalve shell fish: others copulate reciprocally, or each individual performs the double office of male and female; this is the case with snails, and such other of the mollusca as crawl on the belly.

As to the produce of generation, there are three modes in which the offspring is brought forth. Some animals, as some of the zoophytes and of articulated worms produce shoots which remain for some time on the body of the animals, and these are gemmiparous. Others, as man and the mammalia, contain the fœtus within a uterus, to which it is connected by a net-work of blood vessels, and from which it is sent forth alive; these, therefore, are viviparous. A third class, comprehending all the other animals, have the young contained within a shell, and enveloped by a substance which it absorbs before it is hatched; the viper may seem an exception to this division, as it brings forth its young alive; but then these have been hatched in the receptacle which contained the eggs; these animals are called *oviparous*.

Lastly, The organs of secretion show some diversity. All the vertebral animals and some mollusca secrete by means of glands situated in various parts of the body, or at least by means of expansions of vessels. The only secretory organs in insects seem to be tubes of various lengths, which attract with the spongy tissue of their sides, those fluids which they are to separate from the general nutritious mass. The secretory organs in the zoophytes are very imperfectly understood.

These are the principal general differences which we had to notice as taking place in animals. The following Table exhibits a comprehensive view of these, arranged in the order in which we have enumerated them.

1. OSSIFICATION.

A. a. Animals with an internal bony skeleton.
MAN, MAMMALIA, BIRDS, REPTILES, FISHES properly so called.

b. ——— with an internal cartilaginous skeleton.
CARTILAGINOUS FISHES.

B. a. ——— with an external horny skeleton.
PERFECT INSECTS, LITHOPHYTES.

b. Animals

General relations, &c.

b. Animals with an external cretaceous ſkeleton.
CRUSTACEA, and moſt of the ZOOPHYTES.

C. ——— without a ſkeleton.
LARVÆ of INSECTS, WORMS, POLYPI.

2. IRRITABILITY.

A. Animals which have the whole body muſcular.
Moſt larvæ of INSECTS, WORMS, POLYPI.

B. ——— which have the muſcles covering the ſkeleton.
MAN, MAMMALIA, BIRDS, FISHES, REPTILES.

C. ——— which have the muſcles covered by the ſkeleton.
PERFECT INSECTS, CRUSTACEA.

3. SENSATION.

A. Animals which have a brain and nerves readily diſtinguiſhed from the ſpinal marrow.
MAN, MAMMALIA, BIRDS, FISHES, REPTILES.

B. ——— which have a brain and nerves ſcarcely to be diſtinguiſhed from the ſpinal marrow.
INSECTS, CRUSTACEA, WORMS.

C. ——— which have no apparent ſenſorium.
ZOOPHYTES.

4. DIGESTION.

A. Animals which have one ſtomach, or more, readily diſtinguiſhed from the œſophagus and the alimentary canal.
MAN, MAMMALIA, BIRDS, CRUSTACEA.

B. ——— which have the ſtomach diſtinguiſhed from the œſophagus and alimentary canal only by certain ſwellings.
FISHES and REPTILES.

C. ——— which have only an alimentary canal.
INSECTS, WORMS, ZOOPHYTES.

5. CIRCULATION.

A. a. Animals with red blood, and a heart having two ventricles and two auricles.
MAN, MAMMALIA, BIRDS.

b. ——— with a heart having one ventricle divided into ſeveral cavities and two auricles.
REPTILES.

c. ——— with a heart having but one ventricle and one auricle.
FISHES.

B. Animals with white blood, and a heart formed of a longitudinal canal jointed and contractile.
Moſt CRUSTACEA, WORMS.

C. ——— without a heart, but with fluids contained in veſſels.
INSECTS, ZOOPHYTES.

General relations, &c.

6. RESPIRATION.

A. a. Animals which reſpire by means of lungs not adhering and ſpongy.
MAN, MAMMALIA.

b. ——— which reſpire by means of lungs not adhering, but formed of cells, and muſcular.
REPTILES.

c. ——— which reſpire by means of lungs adhering to the ribs, and furniſhed with appendages.
BIRDS.

B. ——— which reſpire by means of gills of various forms.
FISHES, CRUSTACEA.

C. ——— which reſpire by means of ſtigmata, or holes ſituated in different rings.
INSECTS, TERRESTRIAL WORMS.

D. ——— which reſpire by means of tracheæ, or by external fringed bodies.
AQUATIC WORMS.

E. ——— which appear to have neither ſtigmata nor tracheæ.
ZOOPHYTES ex. ECHINODERMATA.

7. GENERATION.

A. Animals viviparous.
MAN, MAMMALIA.

B. ——— oviparous.
BIRDS, FISHES, REPTILES, INSECTS, CRUSTACEA, WORMS.

C. ——— which may be propagated by cuttings.
WORMS, POLYPI.

8. SECRETION.

A. Animals ſecreting by means of glands.
MAN, MAMMALIA, BIRDS, FISHES, REPTILES, and ſome MOLLUSCA.

B. ——— which appear to have no glands.
Some MOLLUSCA, INSECTS, WORMS, ZOOPHYTES.

CHAP. II. GENERAL RELATIONS WHICH TAKE PLACE AMONG THE VARIATIONS OF ORGANIZATION AND FUNCTIONS.

WE ſhall beſt obſerve theſe relations by comparing together the ſeveral functions, two by two.

To begin with one of the moſt obvious, reſpiration, we perceive that this is always regulated by the motion of the nutritious fluid. In animals which are furniſhed with a heart and veſſels, there is a central receptacle, in which this fluid is collected, and from which it is diſtributed to every part of the body; the heart is its great goal, from which it ſets out, and to which it muſt return before performing a new circuit.

It muſt, therefore, at its ſource undergo the action

General relations, &c.

of the air, and accordingly, before it is ſent through the general artery, to the various organs, it is circulated through the lungs or branchiæ for this purpoſe. But in animals, as inſects, which have neither heart nor veſſels, this correſpondence is unneceſſary. In them the nutritious fluid has no regular motion, no general ſource; it could not have been prepared in a ſeparate organ, before its diſtribution to the reſt of the body, as exuding through the pores of the inteſtinal canal, it continually bathes the ſeveral parts, and introduces freſh particles between thoſe which compoſe them. The air, therefore, could exert its action only at the very points of this introduction, and the very inſtant when it happens. This is extremely well provided for by the diſpoſition of the tracheæ, as there is no one ſolid point in the bodies of inſects to which the fine ramifications of the air veſſels do not extend, and at which the chemical action of the air does not take place. As we clearly ſee the cauſes of theſe relations between the organs belonging to theſe two functions of reſpiration and circulation, we are authorized to conclude that other relations, which are found to hold between them, depend upon cauſes of the ſame kind, though perhaps not equally evident.

158 For inſtance, of thoſe animals who have blood veſſels and a double circulation, ſome reſpire by admitting the air immediately into the ſpongy ſubſtance of the lungs, and in theſe the two trunks of the large arteries approach each other, and are furniſhed with muſcular ventricles united into one fleſhy maſs; others reſpire through the medium of water paſſing between the folds of their branchiæ, and in theſe the two trunks are always ſeparated, whether each be furniſhed with a ſeparate ventricle as in the cuttle fiſh, or both have a common ventricle as in fiſhes and the molluſca.

159 The relation which ſubſiſts between reſpiration and motion is more eaſily explained. We find, that thoſe animals which move quickeſt, and are conſtantly reſident in the air, ſtand moſt in need of pure air, and can obtain it with the greateſt facility. The conſtant demand for freſh air, is found by modern chemiſtry to be owing to the loſs of irritability, in the muſcular fibre, which is ſupplied by ſomething from the air. Birds, therefore, who from the ſwiftneſs of their motion, and conſequent loſs of irritability, have the greateſt demand for freſh air, have alſo the moſt complete and extenſive reſpiratory organs. In reptiles, again, whoſe motion is generally very ſlow, and whoſe irritability is retained with great obſtinacy, theſe organs are incomplete, and their veſſels confounded with thoſe of the general circulation, and they can exiſt long without air. The mammalia ſeem to hold the middle rank between theſe two extremes.

160 The relations which take place between the differences of the organs of ſenſation with thoſe of reſpiration likewiſe deſerve attention.

General relations, &c.

In animals with cold blood, the external ſenſes are much leſs acute than in the warm-blooded animals; and in the former the brain is leſs, and does not completely fill the ſkull. This is doubtleſs owing to the ſlower motion of the cold-blooded animals requiring leſs nervous energy.

The digeſtive organs are found to poſſeſs more 161
power in proportion as thoſe of reſpiration are more active, as the great waſte occaſioned by theſe muſt be compenſated by a proportional ſupply of aliment received. Hence in birds, the ſtomach is extremely powerful, the digeſtion very vigorous, and the demand for food frequent and importunate; while reptiles require very little nouriſhment, and can remain very long without a freſh ſupply.

We have ſeen the relations which ſubſiſt between the organs of reſpiration and thoſe of digeſtion. Theſe laſt are alſo immediately related to the organs of motion and of ſenſation; for the nature of the aliment by which the animal is to be nouriſhed is completely determined by the diſpoſition of the alimentary canal; but if the animal had not its organs of ſenſation and of motion calculated for diſtinguiſhing and procuring its proper food, it is evident that it could not exiſt: thus an animal who can digeſt only fleſh, muſt of neceſſity be enabled to perceive, to purſue, to ſeize, to overcome, and tear in pieces its proper prey. It muſt therefore poſſeſs a piercing ſight, an acute ſmell, a rapid motion, agility, and conſiderable ſtrength in its jaws and talons. Accordingly, we never ſee exiſting in the ſame animal a tooth formed for cutting fleſh together with a horny foot; this explains why every animal with hoofs is herbivorous, and why hoofs indicate grinding teeth with flattened crowns, a very long alimentary canal, a large ſtomach, or ſeveral ſtomachs, and many other ſimilar relations. Among all theſe relations there are many which have ſomething in common, and there are always ſome in which the differences are few, ſo that by bringing together thoſe which have the neareſt reſemblance, we are enabled to form a kind of ſeries, which will appear gradually to proceed from a primitive ſtandard. Hence the idea of a ſcale of beings, which ſome naturaliſts have formed, exhibiting a regular gradation, beginning at the moſt perfect, and deſcending to the moſt ſimple ſtate of organization, or *vice verſa*. As the links which conſtitute this chain are by no means entirely known, a perfect ſcale of beings is at preſent not to be expected.

The following table diſplays a ſeries of animals, beginning with the moſt ſimple ſtate of organization, and aſcending to the moſt perfect.

SCALE

Arrangement of Animals, &c.

SCALE of ANIMALS according to the greater or leſs ſimplicity of their Structure.

Arrangement of Animals, &c.

1. Having only a ſtomach,	Polypes. *Hydra.* Biphores. Vinegar eels. *Vibrio.*	*Linnè.* *Forſkall.*
2. A ſtomach and inteſtines,	Sea animonies. *Actinias.* *Nettles.* *Meduſæ.* Argonauts. Beröe. Moſt animalcula of vegetable infuſions.	*Linnè.*
3. Having beſide theſe an external organ for reſpiration in the water,	Flower-polypes. *Vorticellæ.* Brachioni, Botrylli.	*Miller.* *Pallas.*
4. Having beſides theſe, ſome viſcera, a ſyſtem of abſorbents, organs of generation, (but not of copulation), and a net-work of nerves,	Thetis. Anomiæ. Nereïs. Animals of the bivalve ſhells.	*Linnè.*
5. Having beſide, a blood veſſel, and ſometimes the ſenſe of ſeeing,	Inteſtinal worms.	
6. Having beſide, organs of copulation (hermaphrodites) a heart without auricles, but with diſtinct pulſations, nervous ganglia, the ſenſe of viſion, and an imperfect organ of maſtication,	Leeches. Snails. Animals of the univalve ſhells.	
7. Having beſides a brain, organs of locomotion, male and female organs of generation diſtinct, ſometimes the ſenſe of hearing, and an external bony ſyſtem,	Inſects.	
8. Having rudiments of an internal bony ſyſtem, a heart and blood veſſels,	Cartilaginous fiſhes.	
9. Having a complete internal bony ſyſtem,	Fiſhes properly ſo called.	
10. Having internal lungs, and an organ of ſmelling,	Amphibia.	
11. Having beſides a bilocular heart,	Birds.	
12. Having perfect organs of taſte and maſtication, organs for ſecreting milk, and a uterus,	Mammalia. Man.	

CHAP. III. ARRANGEMENT OF ANIMALS FOUNDED ON THE GENERAL DIFFERENCE OF THEIR ORGANIZATION.

HAVING taken a ſurvey of the general differences which take place in the organization and functions of animals, and of the relations which ſubſiſt among theſe differences; we are now to proceed to a ſummary view of the whole animal kingdom, and conſider what is common in the organization of the various claſſes of which it is compoſed.

The whole animal kingdom is generally divided into two great families, that of the vertebral animals, who have red blood; and that of the invertebral animals, almoſt all of which have white blood.

In the firſt diviſion we always find an interior articulated ſkeleton, of which the principal ſupport is the vertebral column, having the head at its atlantal extremity, and containing within its cavity the general origin of the nerves; its ſacral extremity is commonly prolonged to form a tail. The ribs, which are ſeldom wanting, are ſituated on both ſides of this column (G).

(G) As the terms generally employed in the human anatomy are by no means calculated for deſcribing the ſtructure

Of Quadrupeds.

These animals have never more than four limbs; but in some of them two of these are wanting, in others all.

Their brain is always contained within a peculiar cavity of the head called the *cranium;* all the spinal nerves send off filaments to assist in forming a nervous chord, which is derived from one of the nerves of the cranium, and is distributed to most of the viscera.

They have always five senses: two eyes which they can move at pleasure; the ear has always at least three semicircular canals; the organ of smell is always confined to cavities in the fore part of the head; there is always at least one fleshy ventricle, by which the circulation of the blood is carried on; sometimes there are two ventricles, which are always united.

The lymphatic vessels are always distinct from the blood vessels.

The jaws are always situated horizontally, and separate from above downwards.

The alimentary canal is continued from the mouth to the anus, which is always situated behind the bones with which the sacral extremities are articulated.

The intestines are enveloped in a membranous bag, called *peritonæum*.

There are always a liver, and a pancreas or sweetbread, by which liquors are secreted for the purposes of digestion, and a spleen, in which one part of the blood which goes afterwards to the liver, undergoes some previous change.

The urine is always separated by two kidneys, which are situated on the sides of the vertebral column without the peritonæum, and above which are always two bodies called *atrabiliary capsules*, the use of which is unknown. The vertebral animals are subdivided into two sections; the hot-blooded, and the cold-blooded.

In the hot-blooded vertebral animals there is always a heart and a double circulation. Respiration is carried on by means of lungs, and without the exercise of this function they cannot exist.

The brain in these animals completely fills the cavity of the skull, and their eyes close by means of lids. The tympanum of their ear is sunk in the solid bone of the skull, as the parts of the labyrinth are entirely surrounded by bone; besides the semicircular canal, there is always an organ with two spiral cavities, like the shell of a snail; the nostrils serve for the passage of the air in breathing, and form a communication with the mouth. The trunk is always surrounded by the ribs, and there are for the most part four limbs.

Of Quadrupeds.

The cold-blooded vertebral animals are deficient in several of these particulars; many of them want ribs, and some of them have no limbs. In them the brain never entirely fills the cavity of the skull, and their eyelids are seldom moveable; the tympanum of their ear, as also the small bones, is often wanting, the spiral cavity always; when the tympanum is present, it is never sunk within the skull.

Each of these two divisions is again subdivided into two classes; the former into the mammalia and the birds; the latter into the fishes and the reptiles: the structure of these classes will be considered in their proper place.

The invertebral animals have fewer common circumstances, and constitute a less regular series than those of which we have been speaking; their hard parts, when they are present, are generally, at least when articulated, placed externally. No part of their nervous system is contained within a bony sheath, but floats in a common cavity with the viscera.

The brain only is placed above the alimentary canal; from it proceed two branches which embrace the gullet like a collar, and from which the general bundle of the nerves is formed. In these animals respiration is never carried on by means of cellular lungs, and they are all destitute of voice; their jaws have no particular direction, and their mouths are often merely suckers; they have no kidneys, and consequently secrete no urine; if they have limbs, these are always at least six in number.

Considered in an anatomical point of view, they may be divided into five classes, namely, the mollusca, the crustacea, insects, worms, and zoophytes. We shall treat of these several classes in the order in which we have enumerated them.

CHAP. IV. MAMMALIA, OR QUADRUPEDS.

SECT. I. *General Observations.*

162 Whether man is naturally a biped or a quadruped.

A QUESTION has been started by some fanciful philosophers, "Whether man is naturally a *biped* or a *quadruped?*" and much ingenuity has been employed to establish the latter opinion. But it is presumed that few of their readers have been made converts to such an opinion, and that not many of ours will require much argument to persuade them of their erect destination. It may therefore suffice to observe, that this erect position is best adapted to the conformation of the human head, and the ponderous quantity of human brains:—that the articulation of the *os occipitis* with the first vertebra of the neck, is differently constructed from that of quadrupeds, with the obvious design that man should be able to move his head in every direction with the greatest facility:—that the human species (and also monkies) are destitute of that strong ligament or tendinous aponeurosis, vulgarly called *pax-wax*, which quadrupeds possess (as a kind of *stay-tape*), to prevent the head from sinking to the earth; to which, from its natural position, it must be very prone:—and that our eyes and ears are, fortunately, not

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structure of the inferior animals, we shall in this article make use of others, with which we have been favoured by Dr Barclay, the ingenious lecturer on anatomy, to whose publication on anatomical nomenclature we refer the reader for their explanation.

Of Quadrupeds.

not placed as thoſe of the quadrupeds. The axis of the human eye is nearly perpendicular with a vertical ſection of the head; whereas, in the brute creation (the larger ape excepted), the poſition of the eyes forms an acute angle:—nature has alſo furniſhed other animals with a *ſuſpenſorium oculi*, a muſcle which the *erect* attitude renders needleſs, though highly neceſſary in the *prone;* conſequently, whoever tries the experiment will find that, in the inclined direction, both his eyes and his ears are in the moſt unfavourable ſituation poſſible for quick hearing or extenſive viſion. In fine, the ſhape, breadth, ſtrength of the vertebræ of the back and loins, are all coincident with the erect attitude of the trunk.

All quadrupeds have a covering of hair, wool, &c. to defend them from the injuries of the weather, which varies in thickneſs according to the ſeaſon of the year, and difference of the climate: thus in Ruſſia and the northern countries, the furs are very thick and warm, while the little Spaniſh lap-dogs, and Barbary cows, have little or no hair at all.

163 Cuticula, cutis, panniculus carnoſus.

The cutis and cuticula in quadrupeds are diſpoſed much in the ſame way as the human, only more elaſtic; immediately under this, there is a very thin cutaneous muſcular ſubſtance called *panniculus carnoſus*, which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, ſerving to ſhrivel the ſkin, in order to drive off inſects, their tails and heads not being ſufficient for this purpoſe, while their extremities are employed in their ſupport and progreſſion.

Of Quadrupeds.

164 Whence the motion of the panniculus carnoſus, &c.

It has probably been from obſerving ſome muſcles of the human body, ſuch as the platyſma myoides, cremaſter, and frontales, and the collapſed tunica celluloſa of emaciated ſubjects, to reſemble this thin muſcle, that ſome of the older anatomiſts reckoned ſuch a panniculus among the common teguments of the human body. This Carolus Stephanus has well obſerved.

165 Why moſt quadrupeds want clavicles.

Moſt part of quadrupeds want clavicles, whereby their atlantal extremities fall upon their cheſt, ſo as to make their thorax proportionally narrower than the human. This ſmall diſtance of their atlantal extremities is very neceſſary for their uniform progreſſion: apes indeed and ſquirrels have clavicles to allow them a more full uſe of their extremities in climbing; but when they walk on all-fours, they move but indifferently.

Their head is connected to the firſt vertebra of the neck by two eminences as in man. The vertebræ of the neck are never leſs than ſix, or more than nine. The number of the dorſal and other vertebræ differ conſiderably in the various individuals. The following table exhibits theſe differences in each ſpecies. The brain of theſe animals is more complicated than that of the other claſſes.

TABLE of the Proportional Number of Spinal Vertebræ in various ſpecies of Mammalia.

Species.	*Dorſal Vertebræ.*	*Lumbar Vertebræ.*	*Sacral Vertebræ.*	*Coccygian Vertebræ.*
Man,	12	5	5	4
Simia ſatyrus, Lin. Orang-outang,	12	4	3	4
—— *troglodytes.* Jocko,	13	5	4	5
—— *lar.* Gibbon,	14	3	6	0
—— *paniſcus.* Coaïta,	14	3	2	32
—— *capucina.* Weeping monkey, ſaï,	14	7	4	25
—— *roſalia.* Silky monkey, marakina,	12	7	1	26
—— *patas.* Patas,	12	7	3	16+
Maimon, rib-noſed ape,	12	7	1	13
—— *cynomolgus.* Macaca,	12	7	1	5
—— *chinenſis.* Chineſe monkey,	11	7	3	20
—— *ſphinx.* Baboon, papion,	12	7	1	31
—— *inuus.* Magot,	12	7	1	3
—— *maimon.* Mandrill,	12	7	3	13
—— *pongo.* Pongo,	12	4	3	4
—— *beelzebub.* Aloſti, howling baboon,	14	4	5	25
Lemur catta. Macauco,	12	7	3	18
—— *gracilis.* Lori,	15	9	1	9
—— *tarſius.* Tarſier,	14	5	3	17+
Veſpertilio vampyrus. Rouſette, vampyre bat,	12	4	1	0
—— *murinus.* Common bat,	11	5	4	12
—— *noctula.* Noctule, great bat,	12	7	3	6
—— *ferrum equinum.* Horſe-ſhoe bat,	12	6	3	12

TABLE, &c. continued.

Species.	*Dorſal Vertebræ.*	*Lumbar Vertebræ.*	*Sacral Vertebræ.*	*Coccygian Vertebræ.*
Lemur volans. Flying lemur,	12	6	1	22
Erinaceus europæus. Hedgehog,	15	7	4	12
——— *ecaudatus.* Tanrec,	15	6	3	8
Sorex mus araneus. Muſetta, ſhrew,	12	7	3	17
Talpa europæa. Mole.	13	6	7	11
Urſus maritimus. White bear,	13	6	7	11
——— *arctos.* Brown bear,	14	6	5	4+
——— *meles.* Badger,	15	5	3	16
——— *gulo.* Glutton,	16	5	3	18
Viverra. Coati,	14	6	1	10+
Ur. lotor. Racoon,	14	7	3	20
Muſtela lutra. Otter,	14	6	3	21
——— *martes.* Martin,	14	6	3	18
——— *vulgaris.* Weaſel,	14	6	3	14
Viverra civetta. Civet,	13	6	3	20
Felis leo. Lion,	13	6	3	23
—— *tigris.* Tiger,	13	7	4	19
—— *pardus.* Panther,	13	7	3	24
—— *concolor.* Couguar,	13	7	3	22
—— *catus.* Cat,	13	7	3	22
Canis familiaris. Wolf-dog,	13	6	3	22
—— *lupus.* Wolf,	13	7	3	19
—— *vulpes.* Fox,	13	7	3	20
—— *hyæna.* Hyæna,	16	4	2	8+
Didelphis cancriphaga. Cayenne opoſſum, crab-eater,	13	6	5	16+
——— *murina.* Marmoſe,	13	6	1	29
——— *orientalis.* Phalarger,	13	6	1	30
Hiſtrix criſtata. Porcupine,	14	5	4	8+
Lepus timidus. Hare,	12	7	4	20
—— *cuniculus.* Rabbit,	12	7	2	20
Cavia capybara. Cabæ,	13	6	2	4+
—— *cobaya.* Guinea pig,	13	6	4	6
—— *paca.* Paca, or ſpotted cavy,	13	6	5	7
—— *aguti.* Agouti,	12	8	4	7
Caſtor fiber. Beaver,	15	5	3	23
Sciurus volans. Flying ſquirrel,	12	8	3	13
Mus marmotta. Marmotte,	13	7	6	22
—— *arvalis.* Field mouſe,	13	7	3	15
—— *amphibius.* Water rat,	13	7	4	23
—— *rattus.* Black rat,	13	7	3	26
—— *decumanus.* Norway rat,	13	7	4	23
—— *muſculus.* Common mouſe,	12	7	4	24
—— *ſylvaticus.* Field or harveſt rat,	12	7	3	23
—— *cricetus.* Hamſter,	13	6	4	15
—— *glis.* Fat dormouſe,	13	7	2	18
—— *quercinus.* Garden dormouſe,	13	7	4	24
Myrmecophaga didactyla. Ant-eater,	16	2	4	40
Manis pentadactyla. Pangolin,	15	5	3	28
——— *tetradactyla.* Long-tailed manis,	13	5	2	45
Daſypus. Armadillo,	11	4	3	30
Bradypus didactylus. Two-toed ſloth,	23	2	4	7+
Elephas indicus. Elephant,	20	3	4	14
Sus ſcrofa. Hog,	14	5	3	4

TABLE, &c. continued.

Species.	*Dorsal Vertebræ.*	*Lumbar Vertebræ.*	*Sacral Vertebræ.*	*Coccygian Vertebræ.*
Tapirus. Tapir,	20	4	3	12
Rhinoceros,	19	3	4	22
Camelus bactrianus. Camel,	12	7	4	17
——— *dromedarius.* Dromedary,	12	7	4	18
Cervus elaphus. Stag,	13	6	3	11
Camelo-pardalis. Camelopard,	14	5	4	18
Antilope cervicapra. Antelope,	13	6	5	15
——— *dorcas.* Gazelle,	13	5	5	11
——— *rupicapra.* Chamois goat,	13	5	4	7†
Capra hircus. Goat,	13	6	4	12
Ovis aries. Sheep,	13	6	4	16
Bos taurus. Ox,	13	6	4	16
Equus caballus. Horse,	18	6	2	17
——— *quagga.* Couaga,	18	6	7	18
Phoca vitulina. Seal,	15	5	2	12
Delphinus delphis. Dolphin,	13	} in all		
——— *phocæna.* Porpoise,	13	} 66		

Their eyes have only two lids, and they agree with man in having the internal ear furnished with four little bones articulated with each other, and a completely spiral cochlea, and a tongue entirely soft and fleshy. Their heart, lungs, and diaphragm resemble those of man in their general structure; and differ only in a few circumstances, which will be best seen in the exemplification of their structure, which is presently to be given.

In treating of quadrupeds we shall divide them into the carnivorous, or rather those which feed indifferently on flesh and vegetables, and the granivorous. The structure of the former we shall exemplify in the dog, that of the latter in the cow.

Sect. II. *The Anatomy of a Dog.*

We may first observe of this animal, as of most *quadrupeds*, that its legs are much shorter in proportion to its trunk than in man, the length of whose steps depends entirely on the length of his sacral extremities; however, to balance this, the trunk of the animal is proportionally longer and smaller, his spine more flexible, by which he is able at each step to bring his sacral nearer to his atlantal extremities. His common teguments are much a-kin to those of other quadrupeds, only they allow little or no passage for sweat; but when he is over-heated, the superfluous matter finds an exit by the salivary glands, for he lolls out his tongue and slavers plentifully. We are not, however, to suppose, that because a dog does not sweat, he has no insensible perspiration. That a dog perspires is evident, because one of these animals can trace another by the scent of his footsteps; which could not happen if a large quantity of perspirable matter was not constantly going off.

The pyramidal muscles are wanting, to supply which the rectus is inserted fleshy into the os pubis.

166 Brain. The brain is proportionally much smaller than the human; but, as in man, it is divided into cerebrum and cerebellum, and these two parts bear nearly the same proportion to one another as in us. There was no such occasion for so great a quantity of brain in these animals as in man; seeing that in them all its energy is employed in their progression, while man has a great waste of spirits in the exercise of his reason and intellectual faculties. And besides all this, a bulky brain would be inconvenient to these creatures, in so far as it would add considerably to the weight of the head; which having the advantage of a long lever to act with, would require a much greater force to support it than it does now; for the heads of the greatest part of quadrupeds are not near so heavy as they would at first sight seem to be, from the frontal sinuses being produced a great way upwards to enlarge the organs of smelling.

The pits in the anterior part of their skulls are much more conspicuous than in the human; which may be occasioned by the depending posture of these creatures heads while they gather their food: the brain at this time gravitating much on the bones while they are as yet soft, will gradually make impressions upon them at those places where it rises into eminences. This is prevented in man mostly by his erect posture.

167 Falx. The *falx* is not near so large in quadrupeds as in man, as they have little occasion to lie on either side, and the two hemispheres of the brain are in a great measure hindered from justling against one another in violent motions, by the brain's insinuating itself into the above-mentioned pits.

The second process of the *dura mater*, or *tentorium cerebello super-expansum*, is considerably thicker and stronger

Of Quadrupeds.

ſtronger than in man. This membrane is generally oſſified, or we find the place of it ſupplied by a bone, that it may the more effectually keep off the ſuperincumbent brain from the cerebellum in rapid motions, which otherwiſe would be of bad conſequence.

168 Proceſſus mamillaris.

The olfactory nerves are very large, and juſtly deſerve the name of *proceſſus mamillaris*. They are hollow, and conſiſt of a medullary and cineritious ſubſtance, and at firſt ſight appear to be the frontal ventricles of the brain produced; but in man they are ſmall, and without any diſcernible cavity. The reaſon of this is pretty evident, if we conſider how this animal's head is ſituated; for the lymph continually gravitating upon the inferior part of the ventricles, may thus elongate and produce them; but from this very inferior part the olfactory nerves riſe, and are ſent immediately through the ethmoid bone into the noſe. Hence the ancients, thinking they were continued hollow into the noſe, believed they were the emunctories of the brain: in the brain of ſheep, which by its firm texture is the beſt ſubject of any for ſearching into the ſtructure of this part, we evidently ſee, that the name of the *figmoid cavity* was very properly applied by the ancients to the lateral ventricles of the brain; which are really of a greater extent than they are ordinarily painted by anatomiſts, reaching farther backwards, and forwards again under the ſubſtance of the brain. The cortical and medullary parts, as well as the corpus calloſum, are ſimilar to thoſe parts in man.

169 Nates, teſtes.

The *nates* and *teſtes* deſerve this name much better here than in the human body, with reſpect to each other. They are larger in the quadruped; and hence we perceive that there is no great reaſon for aſcribing the different operations to any particular ſize or ſhape of theſe parts. They are here alſo of different colours; the *nates* being of the colour of the cortical, and the *teſtes* of the medullary ſubſtance of the brain; whereas in man they are both of one colour. The reaſon of theſe differences, and others of the like nature to be met with, we ſhall not pretend to determine; for we have hitherto ſuch an imperfect knowledge of the brain itſelf, that we are entirely ignorant of the various uſes of its different parts. We may in general conclude, that the varying in one animal from what it is in another, is fitted to the creature's particular way of living.

170 Rete mirabile Galeni.

The *rete mirabile Galeni*, ſituated on each ſide of the *ſella turcica*, about which there has been ſo much diſpute, is very remarkable in theſe animals. This network of veſſels is nothing elſe than a continuation of the internal carotid arteries, which, entering the ſkull, divide into a vaſt number of minute branches running along the ſide of the ſella turcica; and, uniting afterwards, are ſpent on the brain in the common way. Galen ſeems with juſtice to ſuppoſe, that this plexus of veſſels ſerves for checking the impetuoſity of the blood deſtined for the brain.

171 Tongue.

The tongue, in conſequence of the length of the jaws, is much longer than ours; and as this creature feeds with his head in a depending poſture, the bolus would always be in danger of falling out of the mouth, were it not for ſeveral prominences or papillæ placed moſtly at the root of the tongue, and crooked backwards in ſuch a manner as to allow any thing to paſs eaſily down to the jaws, but to hinder its return. By the papillæ alſo the ſurface of the tongue is increaſed, and a ſtronger impreſſion is made on the ſenſation of taſte. In ſome animals who feed on living creatures, theſe tenter-hooks are ſtill more conſpicuous; as in ſeveral large fiſhes, where they are almoſt as large as their teeth in the fore part of their mouth, and near as firm and ſtrong.

Of Quadrupeds.

172 Noſe.

The *noſe* is generally longer than in man, and its external paſſage much narrower. The internal ſtructure is alſo better adapted for an acute ſmelling, having a larger convoluted ſurface on which the *membrana ſchneideriana* is ſpread; and this is to be obſerved in moſt quadrupeds, who have the oſſa ſpongioſa commonly large, and theſe too divided into a great number of exceſſively fine thin lamellæ. The ſenſibility ſeems to be increaſed in proportion to the ſurface; and this will alſo be found to take place in all the other ſenſes. The elephant, which has a head pretty large in proportion to its body, has the greateſt part of it taken up with the cavity of the noſe and frontal ſinuſes; which laſt extend almoſt over their whole head, and leave but a ſmall cavity for their brains. A very nice ſenſe of ſmelling was not ſo abſolutely neceſſary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes, who have only their ſenſes, muſt of neceſſity have theſe acute, ſome having one ſenſe in greater perfection than others, according to their different way of life. We not only conclude *à priori* from the large expanded membrana ſchneideriana, that their ſenſe of ſmelling is very acute, but we find it ſo by cows and horſes diſtinguiſhing ſo readily betwixt noxious and wholeſome herbs, which they do principally by this ſenſe.

173 Ear.

The external *ear* in different quadrupeds is differently framed, but always calculated for the creature's manner of life. In ſhape it commonly reſembles the oblique ſection of a cone from near the apex to the baſis. Hares, and ſuch other animals as are daily expoſed to inſults from beaſts of prey, have large ears directed backwards, their eyes warning them of any danger before; rapacious animals, on the other hand, have their ears placed directly forwards, as we ſee in the lion, cat, &c. The ſlow hounds, and other animals that are deſigned to hear moſt diſtinctly the ſounds coming from below, have their ears hanging downwards; or their ears are flexible, becauſe they move their head for the moſt part with greater difficulty than man. Man, again, who muſt equally hear ſounds coming from all quarters, but eſpecially ſuch as are ſent from about his own height, has his external ear placed in a vertical manner, ſomewhat turned forward. In ſhort, wherever we ſee a ſpecialty in the make of this organ in any creature, we ſhall, with very little reflection, diſcover this form to be more convenient for that creature than another. The animal alſo has the power of directing the cone of the ear to the ſonorous body without moving the head. There are ſome differences to be obſerved in the ſtructure of the internal ear in different animals; but we know ſo very little of the uſe of the particular parts of that organ in the human ſubject, that it is altogether impoſſible to aſſign reaſons for theſe variations in other creatures.

174 Membrana nictitans.

All quadrupeds have at the internal canthus of the eye a ſtrong firm membrane with a cartilaginous edge, which may be made to cover ſome part of their eye; and

Of Quadrupeds.

and this is greater or leſs in different animals as their eyes are more or leſs expoſed to dangers in ſearching after their food. This *membrana nictitans*, as it is called, is not very large in this animal. Cows and horſes have it ſo large as to cover one half of the eye like a curtain, and at the ſame time it is ſufficiently tranſparent to allow abundance of the rays of light to paſs through it. Fiſhes have a cuticle always over their eyes, as they are ever in danger in that inconſtant element. In this then we may alſo obſerve a ſort of gradation.

175 Muſculus ſuſpenſorius.

All quadrupeds have a ſeventh muſcle belonging to the eye, called *ſuſpenſorius*. It ſurrounds almoſt the whole optic nerve, and is fixed into the ſclerotic coat as the others are. Its uſe is, to ſuſtain the weight of the globe of the eye, and prevent the optic nerve from being too much ſtretched, without obliging the four ſtraight muſcles to be in a continual contraction, which would be inconvenient; at the ſame time this muſcle may be brought to aſſiſt any of the other four, by cauſing one particular portion of it to act at a time.

176 Pupilla.

The next thing to be remarked is the figure of the *pupil*, which is different in different animals, but always exactly accommodated to the creature's way of life, as well as to the different ſpecies of objects that are viewed. Man has it circular, for obvious reaſons: an ox has it oval, with the longeſt diameter placed tranſverſely, to take in a larger view of his food: cats, again, have theirs likewiſe oval, but the longeſt diameter placed perpendicularly; they can either exclude a bright light altogether, or admit only as much as is neceſſary. The pupil of different animals varies in wideneſs, according as the internal organs of viſion are more or leſs acute: Thus cats and owls, who ſeek their prey in the night, or in dark places (and conſequently muſt have their eyes ſo formed as that a few rays of light may make a lively impreſſion on the retina), have their pupils in the day-time contracted into a very narrow ſpace, as a great number of rays would oppreſs their nice organs; while in the night, or where the light is faint, they open the pupil, and very fully admit the rays. In the ſame way, when the retina is inflamed, a great number of rays of light would occaſion a painful ſenſation; therefore the pupil is contracted: on the contrary, in dying people, or in a beginning amauroſis, it is generally dilated, as the eyes on ſuch occaſions are very difficultly affected, and as it were inſenſible.

177 Tapetum.

The poſterior part of the choroid coat, which is called *tapetum*, is of different colours in different creatures. For oxen, feeding moſtly on graſs, have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are abſorbed: Thus the animal ſees its food better than it does other objects. Cats and owls have their tapetum of a whitiſh colour; and for the ſame reaſons have the pupil very dilatable, and their organs of viſion acute: And we ſhall find, that all animals ſee more or leſs diſtinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs, who have it of a grayiſh colour, diſtinguiſh objects better in the night than man, whoſe tapetum is dark brown; and who, it is believed, ſees worſt in the dark of any creature: it being originally deſigned that he ſhould reſt from all kinds of employment in the night-time. The difference then of the colour of the tapetum, as indeed the fabric of any other part in different creatures, always depends on ſome particular advantage accruing to the animal in its peculiar manner of life from this ſingularity.

Of Quadrupeds.

178 Neck.

We look on it as a general rule, that all quadrupeds, as having occaſion to gather their food from the ground, are provided with longer necks than man: but as a long neck not only gives the advantage of too long a lever to the weight of the head, but alſo, when the animal is gathering his food, makes the brain in danger of being oppreſſed with too great a quantity of blood, by the liquor in the arteries having the advantage of a deſcent, while that in the veins muſt remount a conſiderable way contrary to its own gravity; it was therefore neceſſary that a part of the length of the neck ſhould be ſupplied by the length of the jaws. Thus we ſee horſes, cows, &c. who have no occaſion for opening their mouths very wide, yet have long jaws. Bulldogs, indeed, and ſuch animals as have occaſion for very ſtrong jaws, muſt of neceſſity, have them ſhort; becauſe the longer they are, the reſiſtance to be overcome acts with a longer lever. Another exception to this general rule, is ſuch animals as are furniſhed with ſomething analogous to hands to convey their food to their mouths, as cats, apes, &c. The teeth of this creature plainly ſhow it to be of the carnivorous kind; for there are none of them made for grinding its food, but only for tearing and dividing it. It has ſix remarkably ſharp teeth before, and two very long tuſks behind; both of which the ruminating animals want. Theſe are evidently calculated for laying very firm hold of ſubſtances, and tearing them to pieces; and the vaſt ſtrength of the muſcles inſerted into the lower jaw, aſſiſts greatly in this action; while the grinders have ſharp cutting edges, calculated for cutting fleſh, and breaking the hardeſt bones. Even its poſterior teeth are not formed with rough broad ſurfaces as ours are; but are made conſiderably ſharper, and preſs over one another when the mouth is ſhut, that ſo they may take the firmer hold of whatever comes betwixt them.

179 Jaws.

180 Teeth.

181 Amygdals.

When we open the mouth, we ſee the amygdalæ very prominent in the poſterior part of it; ſo that it would appear at firſt view, that theſe were inconveniently placed, as being continually expoſed to injuries from the hard ſubſtances this creature ſwallows: but upon a more narrow ſcrutiny, we find this provided for by two membranous capſules, into which the amygdalæ, when preſſed, can eſcape, and remove themſelves from ſuch injuries.

182 Velum pendulum palati.

The *velum pendulum palati* is in this creature conſiderably longer than in man, to prevent the food from getting into his noſe; which would happen more frequently in this animal than in man, becauſe of its ſituation while feeding.

183 Glottis.

In this ſubject, as well as in other quadrupeds, there is no *uvula*; but then the *epiglottis*, when preſſed down, covers the whole rima entirely, and naturally continues ſo: there is therefore a ligament, or rather muſcle, that comes from the os hyoides and root of the tongue, that is inſerted into that part of the epiglottis where it is articulated with the cricoid cartilage, which ſerves

184 Epiglottis.

Of Quadrupeds.

to raiſe it from the rima, though not ſo ſtrongly but that it may with a ſmall force be clapped down again.

185 The uſe of the uvula in man.

It may be aſked, however, Why the uvula is wanting here, and not in man? This ſeems to be, that quadrupeds, who ſwallow their food in a horizontal ſituation, have no occaſion for an uvula, though it is neceſſary in man on account of his erect ſituation.

In the upper part of the pharynx, behind the cricoid cartilage, there is a pretty large gland to be found, which ſerves not only for the ſeparation of a mucous liquor to lubricate the bolus as it paſſes this way, but alſo ſupplies the place of a valve, to hinder the food from regurgitating into the mouth, which it would be apt to do by reaſon of the deſcending ſituation of the creature's head. In man, the muſcle of the epiglottis is wanting, its place being ſupplied by the elaſticity of the cartilage.

186 Gullet.

The *gullet* is formed pretty much in the ſame way as the human. Authors indeed generally allege, that quadrupeds have their gullet compoſed of a double row of ſpiral fibres decuſſating one another; but this is peculiar to ruminating animals, who have occaſion for ſuch a decuſſation of fibres. The action of theſe you may eaſily obſerve in a cow chewing her cud.

187 Omentum.

The omentum reaches down to the os pubis, which conſidering the poſture of the animal we ſhall find to be a wiſe proviſion, ſince its uſe is to ſeparate an oily liquor for lubricating the guts and facilitating their periſtaltic motion; ſo in our erect poſture the natural gravity of the oil will determine it downward, but in the horizontal poſition of theſe creatures, if all the inteſtines were not covered, there would be no favourable derivation of the fluid to the guts lying in the ſacral part of the abdomen, which is the higheſt; and beſides, had the omentum reached much farther down in us, it would not only have ſupplied too great a quantity of oil to the lower part of the abdomen, but we ſhould have been in continual danger of herniæ; and even at preſent the omentum frequently paſſes down with ſome of the other viſcera, and forms part of theſe tumours. To theſe, however, the dog is not ſubject, as his viſcera do not preſs ſo much on the rings of the abdominal muſcles, and beſides are prevented from paſſing through by a pendulous flap of fat mentioned N° 35. The ſacral and ſternal lamella of the omentum is fixed to the ſpleen, fundus of the ſtomach, pylorus, liver, &c. in the ſame way as the human; but the ſuperior having no colon to paſs over, goes directly to the back-bone. This ſerves to explain the formation of the ſmall omentum in the human body; which is nothing but the large omentum, having loſt its fat, paſſing over the ſtomach and colon, where it reaſſumes its fat, ſo proceeds, and is firmly attached to the liver, ſpine, &c. The ſtriæ of fat are pretty regularly diſpoſed through it, accompanying the diſtribution of the blood veſſels to guard them from the preſſure of the ſuperincumbent viſcera.

188 Stomach.

This animal's ſtomach, though pretty much reſembling the human in its ſhape, is ſomewhat differently ſituated. It lies more longitudinal, as indeed all the other viſcera do, to accommodate themſelves to the ſhape of the cavity in which they are contained; that is, its ſacral orifice is much farther down with reſpect to the atlantal than the human: by this means the groſs food has an eaſier paſſage into the duodenum. Again, the fundus of the human ſtomach, when diſtended, ſtands almoſt directly ſternal, which is occaſioned by the little omentum tying it ſo cloſe down to the back bone, &c. at its two orifices; but it not being fixed in that manner in the dog, the fundus remains always dorſal: this alſo anſwers very well the ſhape of the different cavities, the diſtance betwixt the cardia and fundus being greater than that betwixt the two ſides. It ſeems to be much larger in proportion to the bulk of the animal than the human, that it might contain a greater quantity of food at once; which was very neceſſary, ſince this animal cannot at any time get its ſuſtenance as men do. The turbillion is not ſo large, nor is there any coarction forming the *antrum Willeſii*, as in the ſtomach of man. It is conſiderably thicker and more muſcular than ours, for breaking the coheſion of their food, which they ſwallow without ſufficient chewing. Hence it is evident the force of the ſtomach is not ſo great as ſome would have it, nor its contraction ſo violent: otherwiſe that of dogs would be undoubtedly wounded by the ſharp bones, &c. they always take down; for the contraction here is ſtill greater than in the human ſtomach, which is much thinner. The rugæ of the tunica villoſa are neither ſo large, nor ſituated tranſverſely, as in the human, but go from one orifice to the other: the reaſon of which difference is, perhaps, that they might be in leſs danger of being hurt by the hard ſubſtances this creature frequently feeds upon; and for the ſame reaſon there is not the like ſtricture at their pylorus.

Of Quadrupeds.

189 Inteſtines.

The inteſtines of this animal are proportionally much ſhorter than ours; for the food which theſe creatures moſtly uſe, ſoon diſſolves, and then putrifies; on which account there was no occaſion for a long tract of inteſtines, but on the contrary that it ſhould be quickly thrown out of the body. The ſame is to be obſerved of all the carnivorous animals. The muſcular coat of the inteſtines is alſo thicker and ſtronger than the human, to protrude the contents quickly and accurately.

The valvulæ conniventes are leſs numerous, and in a longitudinal direction; and the whole tract of the alimentary canal is covered with a ſlime, which lubricates the inteſtines, ſaves them from the acrimony of the excrementitious part, and facilitates its paſſage.

190 Duodenum.

The *duodenum* differs conſiderably in its ſituation from the human. For in man it firſt mounts from the pylorus upwards, backwards, and to the right ſide; then paſſes down by the gall-bladder; and, marching over the right kidney and ſuperior part of the pſoas muſcles, makes a curvature upwards; and paſſes over the back bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, meſentery, and meſocolon, to commence the *jejunum*, being firmly tied down all the way, the biliary and pancreatic ducts entering at its moſt depending part: Whereas, in the dog, the duodenum is fixed at the pylorus to the concave ſurface of the liver, and hangs looſe and pendulous with the meſentery backwards into the cavity of the abdomen; then turning up again, is fixed to the back bone, where it ends in the jejunum; the bile and pancreatic juice are poured into it at the moſt depending part. Therefore the ſame intention

191 Jejunum.

ſeems

Of Quadrupeds.

ſeems to have been had in view in the formation of this part in both, viz. the giving the chyle, after the liquors of the liver and pancreas are poured into it, a diſadvantageous courſe, that ſo it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous: And thus, by reaſon of their different poſture, the ſame deſign (though by a very different order of the parts) is brought about in both.

192 Inteſtina tenuia.

The other ſmall guts are much the ſame with ours, only ſhorter. The great guts are alſo ſhorter and leſs capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food, have not only their ſmall guts conſiderably longer, but alſo their great guts more capacious, than ſuch creatures as feed on other animals. Hence man, from this form of his inteſtines, and that of the teeth, ſeems to have been originally deſigned for feeding on vegetables chiefly; and ſtill the moſt of his food, and all his drink, is of that claſs.

The reaſon of this difference ſeems to be, that as animal food is not only much more eaſily reduced into chyle, but alſo more prone to putrefaction, too long a delay of the juices might occaſion the worſt conſequences. So it was neceſſary that their receptacles ſhould not be too capacious; but, on the contrary, being ſhort and narrow, might conduce to the ſeaſonable diſcharge of their contents. Whereas vegetable food being more difficultly diſſolved and converted into an animal nature, there was a neceſſity for ſuch creatures as fed on it to be provided with a long inteſtinal canal, that this food in its paſſage might be conſiderably retarded, and have time to change its quality into one more agreeable to our nature. Beſides which there is another advantage with accrues to man in particular, from having his great guts very capacious: for as he is a rational being, and moſtly employed in the functions of ſocial life, it would have been very inconvenient as well as unbecoming for him to be too frequently employed in ſuch ignoble exerciſes; ſo that, having this large reſervoir for his fæces alvinæ, he can retain them for a conſiderable time without any trouble.

193 Appendix vermiformis.

The *appendix vermiformis* juſtly enough deſerves the name of an *inteſtinum cæcum* in this ſubject, though in the human body it does not; and it has probably been from the largeneſs of this part in this and ſome other animals, that the oldeſt anatomiſts came to reckon that ſmall appendicle in man as one of the great guts. On its internal ſurface we obſerve a great number of mucous glands. As all theſe throw out ſlime, their principal office would ſeem to be the procuring a ſufficient quantity of that matter for the purpoſes above mentioned. Still, however, there ſeems to be ſome unknown uſe for this organ in other animals; for the appendicula vermiformis in them is either of great ſize or of great length. In a rat, it is rather larger than the ſtomach; in others, as ſwine, and ſome of the animals which live on vegetables, it has long convolutions, ſo that the food muſt be lodged in it for a long time. Thus, probably, ſome change takes place in the food, which requires a conſiderable time to effectuate, and, though unknown to us, may anſwer very uſeful purpoſes to the animal.

The *colon* has no longitudinal ligaments; and conſequently this gut is not purſed up into different bags or cells as the human: nor does this inteſtine make any circular turn round the abdomen; but paſſes directly acroſs it to the top of the os ſacrum, where it gets the name of *rectum*.

Of Quadrupeds.

194 Colon.

195 Rectum.

At the extremity of the *inteſtinum rectum*, or verge of the anus, there are found two bags or pouches, which contain a moſt abominable fetid mucus of a yellow colour, for which we know no uſe, unleſs it ſerves to lubricate the ſtrained extremity of the rectum, and defend it againſt the aſperity of the fæces, or to ſeparate ſome liquor that might otherwiſe prove hurtful to their bodies. There is nothing analogous to thoſe ſacs in the human ſubject, unleſs we reckon the mucilaginous glands that are found moſt frequent and largeſt about the lower part of the rectum.

196 Meſentery.

The *meſentery* is conſiderably longer than in the human body; that, in his horizontal ſituation, the inteſtines may reſt ſecurely on the ſoft cuſhion of the abdominal muſcles. The fat is here diſpoſed in the ſame way, and for the ſame reaſon, as in the omentum. The interſtices betwixt the fat are filled with a fine membrane. Inſtead of a great number of glandulæ vagæ to be found in the human meſentery, we find the glands few in number, and thoſe are cloſely connected together; or there is only one large gland to be obſerved in the middle of the meſentery of a dog, which, from its imagined reſemblance to the pancreas and the name of its diſcoverer, is called *pancreas Aſellii;* but the reſemblance, if there is any, depends chiefly on the connexion, the ſtructure being entirely different. The reaſon why this in man is as it were ſubdivided into many ſmaller ones, may poſſibly be, that as the guts of a human body are proportionally much longer than thoſe of this creature, it would have been inconvenient to have gathered all the *lactea primigeneris* into one place; whereas, by collecting a few of theſe veſſels into a neighbouring gland, the ſame effect is procured much more eaſily. Whether the food in this animal needs leſs preparation in its paſſage through theſe glands, is a matter very much unknown to us; though it is certain that ſome changes really do take place.

197 Pancreas Aſellii.

198 Pancreas.

The *pancreas* in man lies acroſs the abdomen, tied down by the peritonæum; but the capacity of this creature's abdomen not allowing of that ſituation, it is diſpoſed more longitudinally, being tied to the duodenum, which it accompanies for ſome way. Its duct enters the duodenum about an inch and a half below the ductus communis.

199 Spleen.

The *ſpleen* of this animal differs from the human very much, both in figure and ſituation. It is much more oblong and thin, and lies more according to the length of the abdomen, like the pancreas. Though the ſpleen of this creature is not firmly tied to the diaphragm (which was neceſſary in our erect poſture to hinder it from falling downwards), yet by the animal's prone poſition, its dorſal parts being rather higher than the ſternal, it comes to be always contiguous to this muſcle, and is as effectually ſubjected to an alternate preſſure from its action as the human ſpleen is.

200 Liver.

The human *liver* has no fiſſures or diviſions, unleſs we may reckon that ſmall one betwixt the two *pylæ*, where the large veſſels enter: Whereas in a dog, and

Of Quadrupeds.

all other creatures that have a large flexion in their ſpine, as lions, leopards, cats, &c. the liver and lungs are divided into a great many lobes by deep ſections, reaching the large blood veſſels, which in great motions of the back bone may eaſily ſlide over one another; and ſo be in much leſs danger of being torn or bruiſed, than if they were formed of one entire piece, as we really ſee it is in horſes, cows, and ſuch creatures as have their back bone ſtiff and immoveable. There is here no *ligamentum latum* connecting the liver to the diaphragm, which, in our ſituation, was neceſſary to keep the viſcus in its place: Whereas in this creature, it naturally gravitates forwards, and by the horizontal poſition of the animal is in no danger of preſſing againſt the vena cava; the preventing of which is one uſe generally aſſigned to this ligament in man. Had the liver of the dog been thus connected to the diaphragm, the reſpiration muſt neceſſarily have ſuffered; for, as we ſhall ſee afterwards, this muſcle is here moveable at the centre as well as at the ſides: But in man the liver is fixed to the diaphragm, moſtly at its tendinous part; that is, where the pericardium is fixed to it on the other ſide; ſo that it is in no danger of impeding the reſpiration, being ſuſpended by the mediaſtinum and bones of the thorax. In conſequence of this viſcus being divided into ſo many lobes, it follows, that the hepatic ducts cannot poſſibly join into one common trunk till they are quite out of the ſubſtance of the liver; becauſe a branch comes out from every lobe of the liver; all of which, by their union, form the hepatic duct: whence we are led to conclude, that the hepato-cyſtic ducts, mentioned by former authors, do not exiſt. The gall-bladder itſelf is wanting in ſeveral animals, ſuch as the deer, the horſe, the aſs, &c.; but, in place of it, in ſuch animals, the hepatic duct, at its beginning, is widened into a reſervoir of conſiderable ſize, which may anſwer the ſame purpoſe in them that the gall-bladder does in others.

201 Mediaſtinum.

The *mediaſtinum* in this creature is pretty broad. The pericardium is not here contiguous to the diaphragm, but there is an inch of diſtance betwixt them, in which place the ſmall lobe of the lungs lodges; and by this means the liver, &c. of this animal, though continually preſſing upon the diaphragm, yet cannot diſturb the heart's motion.

202 Heart.

The heart is ſituated with its point almoſt directly ſternally, according to the creature's poſture, and is but very little inclined to the left ſide. Its point is much ſharper, and its ſhape more conoidal, than the human. The animal has the *vena cava* of a conſiderable length within the thorax, having near the whole length of the heart to run over ere it gets at the *ſinus Lowerianus dexter*. In man, as ſoon as it pierces the diaphragm, it enters the pericardium, which is firmly attached to it, and immediately gets into the *ſinus Lowerianus;* which ſinus, in the human ſubject, by the oblique ſituation of the heart is almoſt contiguous to the diaphragm: and by this we diſcover, that ſeveral authors have taken their delineations of the human heart from brutes; which is eaſily detected by the ſhape and ſituation of the heart, and long vena cava, within the thorax. This was one of the faults of the curious wax-work that was ſhown at London and Paris, which was plainly taken from a cow.

203 Vena cava.

This ſituation of the heart of the creature agrees beſt with the ſhape of its thorax, which is lower than the abdomen.

Of Quadrupeds.

The egreſs of the large blood veſſels from the heart is ſomewhat different from the human: For here the right ſubclavian comes off firſt: and as a large trunk runs ſome way upwards before it gives off the left carotid, and ſplits into the carotid and ſubclavian of the right ſide, then the left ſubclavian is ſent off. So that neither here, properly ſpeaking, is there an *aorta aſcendens*, more than in the human; but this name has probably been impoſed upon it from obſerving this in a cow, where indeed there is an aſcending and deſcending aorta.

204 Aorta aſcendens, improperly ſo called.

From this ſpecialty of the diſtribution of the veſſels of the right ſide, which happens, though not in ſo great a degree, in the human ſubject, we may perhaps in ſome meaſure account for the general greater ſtrength, readineſs, or facility of motion, which is obſervable in the right arm. Upon meaſuring the ſides of the veſſels, the ſurface of the united trunk of the right ſubclavian and carotid is leſs than that of the left ſubclavian and carotid, as they are ſeparated. If ſo, the reſiſtance to the blood muſt be leſs in that common trunk than in the left ſubclavian and carotid: But if the reſiſtance be ſmaller, the abſolute force with which the blood is ſent from the heart being equal, there muſt neceſſarily be a greater quantity of blood ſent through them in a given time; and as the ſtrength of the muſcles is, *cæteris paribus*, as the quantity of blood ſent into them in a given time, thoſe of the right arm will be ſtronger than thoſe of the left. Now children, being conſcious of this ſuperior ſtrength, uſe the right upon all occaſions; and thus from uſe comes that great difference which is ſo obſervable. That this is a ſufficient cauſe, ſeems evident from fact; for what a difference is there betwixt the right and the left arm of one who has played much at tennis? View but the arms of a blackſmith and legs of a footman, and you will ſoon be convinced of this effect ariſing from uſing them. But if by any accident the right arm is kept from action for ſome time, the other from being uſed gets the better; and thoſe people are left-handed: For it is not to be imagined, that the ſmall odds in the original formation of the veſſels ſhould be ſufficient to reſiſt the effect of uſe and habit (inſtances of the contrary occur every day); it is enough for our preſent argument, that where no means are uſed to oppoſe it, the odds are ſufficient to determine the choice in favour of the right. Now becauſe it is natural to begin with the leg correſponding to the hand we have moſt power of, this is what gives alſo a ſuperiority to the right leg.

205 A mechanical account of the ſuperior ſtrength of the right arm, leg, &c.

This difference is not peculiar to man, but is ſtill more obſervable in thoſe creatures in whom the ſame mechaniſm does obtain in a greater degree. Do but obſerve a dog at a trot, how he bears forward with his right ſide; or look at him when a-ſcraping up any thing, and you will preſently ſee that he uſes his right much oftener than he does his left foot. Something analogous to this may be obſerved in horſes. It has been the opinion of ſome anatomiſts, that left-handed people, as well as thoſe diſtinguiſhed by the name of *ambidexter* (who uſe both hands alike), have the two carotid and ſubclavian arteries coming off in four diſtinct

Of Quadrupeds.

ſtinct trunks from the arch of the aorta: but no appearance of this kind has ever been obſerved in ſuch bodies as have been examined for this purpoſe; though indeed theſe have been but few, and more experience might throw greater light on the ſubject.

206 Diaphragm

The *diaphragm*, in its natural ſituation, is in general more looſe and free than the human; which is owing to its connexion with the neighbouring parts in a different manner from ours. The human *diaphragm* is connected to the pericardium; which again, by the intervention of the mediaſtinum, is tied to the ſternum, ſpine, &c. but here there is ſome diſtance between the diaphragm and pericardium. We obſerve further, that its middle part is much more moveable, and the tendinous parts not ſo large. And indeed it was neceſſary their *diaphragm* ſhould be ſomewhat looſe, they making more uſe of it in difficult reſpiration than man. This we may obſerve by the ſtrong heaving of the flanks of a horſe or dog when out of breath; which

207 Sternum.

correſponds to the riſing of the ribs in us.

The *ſternum* is very narrow, and conſiſts of a great number of ſmall bones, moveable every way; which always happens in creatures that have a great mobility in their ſpine. The ribs are ſtraighter, and by no means ſo convex as the human; whereby in reſpiration the motion forward will very little enlarge their thorax, which is compenſated by the greater mobility of their diaphragm: ſo our thorax is principally enlarged according to its breadth and depth, and theirs according to its length. The want of clavicles, and the conſequent falling in of the atlantal extremities upon the cheſt, may contribute ſomewhat to the ſtraightneſs of the ribs.

208 Ribs.

209 Kidneys.

We come next to diſcourſe of thoſe organs that ſerve for the ſecretion and excretion of urine. And firſt of the kidneys: Which in this animal are ſituated much in the ſame way as in the human ſubject; but have no fat on their inferior ſurface, where they face the abdomen, and are of a more globular form than the human. The reaſon of theſe differences will eaſily appear, if we compare their ſituation and poſture in this animal with thoſe in a man who walks erect. They are placed in them in the ſacral part of the body, ſo are not ſubject to the preſſure of the viſcera, which ſeems to be the principal cauſe of the fatneſs of thoſe organs in us, and perhaps may likewiſe be the cauſe of our being more ſubject to the ſtone than other animals. Hence there is no need of any cellular ſubſtance to ward off this preſſure where there would neceſſarily be fat collected; but the atlantal part of their kidneys is pretty well covered with fat, leſt they ſhould ſuffer any compreſſion from the action of the ribs and

210 Papillæ.

ſpine.

In the internal ſtructure there is ſtill more conſiderable difference: For the *papillæ* do not here ſend out ſingle the ſeveral *tubuli uriniferi;* but being all united, they hang down in form of a looſe pendulous flap in the middle of the pelvis, and form a kind of

211 Pelvis.

partition; ſo that a dog has a pelvis formed within the ſubſtance of the kidney. The only thing that is properly analogous to a pelvis in man is that ſac or dilatation of the ureters formed at the union of the *ductus uriniferi.* The external part of the kidney of a dog ſomewhat reſembles one of the lobes of the kidney of a human fœtus: but in a human adult the appearance is very different; becauſe, in man, from the continual preſſure of the ſurrounding viſcera, the lobes, which in the fœtus are quite diſtinct and ſeparated, concrete, but the original cortical ſubſtance is ſtill preſerved in the internal parts of the kidney. The reaſon of theſe particularities may probably be, that the liquors of this animal, as of all thoſe of the carnivorous kind, being much more acrid than thoſe that live on vegetable food, its urine muſt incline much to an alkaleſcency, as indeed the ſmell and taſte of that liquor in dogs, cats, leopards, &c. evidently ſhow, being fetid and pungent, and therefore not convenient to be long retained in the body. For this end it was proper that the ſecreting organs ſhould have as little impediment as poſſible by preſſure, &c. in the performing their functions; and for that deſign, the mechaniſm of their kidneys ſeems to be excellently adapted: We have moſt elegant pictures in Euſtachius of the kidneys of brutes, delineated as ſuch, with a view to ſhow Veſalius's error in painting and deſcribing them for the human.

Of Quadrupeds.

212 Capſulæ atrabilariæ.

The *glandulæ* or *capſulæ atrabilariæ* are thicker and rounder than the human, for the ſame reaſon as the kidneys.

213 Ureters.

The *ureters* are more muſcular than the human, becauſe of the unfavourable paſſage the urine has through them; they enter the bladder near its large extremity.

214 Bladder.

The bladder of urine differs conſiderably from the human; and firſt in its form, which is pretty much pyramidal or pyriform. This ſhape of the dog's bladder is likewiſe common to all quadrupeds, except the ape and thoſe of an erect poſture. In man it is by no means pyriform, but has a large ſac at its dorſal and ſacral part: this form depends entirely on the urine gravitating in our erect poſture to its bottom, which it will endeavour to protrude; but as it cannot yield before, being contiguous to the os pubis, it will naturally ſtretch out where there is the leaſt reſiſtance, that is, at the poſterior and lateral parts; and were it not for this ſac, we could not ſo readily come at the bladder to extract the ſtone either by the leſſer or lateral operation of lithotomy. Moſt anatomiſts have delineated this wrong: ſo much, that we know of none who have juſtly painted it, excepting Mr Cowper in his *Myotomia*, and Mr Butty. It has certainly been from obſerving it in brutes and young children, that they have been led into this miſtake. The ſame cauſe, viz. the gravity of the urine, makes the bladder of a different form in brutes: In their horizontal poſition the neck, from which the urethra is continued, is higher than its fundus; the urine muſt therefore diſtend and dilate the moſt depending part by its weight.

215 Connection.

As to its *connexion*, it is faſtened to the abdominal muſcles by a proceſs of the peritoneum, and that membrane is extended quite over it; whereas in us its ſuperior and poſterior parts are only covered by it: hence in man alone the high operation of lithotomy can be performed without hazard of opening the cavity of the abdomen. Had the peritoneum been ſpread over the bladder in its whole extent, the weight of the viſcera in our erect poſture would have ſo born upon it, that they would not have allowed any conſiderable quantity of urine to be collected there; but we muſt have been obliged

216 Why the human bladder but in part covered by the peritoneum.

Of Quadrupeds.

obliged to discharge its contents too frequently to be consistent with the functions of a social life: Whereas by means of the peritoneum, the urine is now collected in sufficient quantity, the viscera not gravitating this way.

It may be taken for a general rule, that those creatures that feed upon animal food have their bladder more muscular and considerably stronger and less capacious, than those that live on vegetables, such as horses, cows, swine, &c. whose bladder of urine is perfectly membranous, and very large. This is wisely adapted to the nature of their food: For in these first, as all their juices are more acrid, so in a particular manner their urine becomes exalted; which, as its delay might be of very ill consequence, must necessarily be quickly expelled. This is chiefly effected by its stimulating this viscus more strongly to contract, and so to discharge its contents, though the irritation does not altogether depend upon the stretching, but likewise

217 A stimulus proved to be a principal cause of the evacuation of the bladder.

arises from the quality of the liquor. That a stimulus is one of the principal causes of the excretion of urine, we learn from the common saline diuretic medicines that are given, which are dissolved into the serum of the blood, and carried down by the kidneys to the bladder: The same appears likewise from the application of cantharides; or without any of these, when the parts are made more sensible, as in an excoriation of the bladder, there is a frequent desire to make water. Accordingly we find these animals evacuate their urine much more frequently than man, or any other creature that lives on vegetable food. And if these creatures, whose fluids have already a tendency to putrefaction, are exposed to heat or hunger, the liquids must for a considerable time undergo the actions of the containing vessels, and frequently perform the course of the circulation, without any new supplies of food; by which the fluids becoming more and more acrid, the creature is apt to fall into feverish and putrid diseases.

218 Vasa spermatica.

Their *spermatic vessels* are within the peritoneum, which is spread over them, and from which they have a membrane like a mesentery, to hang loose and pendulous in the abdomen: whereas in us, they are contained in the cellular part of the peritoneum, which is tensely stretched over them. At their passage out of the lower belly, there appears a plain perforation, or holes; hence the adult quadruped, in this respect, resembles the human fœtus. And from observing this in quadrupeds, has arisen the false notion of *hernia* or *rupture* among authors. This opening, which leads down to the testicle, is of no disadvantage to them, but evidently would have been to us; for from the weight of our viscera, and our continually gravitating upon these holes, we must have perpetually laboured under enteroceles. This they are in no hazard of, since in them this passage is at the highest part of their belly, and, in their horizontal posture, the viscera cannot bear upon it: And, to prevent even the smallest hazard, there is a loose pendulous semilunar flap of fat; which serves two uses, as it both hinders the intestines from getting into the passage, and also the course of the fluids from being stopped in the vessels, which is secured in us by the cellular substance and tense peritoneum: And it may be worth while to observe, that

219 Whence the false notion of hernia or rupture.

this process remains almost unaltered, even after the animal has been almost exhausted of fat. Of Quadrupeds.

There is next a passage quite down into the cavity where the testicles lie. Had the same structure obtained in man, by the constant drilling down of the liquor which is secreted for the lubricating of the guts, we should always have laboured under an hydrocele; but their posture secures them from any hazard of this kind: indeed very fat lap-dogs, who consequently have an overgrown omentum, are sometimes troubled with an epiplocele.

220 Scrotum.

The *scrotum* is shorter and not so pendulous as the human in all the dog kind that want the *vesiculæ seminales*, that the seed at each copulation might the sooner be brought from the testes, thus in some measure supplying the place of the *vesiculæ seminales*; for the course of the seed through the *vasa deferentia* is thus shortened, by placing the secerning vessels nearer the excretory organs. Perhaps its passage is likewise quickened by the muscular power of the vasa deferentia, which is stronger in this creature than in man. The want of *vesiculæ seminales* at the same time explains the reason why this creature is so tedious in copulation. But why these bodies are absent in the dog kind more than in other animals, is a circumstance we know nothing of.

221 The vesiculæ seminales, how supplied.

222 Testes.

The structure of the *testicles* is much the same with the human; as are likewise the *corpus pyramidale*, *varicosum*, or *pampiniforme*, and the *epididymis* or excretory vessel of the testicle. The *vasa deferentia* enter the abdomen where the blood vessels come out; and, passing along the upper part of the bladder, are inserted a little below the bulbous part of the urethra.

223 Penis.

The præputium has two muscles fixed to it: one that arises from the sphincter ani, and is inserted all along the *penis*; and this is called *retractor præputii*: But the other, whose office is directly contrary to this, is cutaneous; and seems to take its origin from the muscles of the abdomen, or rather to be a production of their tunica carnosa. The *corpora cavernosa* rise much in the same way as the human: but these soon terminate; and the rest is supplied by a triangular bone, in the inferior part of which there is a groove excavated for lodging the urethra. There are upon the penis two protuberant bulbous fleshy substances, resembling the glans penis in man, at the back of which are two veins, which by the *erectores penis* and other parts are compressed in the time of coition; and the circulation being stopped, the blood distends the large cavernous bodies. After the penis is thus swelled, the vagina by its contraction and swelling of its corpus cavernosum, which is considerably greater than in other animals, gripes it closely; and so the male is kept in action some time contrary to his will, till time be given for bringing a quantity of seed sufficient to impregnate the female: and thus, by that *orgasmus veneris* of the female organs, the want of the *vesiculæ seminales* is in some measure supplied. But as it would be a very uneasy posture for the dog to support himself solely upon his hinder feet, and for the bitch to support the weight of the dog for so long a time; therefore, as soon as the bulbous bodies are sufficiently filled, he gets off and turns averse to her. Had, then, the penis been pliable as in other animals, the urethra must of

224 Coitus.

necessity

Of Quadrupeds.

neceſſity have been compreſſed by this twiſting, and conſequently the courſe of the ſeed intercepted; but this is wiſely provided againſt by the urethra's being formed in the hollow of the bone. After the emiſſion of the ſeed, the parts turn flaccid, the circulation is reſtored, and the bulbous parts can be eaſily extracted.

225 Proſtata. The *proſtata* ſeems here divided into two, which are proportionably larger than the human, and afford a greater quantity of that liquid.

226 Uterus. The *uterus* of multiparous animals is little elſe but a continuation of their vagina, only ſeparated from it by a ſmall ring or valve. From the *uterus* two long canals mount upon the loins, in which the fœtus are lodged: theſe are divided into different ſacs, which are ſtrongly conſtricted betwixt each fœtus; yet theſe coarctions give way in the time of birth. From theſe go out the *tubæ Fallopianæ*, ſo that the ovaria come to lodge pretty near the kidneys.

227 Mammæ. The diſpoſition and ſituation of the *mammæ* vary as they bear one or more young. Thoſe of the uniparous kind have them placed betwecn the ſacral extremities, which in them is the higheſt part of their bodies, whereby their young get at them without the inconvenience of kneeling: Nevertheleſs, when the creatures are of no great ſize, and their breaſt large, as in ſheep, the young ones are obliged to take this poſture. In multiparous animals, they muſt have a great number of nipples, that their ſeveral young ones may have room at the ſame time, and theſe diſpoſed over both thorax and abdomen; and the creatures generally lie down when the young are to be ſuckled, that they may give them the moſt favourable ſituation. From this it does not appear to be from any particular fitneſs of the veſſels at certain places for giving a proper nouriſhment to the child, that the breaſts are ſo placed in women as we find in them, but really from that ſituation being the moſt convenient both for mother and infant.

Sect. III. *Anatomy of ruminating Animals, and particularly of the Cow.*

The animal whoſe ſtructure we have been examining, being one of thoſe which live chiefly on other animals, had a foot formed for running and ſeizing its prey. But the tribe of ruminating animals have their feet enveloped in a horny covering, fitting them for walking much, as is required of many of them, but totally diſqualifying them for ſeizing living prey.

In theſe animals, the ſpinous proceſſes of the vertebræ of the neck diminiſh in ſize according to the length of the neck; the atlas or firſt vertebra, has its lateral proceſſes flatted and bending forwards, and the mammillary proceſſes of the back of the head are lengthened out; hence, they can move the head with difficulty ſideways or forwards, but the motion of the neck is very extenſive. The ribs are broad and thick. The ſcapula is narrow next the back, and lengthened out towards the neck, and it has neither acromion nor coracoid proceſs. The great tuberoſity near the head of the thigh bone, in the atlantal extremity is very large, and the rough line on the bone very prominent, to give greater room for the inſertion of ſtrong muſcles. The two bones of the fore leg, grow together almoſt their whole length, being only diſtinguiſhed from it at the top by a furrow. Hence, the ſide motion of the foot in theſe animals, is almoſt entirely prevented. The haunch bone is ſhaped ſomething like a hammer, with the anterior part of the ſpine extremely large, and the muſcles ſituated about theſe bones, exceeding ſtrong and bulky, as one would ſuppoſe they ought to be, in order to enable theſe animals to kick with greater power.

Of Quadrupeds.

There are no parietal bones in the ſkull of theſe animals, but their place is occupied by one very ſtrong bone in the top of the head; the frontal bone is very large, and forms a large arch overhanging each orbit.

The brain in theſe animals, is much ſmaller in proportion to the reſt of their body, than in man; in the ox it conſtitutes $\frac{1}{800}$ of the weight of the body, whereas in man it amounts to about $\frac{1}{30}$; its general form does not differ much from that of man.

In the eye of the cow the pupil is oblong, rounded at the ends, and the tapetum is of a beautiful green colour, changing to an azure blue; the ſtriæ at the back of the uvea are very large and conſpicuous. The eye of this animal is uſually the ſubject of diſſection in examining the ſtructure of this organ, which it exhibits to great advantage. It is in the organs of digeſtion, that theſe animals differ moſt eſſentially from the other mammalia; theſe therefore deſerve a particular examination.

228 The hiſtory of the cow as a ruminant animal. There are no cutting teeth in the upper jaw, but the gums are pretty hard, and the tongue rough. This roughneſs is occaſioned by long ſharp-pointed papillæ, with which the whole ſubſtance of it is covered. Theſe papillæ are turned towards the throat; ſo that by their means the food, having once got into the mouth, is not eaſily pulled back. The animals therefore ſupply the defect of teeth by wrapping their tongue round a tuft of graſs; and ſo, preſſing it againſt the upper jaw, keep it ſtretched, and cut it with the teeth of the under jaw; then, without chewing, throw it down into the gullet, which in theſe creatures conſiſts of a double row of ſpiral fibres croſſing one another. All animals which ruminate muſt have more ſtomachs than one; ſome have two, ſome three; our preſent ſubject has no leſs than four. The food is carried directly down into the firſt, which lies upon the left ſide, and is the largeſt of all; it is called *γαστηρ*, *ventriculus*, and *κοιλια*, by way of eminence. It is what is called by the general name of *paunch* by the vulgar. There are no rugæ upon its internal ſurface; but inſtead of theſe there are a vaſt number of ſmall blunt-pointed proceſſes, by which the whole has a general roughneſs, and the ſurface is extended to ſeveral times the ſize of the paunch itſelf. The food, by the force of its muſcular coat, and the liquors poured in here, is ſufficiently macerated; after which it is forced up hence by the gullet into the mouth, and there it is made very ſmall by maſtication; this is what is properly called *chewing the cud*, or *rumination*; for which purpoſe the grinders are exceedingly well fitted: for inſtead of being covered with a thin cruſt, the enamel on them conſiſts of perpendicular plates, between which the bone is bare, and conſtantly wearing faſter than the enamel, ſo that the tooth remains good to extreme old age; and by means of theſe teeth the rumination is carried on for a long time without any danger of

229 It has four ſtomachs.

230 Their names and deſcription.

ſpoiling

Of Quadrupeds.

ſpoiling them. After rumination, the food is ſent down by the gullet into the ſecond ſtomach; for the gullet opens indifferently into both. It ends exactly where the two ſtomachs meet: and there is a ſmooth gutter with riſing edges which leads into the ſecond ſtomach, from thence to the third, and alſo to the fourth: however, the creature has the power of directing it into which it will. Some tell us, that the drink goes into the ſecond; but that might be eaſily determined by making them drink before ſlaughter. The ſecond ſtomach, which is the anterior and ſmaller, is called κικυφαλος, *reticulum*, *honeycomb*, the *bonnet* or *kings hood*. It conſiſts of a great number of cells on its internal ſurface, of a regular pentagonal figure, like a honeycomb. Here the food is farther macerated; from which it is protruded into the third, called εχινος or *omaſum*, *vulgo* the *manyplies*, becauſe the internal ſurface riſes up into a great many plicæ or folds, and *ſtratum ſuper ſtratum*, according to the length of this ſtomach. Some of theſe plicæ are farther produced into the ſtomach than others; *i. e.* firſt two long ones on each ſide, and within theſe two ſhorter in the middle, &c. There are numberleſs glandular grains like millet ſeeds diſperſed on its plicæ, from which ſome authors call this ſtomach the *millet*. From this it paſſes into the fourth, whoſe names are νυστον, *abomaſum*, *caillé*, or the *red*, which is the name it commonly has becauſe of its colour. This much reſembles the human ſtomach, or that of a dog; only the inner folds or plicæ are longer and looſer: and it may alſo be obſerved, that in all animals there is only one digeſtive ſtomach, and that has the ſame coagulating power in the fœtus as the fourth ſtomach in this animal; whence this might not improperly be called the only true ſtomach. *Caillé* ſignifies *curdled;* and hence the French have given that as a name to this fourth ſtomach, becauſe any milk that is taken down by young calves is there curdled. It is this fourth ſtomach, with the milk curdled in it, that is commonly taken for making runnet: but after the bile and pancreatic juice enter, this coagulation is not to be found, which ſhows the uſe of theſe liquors. There are other creatures which uſe the ſame food, that have not ſuch a mechaniſm in their digeſtive organs. Horſes, aſſes, &c. have but one ſtomach, where graſs is macerated, and a liquor for their nouriſhment extracted, and the remainder ſent out by the anus very little altered. From this different ſtructure of the ſtomach in theſe creatures, a ruminant animal will be ſerved with one-third leſs food than another of equal bulk: graſiers are ſufficiently acquainted with this. The reaſon is, that ruminating animals have many and ſtrong digeſtive organs; all their food is fully prepared, and almoſt wholly converted into chyle: But a horſe's ſtomach is not fitted for this; ſo that he requires a much greater quantity of food to extract the ſame nouriſhment.

231 Inteſtina. The guts of theſe creatures are of a conſiderable length in proportion to the bulk of the body; and this confirms what we ſaid formerly on the ſubject of the inteſtines of a dog, viz. that the length and capacity of the guts were different in different animals, according to the nature of their food.

232 Duodenum. The *duodenum* is formed here much the ſame way as in a dog, and the general intention kept in view with regard to the mixture of the bile and pancreatic lymph. The great guts here hardly deſerve that name, their diameter differing very little from that of the ſmall; but to compenſate this, they are much longer proportionally than a dog's, being convoluted as the ſmall guts are. The cæcum is very large and long. The digeſtion of the cow, as well as ſome other animals, is accompanied with *rumination;* the intention of which ſeems to be, that the food may be ſufficiently comminuted, and thus more fully acted upon by the ſtomach: for it is not obſerved that a calf ruminates as long as it is fed only upon milk, though the action takes place as ſoon as it begins to eat ſolid food. But it is to be obſerved, that as long as a calf feeds only upon milk, the food deſcends immediately into the fourth ſtomach (which, as has been already mentioned, ſeems only capable of performing the operation of digeſtion) without ſtopping in any of the firſt three. The rumination does not take place till after the animal has eaten a pretty large quantity: after which ſhe lies down, if ſhe can do it conveniently, and begins to chew; though the operation will take place in a ſtanding poſture, if ſhe cannot lie down. In this action a ball is obſerved to riſe from the ſtomach with great velocity, almoſt as if ſhot from a muſket. This ball the animal chews very accurately, and then ſwallows it again, and ſo on alternately, till all the food ſhe has eaten has undergone this operation. This is eaſily explained from the ſtructure of the gullet, which has one ſet of fibres calculated for bringing up the graſs, and another for taking it down.

Of Quadrupeds.

By means of rumination, the cow extracts a much larger proportion of nouriſhment from her food than thoſe animals which do not ruminate; and hence ſhe is contented with much worſe fare, and ſmaller quantities of it, than a horſe; hence alſo the dung of cows, being much more exhauſted of its fine parts than horſe-dung, proves much inferior to it as a manure.

233 Spleen. The *ſpleen* differs not much either in figure or ſituation from that of a dog; but it is a little more firmly fixed to the diaphragm, there not being here ſo much danger of this viſcus's being hurt in the flexions of the ſpine.

234 Liver. The *liver* is not ſplit into ſo many lobes in this creature as either in a man or dog; which depends on the ſmall motion this creature enjoys in its ſpine, which made ſuch a diviſion needleſs. This alſo confirms what we formerly advanced on this head.

235 Heart. The ſituation of the *heart* is pretty much the ſame with that of a dog, only its point is rather ſharper: In us, the heart beating continually againſt the ribs, and both ventricles going equally far down to the conſtitution of the apex, it is very obtuſe: but here the apex is made up only of the left ventricle, ſo is more acute.

236 Aorta aſcendens and deſcendens. The *aorta* in this creature is juſtly divided into *aſcending* and *deſcending*, though this diviſion is ill founded either in a dog or man; and it has certainly been from this ſubject that the older anatomiſts took their deſcriptions when they made this diviſion; for here the aorta divides into two, the aſcending and deſcending.

237 Bladder. Their urinary bladder is of a pyramidal ſhape. It is very large, and more membranaceous; for the urine

of

Of Quadrupeds.

of theſe creatures not being ſo acrid as that of carnivorous animals, there was no ſuch occaſion for expelling it ſo ſoon.

238 Scrotum. Veſiculæ ſeminales.

The male is provided with a looſe pendulous *ſcrotum*, and conſequently with *veſiculæ ſeminales*. The female organs differ from thoſe of a bitch, moſtly as to the form of the cornua uteri, which are here contorted in form of a ſnail. In this, and all uniparous animals, they contain only part of the ſecundines; but in bitches, and other multiparous animals, they run ſtraight up in the abdomen, and contain the fœtus themſelves.

239 Uterus.

The form of a cow's *uterus* differs from the human in having two pretty large cornua. This is common to it with other brutes; for a bitch has two long *cornua uteri:* But theſe again differ (as being multiparous and uniparous) in this, that in the bitch's cornua the fœtus are contained; whereas here there is only part of the ſecundines, being moſtly the allantois with the included liquor. The muſcular fibres of the uterus are more eaſily diſcovered; its internal ſurface has a great number of ſpongy, oblong, protuberant, glandular bodies fixed to it. Theſe are compoſed of veſſels of the uterus terminating here. In an impregnated uterus, we can eaſily preſs out of them a chylous mucilaginous liquor; they are compoſed of a great many proceſſes or digituli, and deep caverns, anſwering to as many caverns and proceſſes of the placenta. Their reſemblance has occaſioned the name of *papillæ* to be given them; and hence it was that Hippocrates was induced to believe that the fœtus ſucked *in utero*. The papillæ are found in all the different ſtages of life, in the various ſtages of pregnancy, and likewiſe in the unimpregnated ſtate. It is not eaſy to determine whether the uterus grows thicker or thinner in the time of geſtation. The membranes, it is plain (by the ſtretching of the parts), muſt be made thinner; but then it is as evident, that the veſſels are at that time enlarged, upon which principally the thickneſs of any part depends; ſo there ſeems to be as much gained the one way as loſt the other.

240 Cornua uteri.

241 Uterus if thicker in time of geſtation.

The *os uteri* is entirely ſhut up by a glutinous mucilaginous ſubſtance, that is common to the females of all creatures when with young: by this the external air is excluded, which would ſoon make the liquors corrupt: it alſo prevents the inflammation of the membranes, and the hazard of abortion. By this means alſo the lips of the womb are kept from growing together, which otherwiſe they would certainly at this time do. There are mucous glands placed here to ſecrete this gluten, which on the breaking of the membranes with the contained waters make a ſoap that lubricates and waſhes the parts, and makes them eaſily yield. The firſt of the proper involucra of the fœtus is the chorion.

242 Chorion.

The *chorion* is a pretty ſtrong firm membrane, on whoſe external ſurface are diſperſed a great many red fleſhy bodies of the ſame number, ſize, and ſtructure, with the papillæ, with which they are mutually indented. They have been called *cotyledones*, from Κοτυλη, "cavity." This is greatly diſputed by ſome as a name very improper; but we think without reaſon, ſince the ſurface that is connected to the papillæ is concave, though when ſeparated it appears rather convex. To ſhun all diſpute, they may be called properly enough

243 Cotyledones.

placentulæ, ſince they ſerve the ſame uſe as the placenta in women. The ſeparation of theſe from the papillæ without any laceration, and our not being able to inject coloured liquors from the veſſels of the glands of the uterus into the placentulæ, ſeem to prove beyond a reply, that there can be here no anaſtomoſes betwixt the veſſels. On their coats run a great number of veſſels that are ſent to the ſeveral placentulæ, on the external ſide next to the uterus; whereas in creatures that have but one placenta, as in the human ſubject, cats, dogs, &c. the adheſion is ſomewhat firmer: The placentæ are likewiſe joined to the papillæ in the cornua uteri. We ſhall next give the hiſtory of the *allantois*.

Of Quadrupeds.

244 Allantois.

This is a fine tranſparent membrane contiguous to the former. It is not a general involucrum of the fœtus in the mother, for it covers only a ſmall part of the amnios. It is moſtly lodged in the cornua uteri. In mares, bitches, and cats, it ſurrounds the amnios, being everywhere interpoſed betwixt it and the chorion. In ſheep and goats it is the ſame as in this animal; and in ſwine and rabbits it covers ſtill leſs of the amnios. This ſac is probably formed by the dilatation of the urachus, which is connected at its other end to the fundus of the bladder, through which it receives its contents; and a great quantity of urine is commonly found in it. The membrane is doubled at the extremity of the canal, to hinder the return of the urine back into the bladder. Its veſſels are ſo exceſſively fine and few, that we cannot force an injected liquor farther than the beginning of this coat. This membrane is ſo far analogous to the cuticula, as not to be liable to corruption, or eaſily irritated by acrid liquors. The exiſtence of this membrane in women has been very warmly diſputed on both ſides. Thoſe who are againſt its exiſtence deny they could ever find it; and, allowing it were ſo, allege, that ſince the urachus is impervious, as appears by our not being able to throw liquors from the bladder into it, or *vice verſa*, it cannot ſerve the uſe that is agreed by all it does ſerve in beaſts; and therefore in the human body there is no ſuch thing. But if we conſider, on the other hand, firſt, that there ſeems to be the ſame neceſſity for ſuch a reſervoir in man as in other animals: ſecondly, that we actually find urine contained in the bladder of the human fœtus: thirdly, that urine has been evacuated at the navel when the urethra was ſtopped, which urine without this conduit would have fallen into the cavity of the abdomen: fourthly, that midwives have pretended to remark two different ſorts of waters come away at the time of birth: and, laſtly, that Dr Littre and Dr Hale have given in this membrane of a human ſubject, with all the other ſecundines curiouſly prepared, the one to the Royal Academy at Paris, the other to the Royal Society at London; by which ſocieties their reſpective accounts are atteſted; not to mention Verheyen, Heiſter, Keill, &c. who affirm their having ſeen it; and Albinus is ſaid to have ſhown to his college every year a preparation of it: On all theſe accounts it ſeems moſt probable, that there is ſuch a membrane in the human body.

245 The arguments for and againſt the human allantois.

The third proper integument of the fœtus is the *amnios*. It is thinner and firmer than the chorion; it has numerous ramifications of the umbilical veſſels ſpread upon it, the lateral branches of which ſeparate a liquor into its cavity. This is the proper liquor of the amnios;

246 Amnios.

Of Birds.

nios; which at firſt is in a ſmall quantity, afterwards increaſes for ſome months, then again decreaſes; and in a cow near her time, the quantity of this liquor is not above a pound. This membrane does not enter the *cornua uteri* in this creature, being confined to the body of the uterus; whereas the allantois occupies chiefly its cornua. But for what further relates to the ſtructure of the involucra, with the nature of the liquors contained in them, we muſt refer to the ſecond volume of Medical Eſſays, from page 121, where you have the ſum of all we know of this matter.

There are here two *venæ umbilicales*, and but one in the human ſubject; becauſe the extreme branches coming from the ſeveral placentulæ could not unite ſo ſoon as they would have done had they come all from one cake, as in the human. Of Birds.

There is a ſmall round fleſhy body that ſwims in the urine of this creature, mares, &c. which is the *hippomanes* of the ancients. Several idle opinions and whims have been entertained as to its uſe; but that ſeems to be ſtill unknown, or how it is generated or nouriſhed, for it has no connexion with the fœtus or placentulæ.

CHAP. V. THE ANATOMY OF BIRDS.

SECT. I. *Of Birds in general.*

THE ſtructure of the greater part of theſe animals is obviouſly calculated for the moſt rapid of all motions. That part of the vertebral column which conſtitutes the back is immoveable, but the neck is exceedingly flexible, the vertebræ being articulated together, not by flat ſurfaces, but by portions of cylinders, but in ſuch a manner as that the more atlantal vertebræ can move only forward, the more ſacral only backward. The neck is generally long, but its length differs in various ſpecies, being determined by their manner of life and other circumſtances. The head is ſmall in proportion to the body, and generally ends in a ſharp bill, that the animal may the more eaſily make its way through the air. The breaſt bone is ſhaped like a ſhield, and has in the middle a large and broad ſpine, like the keel of a ſhip, thus forming a conſiderable extent of ſurface for the inſertion of muſcles. This ridge is moſt conſpicuous in birds that fly. On each ſide of the breaſt bone, next the wings, are two bones, which correſpond to the clavicle or collar bone in man, by which the wings are connected to the breaſt bone, and between theſe is a very elaſtic bone with two horns, ſhaped like a V, and commonly known by the name of *merry-thought*. The wings are compoſed in a manner very ſimilar to the atlantal extremity in the mammalia, and are generally divided into two portions; the *wing*, to which the principal muſcles are attached, and the *pinion*.

247 Their wings, how furniſhed.

Fowls have the ſtrongeſt muſcles of their whole body inſerted into their wings; whence by the way we may obſerve, that it is altogether impoſſible for man to buoy himſelf up into the air like birds, even though he had proper machines in place of wings, unleſs he were likewiſe provided with muſcles ſtrong enough for moving them, which he has not. In the next place, their wings are not placed in the middle of their bodies, but a good deal farther forwards; whence it would at firſt view appear, that their heads would be erect, and their poſterior parts moſt depending when raiſed in the air; but by ſtretching out their heads which act upon the lever of a long neck, they alter their centre of gravity pretty much; and alſo by filling the ſacs or bladders in the inſide of their abdomen with air, and expanding their tail, they come to make the poſterior part of their bodies conſiderably higher; and thus they fly with their bodies nearly in a horizontal ſituation. Hence we find, that if their necks are kept from being ſtretched out, or if you cut away their tails, they become incapable of flying any conſiderable way.

248 Why not placed in the middle of the body.

The largeneſs of the wings in different fowls varies according to the wants of the creature. Thus birds of prey, who muſt fly a conſiderable way to provide their food, have large ſtrong wings; whereas domeſtic birds, who find their nouriſhment almoſt everywhere, have very ſhort and but ſmall wings. Their tail is of uſe in aſſiſting to raiſe them in the air; though the chief purpoſe of it is to ſerve as a rudder in guiding their flight, whilſt they uſe their wings as we do oars in putting forward a boat. The beſt account of this manner of progreſſion of fowls is given by Alfonſus Borellus, in his treatiſe *De Motu Animalium;* and in the *Religious Philoſopher* we have Borelli's doctrine ſtripped pretty much of its mathematical form. The ſacral extremities are ſituated ſo far back, as to make us at firſt think they would be in continual hazard of falling down forwards when they walk: but this is prevented by their holding up their head and neck, ſo as to make the centre of gravity fall upon the feet; and when they have occaſion for climbing up a ſteep place they ſtretch out their heads and necks forward, eſpecially if they are ſhort-legged, the better to preſerve properly the balance of the body. Thus we may obſerve a gooſe entering a barn-door, where generally there is an aſcending ſtep, to ſtretch out its neck, which before was raiſed, and incline its body forwards. This is laughed at by the common people, who aſcribe it to a piece of folly in the gooſe, as if afraid of knocking its head againſt the top of the door.

249 A peculiar mechaniſm in the toes of fowls.

Carnivorous birds are provided with ſtrong crooked claws for catching their prey: water fowls uſe them for ſwimming; and, principally for this purpoſe, have a ſtrong firm membrane interpoſed betwixt the toes. There is a beautiful mechaniſm to be obſerved in the toes of fowls, which is of conſiderable uſe to them. For their toes are naturally drawn together, or bend, when the foot is bended: this is owing to the ſhortneſs of the tendons of the toes, which paſs over them, which is analogous to our heel; and that the toes are ſet in the circumference of a circle, as our fingers are: Hence, when the foot is bended, the tendons muſt conſequently be much ſtretched; and, ſince they are inſerted into the toes, muſt of neceſſity bend them when the foot is bended; and when the foot is extended, the flexors of the toes are again relaxed, and they are therefore expanded. This is alſo of great uſe to different kinds of fowls: thus the hawk deſcending

Of Birds.

ſcending with his legs and feet extended, ſpreads his talons over his prey; and the weight of his body bending his feet, the toes are contracted, and the prey is ſeized by the talons. This is alſo of great uſe to water fowls: for had there been no ſuch contrivance as this, they muſt have loſt as much time when they pulled their legs in as they had gained by the former ſtroke: but, as the parts are now framed, whenever the creature draws in its foot, the toes are at the ſame time bended and contracted into leſs ſpace, ſo that the reſiſtance made againſt the water is not near ſo great as before: on the contrary. when they ſtretch their foot, their toes are extended, the membrane betwixt them expanded, and conſequently a greater reſiſtance made to the water. Again, ſuch fowls as live moſtly in the air, or have occaſion to ſuſtain themſelves on branches of trees in windy weather, and even in the night-time when aſleep, while all their muſcles are ſuppoſed to be in a ſtate of relaxation, have only to lean down the weight of their bodies, and their toes continue bended without any muſcles being in action; and whenever they would diſentangle themſelves, they raiſe up their bodies, by which their feet, and conſequently their toes, are extended.

250 Their covering.

Fowls have a particular covering of feathers different from all other creatures, but exactly well ſuited to their manner of life: for it not only protects them from the injuries of the weather, but ſerves them in their progreſſion through that thin aerial element they are, for the moſt part, employed in; and as fowls live much in the water, their feathers being continually beſmeared with an oily liquor, keeps the water from ſoaking into their ſkins, and ſo prevents the bad effects which it would infallibly otherwiſe produce.

The brain in birds is large in proportion to their heads; it has neither *corpus calloſum*, *fornix*, nor *corpora quadrigemina*. Hence we may conclude, that theſe parts are not eſſential to life, nor probably to reaſon.

The organ of ſmelling is placed at the baſe of the beak; the noſtrils are ſometimes naked, ſometimes concealed by feathers, and by a ſmall ſcale, or even by a fleſhy ſubſtance.

251 The organ of ſmelling.

Their organ of *ſmelling* is very large, and well provided with nerves; hence they have this ſenſation very acute. Ravens and other birds of prey give a ſure proof of this, by their being able to find out their prey, though concealed from their ſight and at a conſiderable diſtance.

Thoſe birds that grope for their food in the waters, mud, &c. have large nerves, which run quite to the end of their bills, by which they find out and diſtinguiſh their food.

252 Eye.

The anterior part of their *eyes* (inſtead of having the ſclerotic coat continued, ſo as to make near a ſphere as in us) turns all of a ſudden flat; ſo that here the ſclerotic makes but half a ſphere; and the cornea riſes up afterwards, being a portion of a very ſmall and diſtinct ſphere: ſo that in theſe creatures there is a much greater difference betwixt the ſclerotic and cornea than in us. Hence their eyes do not jut out of their heads, as in man and quadrupeds. As moſt of theſe creatures are continually employed in hedges and thickets, therefore, that their eyes might be ſecured from theſe injuries, as well as from too much light when flying in the face of the ſun, there is a very elegant mechaniſm in their eyes. A membrane riſes from the internal canthus, which at pleaſure, like a curtain, can be made to cover the whole eye; and this by means of a proper muſcle that riſes from the ſclerotic coat, and paſſing round the optic nerves, runs through the *muſculus oculi attollens* (by which however the optic nerves are not compreſſed) and palpebra, to be inſerted into the edge of this membrane. Whenever this muſcle ceaſes to act, the membrane by its own elaſticity again diſcovers the eye. This covering is neither pellucid nor opaque, both which would have been equally inconvenient; but, being ſomewhat tranſparent, allows as many rays to enter as to make any object juſt viſible, and is ſufficient to direct them in their progreſſion. By means of this membrane it is that the eagle is ſaid to look at the ſun.

Of Birds.

253 Bourſe noire. Its deſcription and uſes.

Beſides, all birds have another particularity, the uſe of which is not ſo well underſtood; and that is, a pretty long black triangular purſe, riſing from the bottom of their eye juſt at the entry of the optic nerve, and ſtretched out into their vitreous humour, and one would imagine it gave ſome threads to the cryſtalline. To this the French (who probably were the firſt who took notice of it in their diſſections before the Royal Academy) gave the name of *bourſe noire*. This may poſſibly ſerve to ſuffocate ſome of the rays of light, that they may ſee objects more diſtinctly without hurting their eyes. It has a connexion with the vitreous, and ſeems to be joined alſo to the cryſtalline humour. If we ſuppoſe it to have a power of contraction (which may be as well allowed as that of the iris), it may ſo alter the poſition of the vitreous and cryſtalline humours, that the rays from any body may not fall perpendicularly upon the cryſtalline: and this ſeems to be neceſſary in them, ſince they cannot change the figure of the anterior part of their eye ſo much as we can do: and as this animal is expoſed often to too great a number of rays of light, ſo they have no tapetum, but have the bottom of their eye wholly black on the retina; and in conſequence of this, fowls ſee very ill in the dark.

254 Organ of hearing.

They have no external ear; but in place of it a tuft of very fine feathers covering the *meatus auditorius*, which eaſily allows the rays of ſound to paſs them, and likewiſe prevents duſt or any inſect from getting in. An external ear would have been inconvenient in their paſſing through thickets, and in flying, &c. A liquor is ſeparated in the external part of the ear, or *meatus auditorius*, to lubricate the paſſage, and further prevent the entrance of any inſects, &c. The *membrana tympani* is convex externally; and no muſcles are fixed to the bones of their ear, which are rather of a cartilaginous conſiſtence: any tremulous motions impreſſed on the air are communicated in theſe creatures merely by the ſpring and elaſticity of theſe bones; ſo probably, the membrane is not ſo ſtretched as in the human ear by muſcles. The ſemicircular canals are very diſtinct, and eaſily prepared.

255 The variety in the beaks of fowls. Its uſes, &c.

The roſtrum, bill, or beak of fowls, is compoſed of two mandibles; and, as in quadrupeds, the upper one has no motion but what it poſſeſſes in common with the head. But parrots are an exception to this rule; for they can move the upper mandible at pleaſure: this is exceedingly convenient, as it enables them to lay hold of whatever comes in their way. Carnivorous

Of Birds.

fowls have their beaks long, ſharp, and crooked; the domeſtic fowls, ſuch as the hen-kind, &c. have ſtrong ſhort beaks, commodiouſly fitted to dig up and break their food; the water fowls, again, have long or very broad ſcoop-like beaks, which is moſt convenient for them.

The other circumſtances in which the ſtructure of birds differs from that of other animals, particularly as to the organs of digeſtion, reſpiration, and generation, will be beſt explained by deſcribing them in an individual inſtance; and we ſhall ſelect for this purpoſe the domeſtic cock, taking an opportunity of contraſting the viſcera of a carnivorous bird with thoſe of this ſpecies as a granivorous bird.

Sect. II. *Anatomy of a Cock.*

Though this kind of birds live upon food ſomewhat ſimilar to that of man, yet as they have no teeth to ſeparate or break down this food, we ſhould expect to find ſomething to compenſate for the want of teeth, ſomething remarkable in the organs of digeſtion: we ſhall therefore begin with theſe parts.

256 Crop.

The *gullet* of this creature runs down its neck, ſomewhat inclined to the right ſide; and terminates in a pretty large membranous ſac, which is the ingluvies or crop, where the food is macerated and diſſolved by a liquor ſeparated by the glands, which are eaſily obſerved everywhere on the internal ſurface of this bag. The effect of this maceration may be very well obſerved in pigeons, who are ſometimes in danger of being ſuffocated by the peaſe, &c. they feed upon, ſwelling to ſuch an immenſe bulk in their ingluvies, that they can neither get upwards nor downwards. If it be a favourite fowl, it might be preſerved by opening the ſac, taking out the peaſe, and ſewing up the wound.

257 Ventriculus ſuccenturiatus ſeu infundibulum.

The food getting out of this ſac goes down by the remaining part of the gullet into the *ventriculus ſuccenturiatus*, or *infundibulum Peyeri*, which is a continuation of the gullet with more numerous glands, which ſeparate a liquor to dilute the food ſtill more, which at length gets into the true ſtomach or gizzard, *ventriculus calloſus*, which conſiſts of two very ſtrong muſcles covered externally by a tendinous aponeuroſis, and lined on the inſide by a very thick firm membrane, which we evidently diſcover to be a production of the cuticula. This might have been proved in ſome meaſure *à priori*, from taking notice, that this membrane, which in chicks is only a thin ſlight pellicle, by degrees turns thicker and ſtronger the more attrition it ſuffers: but there is no other animal ſubſtance, ſo far as we know, which grows more hard and thick by being ſubjected to attrition, excepting the cuticula.—

258 Epidermis inveſts the internal ſurface of all the cavities and veſſels of the human body.

Hence may be drawn ſome kind of proof of what has been affirmed concerning the tunica villoſa of the ſtomach and inteſtines in the human body, viz. that it was in part a continuation of the epidermis; nay, all the hollow parts of the body, even arteries, veins, &c. ſeem to be lined with a production of this membrane, or one analogous to it. The uſe of the internal coat of the ſtomach of fowls is to defend the more tender parts of that viſcus from the hard grains and little ſtones thoſe creatures take down. The uſe of the gizzard is to compenſate for the want of teeth; and it is well fitted for this purpoſe, from the great ſtrength which it poſſeſſes. Of Birds.

The digeſtion of theſe animals is performed merely by attrition, as is evinced by many experiments; and it is further aſſiſted by the hard bodies they ſwallow. We ſee them daily take down conſiderable numbers of the moſt ſolid rugged little flints they find; and theſe can ſerve for no other purpoſe than to help the trituration of their aliments. After theſe pebbles, by becoming ſmooth, are unfit for this office, they are thrown up by the mouth. Hence fowls that are long confined, though ever ſo well fed, turn lean for want of theſe ſtones to help their digeſtion. This was put beyond all diſpute by Mr Tauvry, who gave a piece of metal to an oſtrich, convex on one ſide and concave on the other, but carved on both; and opening the creature's body ſome time after, it was found, that the carving on the convex ſide was all obliterated, while the engraved character remained the ſame as before on the concave ſide, which was not ſubjected to the ſtomach's preſſure: which could not have happened had digeſtion been performed by a menſtruum, or any other way whatſoever; but may be eaſily ſolved by allowing a ſimple mechanical preſſure to take place. We are, however, by no means to conclude from this, as ſome have too raſhly done, that in the human body digeſtion is performed by ſimple attrition; otherwiſe we may, with equal ſtrength of reaſon, by as good arguments drawn from what is obſerved in fiſhes, prove that the aliments are diſſolved in our ſtomachs by the action of a menſtruum. But this method of reaſoning is very faulty; nor can it ever bring us to the true ſolution of any philoſophical or medical problem. It is very plain, ſince the ſtructure of the parts of the human ſtomach are ſo very different from that of this creature, that it is fooliſh and unreaſonable to imagine both of them capable of producing the ſame effects. At each end of the ſtomach, there are as it were two particular ſacs of a different texture from the reſt of the ſtomach, not conſiſting of ſtrong muſcular fibres; they ſeem to be receptacles for the ſtones (eſpecially at the end which is fartheſt from the orifice), while the digeſted aliment is protruded into the inteſtines.

Spallanzani, however, has lately found, that pebbles are not at all neceſſary to the trituration of the food of theſe animals. At the ſame time, he does not deny, that when put in motion by the gaſtric muſcles, they are capable of producing ſome effect on the contents of the ſtomach; but is inclined to believe, that they are not ſought for and ſelected by deſign, as many ſuppoſe, but becauſe they frequently happen to be mixed with the food.

259 Duodenum.

The *duodenum* begins pretty near the ſame place at which the gullet enters; yet notwithſtanding the vicinity of theſe two tubes, the aliments are in no danger of getting out before they are perfectly digeſted, by reaſon of a protuberance betwixt the orifices; and in thoſe creatures who have ſuch a ſtrong muſcular ſtomach, it is a matter of great indifference whether the entry of the gullet or pylorus be higheſt, provided that the entry from the gullet does not allow the food to regurgitate, ſince the force of the ſtomach can eaſily protrude it towards the duodenum. This gut is moſtly in the right ſide, and hangs pendulous in their abdomen, having

Of Birds.

having its two extremities fixed to the liver. The *ductus choledochus* enters near its termination, where it mounts up again to be fixed to the liver; and leſt, by the contraction of the inteſtines, the bile ſhould paſs over without being intimately blended with the chyle, that duct enters downwards, contrary to the courſe of the food, and contrary to what is obſerved in any of the animals we have yet mentioned. But ſtill the general intention is kept in view, in allowing theſe juices the faireſt chance of being intimately blended with the food.

260 Ductus choledochus.

261 Inteſtina tenuia.

The *ſmall guts* are proportionally longer than thoſe of carnivorous birds, for the general cauſe already aſſigned. At the end of the ilium they have two large *inteſtina cæca*, one on each ſide, four or five inches long, coming off from the ſide of the rectum, and aſcending; and we find them containing part of the food: Theſe ſerve as reſervoirs to the feces; which, after ſome delay there, regurgitate into what ſoon becomes the rectum; which, together with the excretories of urine and organs of generation, empties itſelf into the common cloaca. The ſmall inteſtines are connected by a long looſe meſentery, which has little or no fat accompanying the blood veſſels, there being no hazard of the blood's being ſtopped.

262 Carnivorous birds.

The principal difference to be obſerved in carnivorous birds is in their chylopoietic viſcera, which may be accounted for from their different way of life.

263 Ingluvies.

Immediately under their clavicles, you will obſerve the œſophagus expanded into their *ingluvies*, which is proportionally leſs than in the granivorous kind, ſince their food does not ſwell ſo much by maceration; and for the ſame reaſon, there is a leſs quantity of a menſtruum to be found here.

264 Ventriculus ſuccenturiatus.

They have alſo a *ventriculus ſuccenturiatus*, plentifully ſtored with glands, ſituated immediately above their ſtomach, which we ſee here is thin and muſculomembranous, otherwiſe than in the granivorous kind: and this difference, which is almoſt the only one we ſhall find betwixt the two different ſpecies of fowls, is eaſily accounted for from the nature of their food, which requires leſs attrition, being eaſier of digeſtion than that of the other kind; nevertheleſs, it ſeems requiſite it ſhould be ſtronger than the human, to compenſate the want of abdominal muſcles, which are here very thin.

265 Inteſtina.

The ſame mechaniſm obtains in this creature's *duodenum* that we have hitherto obſerved. As being a carnivorous animal, its guts are proportionally ſhorter than thoſe of the granivorous kind: for the reaſon firſt given, viz. its food being more liable to corrupt, therefore not proper to be long detained in the body; and for that reaſon it has no *inteſtina cæca*, of which the other ſpecies of fowls have a pair. The difference in their wings, backs, and claws, is obvious; and has been already in ſome meaſure obſerved.

266 Pancreas.

The *pancreas* in this creature lies betwixt the two folds of the duodenum, and ſends two or three ducts into this gut pretty near the biliary.

267 The ſpleen.

The *ſpleen* is here of a round globular figure, ſituated between the liver and ſtomach; and betwixt theſe and the back bone it enjoys the ſame properties as in other animals, viz. large blood veſſels, &c. All its blood is ſent into the *vena portarum*, and has a perpetual conquaſſation. It has no excretory, as far as we know. Their *liver* is divided into two equal lobes by a pellucid membrane, running according to the length of their body: and hence we may obſerve, that it is not peculiar to that bowel to lie on the right ſide; which is ſtill more confirmed by what we obſerve in fiſhes, where the greateſt part of it lies in the left ſide.

Of Birds.

268 Liver.

The ſhape of their *gall bladder* is not much different from that of quadrupeds; but is thought to be longer in proportion to the ſize of the animal, and is farther removed from the liver.

269 Veſica fellis.

The principal difference to be remarked in their *heart*, is the want of the *valvulæ tricuſpides*, and their place being ſupplied by one fleſhy flap.

270 Cor.

The *lungs* are not looſe within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in thoſe animals that have a large motion in their ſpine. They are two red ſpongy bodies, covered with a membrane that is pervious, and which communicates with the large veſicles or air-bags that are diſperſed over their whole abdomen; which veſicles, according to Dr Monro, ſerve two very conſiderable uſes. The one is to render their bodies ſpecifically light, when they have a mind to aſcend and buoy themſelves up when flying, by diſtending their lungs with air, and alſo ſtraiten their windpipe, and ſo return the air. Secondly, They ſupply the place of a muſcular *diaphragm* and ſtrong abdominal muſcles; producing the ſame effects on the ſeveral contained viſcera, as theſe muſcles would have done, without the inconveniency of their additional weight; and conducing as much to the excluſion of the egg and feces.

271 Pulmones, their ſtructure and uſes.

272 The uſe of the veſicles in the abdomen.

273 The diaphragm, how ſupplied.

Dr Hunter has made ſome curious diſcoveries relative to theſe internal receptacles of air in the bodies of birds. Some of them are lodged in the fleſhy parts, and ſome in the hollow bones; but all of them communicate with the lungs. He informs us, that the air cells which are found in the ſoft parts have no communication with the cellular membrane which is common to birds as well as other animals. Some of them communicate immediately with each other; but all of them by the intervention of the lungs as a common centre. Some of them are placed in cavities, as the abdomen; others in the interſtices of parts, as about the breaſt. The bones which receive air are of two kinds; ſome of them divided into innumerable cells; others hollowed out into one large canal. They may be diſtinguiſhed from ſuch as do not receive air, by having leſs ſpecific gravity; by being leſs vaſcular; by containing little oil; by having no marrow nor blood in their cells; by having leſs hardneſs and firmneſs than others; and by the paſſage for the air being perceivable.

The mechaniſm by which the lungs are fitted for conveying air to theſe cavities is, their being attached to the diaphragm, and connected alſo to the ribs and ſides of the vertebræ. The diaphragm is perforated in ſeveral places by pretty large holes, allowing a free paſſage of air into the abdomen. To each of theſe holes is attached a diſtinct membranous bag, thin and tranſparent. The lungs open at their interior part into membranous cells, which lie upon the ſides of the pericardium, and communicate with the cells of the ſternum. The ſuperior parts of the lungs open into cells of a looſe net-work, through which the windpipe and gullet paſs. When theſe cells are diſtended with

Of Birds.

with air, it indicates paſſion, as in the caſe of the turkey-cock, pouting-pigeon, &c.

Theſe cells communicate with others in the axilla, and under the large pectoral muſcle; and thoſe with the cavity of the os humeri, by means of ſmall openings in the hollow ſurface near the head of that bone. Laſtly, The poſterior edges of the lungs have openings into the cells of the vertebræ, ribs, os ſacrum, and other bones of the pelvis, from which the air finds a paſſage to the cavity of the thigh bone.

Concerning the uſe of theſe cavities the doctor conjectures, that they are a kind of appendage to the lungs; and that, like the bags continued through the bellies of amphibious animals, they ſerve as a kind of reſervoirs of air. They aſſiſt birds during their flight, which muſt be apt to render frequent reſpiration difficult. He farther inſinuates, that this conſtruction of the organs of reſpiration may aſſiſt birds in ſinging; which, he thinks, may be inferred from the long continuance of ſong between the breathings of a canary bird. On tying the windpipe of a cock, the animal breathed through a canula introduced into his belly; another through the os humeri, when cut acroſs; and a hawk through the os femoris. In all theſe caſes the animal ſoon died. In the firſt, the Doctor aſcribes the death to an inflammation of the bowels; but in the laſt, he owns it was owing to difficult breathing. What took place, however, was ſufficient to ſhow that the animals did really breathe through the bone.

When we examine the upper end of the *trachea*, we obſerve a *rima glottidis* with muſcular ſides, which may act in preventing the food or drink from paſſing into the lungs: for there is no *epiglottis* as in man and quadrupeds.

274 Windpipe.

The *windpipe*, near where it divides, is very much contracted; and their voice is principally owing to this coarctation. If you liſten attentively to a cock crowing, you will be ſenſible that the noiſe does not proceed from the throat, but deeper; nay, this very pipe, when taken out of the body, and cut off a little after its diviſion, and blown into, will make a ſqueaking noiſe, ſomething like the voice of theſe creatures. On each ſide, a little higher than this contraction, there is a muſcle ariſing from their ſternum, which dilates the trachea. The cartilages, of which the pipe is compoſed in this animal, go quite round it; whereas in man and quadrupeds they are diſcontinued for about one-fourth on the back part, and the intermediate ſpace is filled up by a membrane. Neither is the trachea ſo firmly attached to their vertebræ as in the other creatures we have examined. This ſtructure we ſhall find of great ſervice to them, if we conſider, that had the ſame ſtructure obtained in them as in us, their breath would have been in hazard of being ſtopped at every flexion or twiſting of their neck, which they are frequently obliged to. This we may be ſenſible of by bending our necks conſiderably on one ſide, upon which we ſhall find a great ſtraitneſs and difficulty of breathing; whereas their trachea is better fitted for following the flexions of the neck by its looſe connexion to the vertebræ.

In place of a *muſcular diaphragm*, this creature has nothing but a thin membrane connected to the pericardium, which ſeparates the thorax and abdomen. But beſides this, the whole abdomen and thorax are divided by a longitudinal membrane or *mediaſtinum* connected to the lungs, pericardium, liver, ſtomach, and to the fat lying over their ſtomach and guts, which is analogous to an *omentum*, and ſupplies its place.

Of Birds.

275 Lymphatic ſyſtem.

The *lymphatic ſyſtem* in birds conſiſts, as in man, of lacteal and lymphatic veſſels, with the thoracic duct.

The lacteals, indeed, in the ſtricteſt ſenſe, are the lymphatics of the inteſtines; and, like the other lymphatics, carry only a tranſparent lymph; and inſtead of one thoracic duct, there are two, which go to the jugular veins. In theſe circumſtances, it would ſeem that birds differ from the human ſubject, ſo far at leaſt as we may judge from the diſſection of a *gooſe*, the common ſubject of this inquiry, and from which the following deſcription is taken.

The lacteals run from the inteſtines upon the meſenteric veſſels: thoſe of the duodenum paſs by the ſide of the pancreas; afterward they get upon the cæliac artery, of which the ſuperior meſenteric is a branch. Here they are joined by the lymphatics of the liver, and then they form a plexus which ſurrounds the cæliac artery. Here alſo they receive a lymphatic from the gizzard, and ſoon after another from the lower part of the gullet. At the root of the cæliac artery they are joined by the lymphatics from the glandulæ renales, and near the ſame part by the lacteals from the other ſmall inteſtines, which veſſels accompany the lower meſenteric artery; but, before they join thoſe from the duodenum, receive from the rectum a lymphatic, which runs from the blood veſſels of that gut. Into this lymphatic ſome ſmall veſſels from the kidneys ſeem to enter at the root of the cæliac artery. The lymphatics of the ſacral extremities probably join thoſe from the inteſtines. At the root of the cæliac artery and contiguous part of the aorta, a net-work is formed by the veſſels above deſcribed. From this net-work ariſe two thoracic ducts, of which one lies on each ſide of the ſpine, and runs obliquely over the lungs to the jugular vein, into the inſide of which it terminates, nearly oppoſite to the angle formed by the vein and this ſubclavian one. The thoracic duct of the left ſide is joined by a large lymphatic, which runs upon the gullet. The thoracic ducts are joined by the lymphatics of the neck, and probably by thoſe of the wings, where they open into the jugular veins. The lymphatics of the neck generally conſiſt of two large branches, on each ſide of the neck, accompanying the blood veſſels; and theſe two branches join near the lower part of the neck, and form a trunk which runs cloſe to the jugular vein, and opens into a lymphatic gland; from the oppoſite ſide of this gland a lymphatic comes out, which ends in the jugular vein.

On the left ſide, the whole of this lymphatic joins the thoracic duct of the ſame ſide; but, on the right one, part of it goes into the inſide of the jugular vein a little above the angle; whilſt another joins the thoracic duct, and with that duct forms a common trunk, which opens into the inſide of the jugular vein, a little below the angle which that vein makes with the ſubclavian. This ſyſtem in birds differs moſt from that of quadrupeds, in the chyle being tranſparent and colourleſs, and in there being no viſible lymphatic glands, neither in the courſe of the lacteals, nor in that of the lymphatics of the abdomen, nor near the thoracic ducts.

The

Of Birds.

276 Kidneys. The *kidneys* lie in the hollow excavated in the ſide of the back-bone, from which there is ſent out a bluiſh-coloured canal running along by the ſide of the *vas deferens*, and terminating directly in the common cloaca. This is the *ureter*, which opens by a peculiar aperture of its own, and not at the penis. Fowls having no urinary bladder, it was thought by ſome they never paſſed any urine, but that it went to the nouriſhment of the feathers: but this is falſe; for that whitiſh ſubſtance that we ſee their greeniſh fæces covered with, and which turns afterwards chalky, is their urine. Let us next conſider the organs of generation of both ſexes, and firſt thoſe of the male.

277 The organs of generation in the male. The *teſticles* are ſituated one on each ſide of the back-bone; and are proportionally very large to the creature's bulk. From theſe run out the *vaſa ſeminifera;* at firſt ſtraight; but after they recede farther from the body of the teſticle, they acquire an undulated or convoluted form, as the epididymis in man. Theſe convolutions partly ſupply the want of *veſiculæ ſeminales*, their coition being at the ſame time very ſhort: Theſe terminate in the penis, of which the cock has two, one on each ſide of the common cloaca, pointing directly outwards. They open at a diſtance from each other, and are very ſmall and ſhort; whence they have eſcaped the notice of anatomiſts, who have often denied their exiſtence. In birds there is no proſtate gland. This is what is chiefly remarkable in the organs of the male.

278 Vitellarium. The *racemus vitellorum*, being analogous to the ovaria in the human ſubject, is attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averſe with reſpect to the ovaria; yet notwithſtanding, by the force of the *orgaſmus venereus*, it turns round and graſps the *vitellus*, which in its paſſage through this duct, called the *infundibulum*, receives a thick gelatinous liquor, ſecreted by certain glands. This, with what it receives in the uterus, compoſes the white of the egg. By this tube then it is carried into the uterus. The ſhell is lined with a membrane; and in the large end there is a bag full of air, from which there is no outlet.

Of Birds.

279 Uterus. The *uterus* is a large bag, placed at the end of the *infundibulum*, full of wrinkles on its inſide; here the egg is completed, receiving its laſt involucrum, and is at laſt puſhed out at an opening on the ſide of the common cloaca. From the teſtes in the male being ſo very large in proportion to the body of the creature, there muſt neceſſarily be a great quantity of ſemen ſecreted; hence the animal is ſalacious, and becomes capable of impregnating many females. The want of the *veſiculæ ſeminales* is in ſome meaſure ſupplied by the convolutions of the *vaſa deferentia*, and by the ſmall diſtance betwixt the ſecerning and excretory organs. The two *penes* contribute alſo very much to their ſhort coition; at which time the opening of the uterus into the cloaca is very much dilated, that the effect of the ſemen on the vitelli may be the greater.

280 The want of the veſiculæ ſeminales, how ſupplied.

A hen will of herſelf indeed lay eggs; but theſe are not impregnated, and yet appear entirely complete, except that the ſmall black ſpot, which comes afterwards to be the rudiments of the chick, is not here to be obſerved.

TABLE of the Proportional Number of RIBS and VERTEBRÆ in various ſpecies of BIRDS.

SPECIES.	Verteb. of Neck.	Verteb. of Back.	Anter. falſe Ribs.	True Ribs.	Poſter. falſe Ribs.	N° of Ribs.	Sacral Verteb.	Coccyg. Verteb.
Vultur. Vulture,	13	7					11	7
Falco fulvus. Eagle,	13	8	0	7	0	7	17	8
—— *haliaëtus.* Bald buzzard,	14	8	0	7	1	8	11	7
—— *buteo.* Buzzard,	11	7					10	8
—— *niſus.* Sparrow hawk,	11	8					11	8
—— *milvus.* Kite,	12	8					11	8
Strix ulula. Owl,	11	8		7			11	8
Muſcicapa griſola. Fly-catcher,	10	8					10	8
Turdus merula. Blackbird,	11	8					10	7
Tanagra taldo. Tanagar,	10	8					9	8
Corvus corone. Crow,	13	8	1	5	1	7	13	7
—— *pica.* Magpie,	13	8	1	5	1	7	13	8
—— *glandarius.* Jay,	12	7	1	5	1	7	11	8
Sturnus vulgaris. Starling,	10	8	1	5	1	7	10	9
Loxia coccothrauſtes. Groſbeak,	10	7					12	7
—— *pyrrhula.* Bulfinch,	10	6					11	6
Fringilla domeſtica. Sparrow,	9	9	1	5	1	7	10	0
—— *carduelis.* Goldfinch,	11	8	1	5	1	7	11	8
Parus major. Titmouſe,	11	8	6	6	1	7	11	7
Alauda arvenſis. Lark,	11	9	1	5	1	7	10	7

TABLE, &c. continued.

Species.	Verteb. of Neck.	Verteb. of Back.	Anter. falſe Ribs.	True Ribs.	Poſter. falſe Ribs.	N° of Ribs.	Sacral Verteb.	Coccyg. Verteb.
Motacilla rubecula. Redbreaſt,	10	8					10	8
Hirundo urbica. Swallow,	11	8					11	9
Caprimulgus europæus. Goatſucker,	11	8					11	8
Trochilus pella. Topaz humming-bird,	12	9					9	8
Upupa epops. Hoopoe,	12	7					10	7
Alcedo iſpida. King's-fiſher,	12	7					8	7
Picus viridis. Woodpecker,	12	8	1	6	1	8	10	9
Ramphaſtos. Toucan,	12	8					12	7+
Pſittacus crithacus. Parrot,	12	9					11	8
Columba œnas. Stockdove,	13	7	1	5	1	6	13	7
Pavo criſtatus. Peacock,	14	7					12	8
Phaſianus colchicus. Pheaſant,	13	7	2	8	1	11	15	5
Meleagris gallo-pavo. Turkey,	15	7					10	5
Crax nigra. Curaſſow bird. Hoceo.	15	8	2	4	1	7	10	7
Struthio camelus. Oſtrich,	18	8					20	9
——— *caſuarius.* Caſſawary,	15	11					19	7
Phœnicopterus. Flamingo,	18	7					12	7
Ardea cinerea. Heron,	18	7	1	7	0	8	10	7
——— *alba.* Stork,	19	7					11	8
——— *grus.* Crane,	19	9	1	7	1	9	12	7
Platalea aïaïa. Spoonbill,	17	7					14	8
Recurviroſtra. Avoſet,	14	9					10	8
Charadrius pluvialis. Plover,	15	8	1	6	1	8	10	7
Tringa vanellus. Lapwing,	14	8					10	7
Scolopax ruſticata. Woodcock,	18	7					13	8
——— *arquata.* Curlew,	13	8					10	8
Hæmatopus oſtralegus. Oyſter-catcher,	12	9					15	0
Rallus crex. Rail,	13	8					13	8
Fulica atra. Coot,	15	9					7	8
Parra. Jacana,	14	8					12	7
Pelicanus onocratalus. Pelican,	16	7					14	7
——— *carbo.* Cormorant,	16	9					14	8
Sterna hirundo. Sea ſwallow,	14	8					10	8
Procellaria. Petril,	14	8					? ?	8
Anas cygnus. Swan,	23	11	2	8	1	11	14	8
—— *anſer.* Gooſe,	15	10					14	7
—— *bernicla.* Bernacle,	18	10					14	9
—— *boſchas.* Duck,	14	8	0	7	1	8	15	8
—— *tadorna.* Sheldrake,	16	11					11	9
—— *nigra.* Black diver,	15	9					14	7
Mergus merganſer. Merganſer,	15	8	2	6	1	9	13	7
Colymbus criſtatus. Grebe,	14	10					13	7

CHAP. VI. ANATOMY OF REPTILES.

Sect. I. *Of Reptiles in general.*

These animals, like the fiſhes, have their blood nearly of the ſame temperature with the element in which they live. They have indeed a lung, and reſpire air, but their pulmonary veſſels are only branches of the large general artery and vein, and do not, as in the hot-blooded animals, form a peculiar ſyſtem equal to the vaſcular ſyſtem of the reſt of the body.

With reſpect to their organs of motion, reptiles may be divided into two orders. In the one, the ſerpents, the body is cylindrical and entirely without limbs, their motion is a kind of writhing or creeping.

The others have four feet very ſimilar in ſtructure to thoſe of the mammalia, whence theſe animals have been called *oviparous quadrupeds*. Such of them as live in the water have frequently membranes between their toes, which they employ like the fins of fiſhes for ſwimming. One ſpecies has a kind of membranaceous

Of Reptiles.

branaceous wings. We know two ſpecies which are called *bipedal reptiles*, which are only diſtinguiſhed from ſerpents in having two very ſmall feet. In the whole claſs the feet are ſo ſhort, and ſo cloſe to the body, that they are not unaptly termed reptiles or creeping animals.

Their eyes are large and fiery, and are furniſhed with three lids. Their ear has neither concha nor external paſſage, and its tympanum lies flat to the head, and is often covered with ſcales or fleſh: internally it has only one little bone compoſed of a plate furniſhed with a ſort of handle. In ſome ſpecies the tympanum and its little bone are entirely wanting, as alſo the cochlea, but they have all ſemicircular canals, and a veſtibule. Their noſtrils are generally ſmall. In the ſerpents, whoſe tongue is almoſt horny, the ſenſe of taſte cannot be very exquiſite, but in the other ſpecies where the tongue is ſofter it may be pretty acute.

Their ſkin is naked or covered with ſcales. The tortoiſes are remarkable for being covered with a kind of buckler.

Some ſpecies of oviparous quadrupeds have ſix toes. Serpents exerciſe the ſenſe of touch by wrapping their body round the object which they deſire to feel.

The brain of reptiles is very ſmall, and divided into very diſtinct tubercles. Their ſenſation ſeems leſs to depend on a common centre than in the other animals which we have been conſidering, as they can live for a long time without the head, and after being deprived of the heart, and all the viſcera; their limbs when ſeparated from the body preſerve their irritability for a conſiderable time; the heart of a frog will beat for many hours after it has been cut out. Reptiles have alſo a conſiderable power of reproduction. The tail of a lizard and ſeveral parts of water ſalamanders will grow again after being cut off. The jaws in theſe animals are for the moſt part armed with teeth which are conical and pointed, but ſome of them have only fleſhy or horny gums. Their alimentary canal is but ſmall and has no cæcum, but it receives fluids ſimilar to thoſe of the hot-blooded animals. The urine, which is ſecreted by the kidneys, is received into a bladder, but is evacuated by the anus.

Their heart has only one ventricle, from which proceeds a ſingle artery divided into two large branches, which furniſh each a twig to the lung of that ſide, and are then united to be diſtributed to the other parts of the body. Hence theſe animals can at pleaſure ſuſpend reſpiration without ſtopping the circulation of the blood, ſo that they can remain a long time under water, or in a cloſe veſſel. The cells of the lungs are much larger than in the hot-blooded animals; and theſe organs reſemble oblong bags, which float in the ſame cavity with the other viſcera, without the interpoſition of a diaphragm. Some of theſe animals have the power of inflating their lungs to a great extent. They have a windpipe and a larynx, by which they can produce ſounds as in other animals which are provided with nerves.

The females of reptiles have a double receptacle for eggs furniſhed with two tubes, which open at the anus. In ſome ſpecies copulation takes place, and the eggs are covered with a ſhell more or leſs hard. In others the male merely ſprinkles with ſemen the eggs already laid, and theſe are merely covered with a membrane. Reptiles, no more than other animals with cold blood, have the power of hatching their eggs.

Of Reptiles.

Sect. II. *Tortoiſe.*

281 Their ſhell or covering, &c.

The covering of this animal is compoſed of a ſhell ſo remarkably hard and firm in its texture, that a loaded waggon may go over it without hurting the ſhell or the animal within it. In the young animal, this ſhell grows harder in proportion as its contents expand; and this creature never changes its ſhell as ſome others do: hence it was neceſſary for it to be made up of different pieces; and theſe are more or leſs diſtinct in different animals. Their feet are ſmall and weak; and they are exceedingly ſlow in motion.

It has neither tongue nor teeth; to make up for which, their lips are ſo hard as to be able to break almoſt the hardeſt bodies.

The alimentary canal very much reſembles that of the former claſs.

The principal difference is in the circulation of the blood. The heart has two diſtinct auricles, without any communication; and under theſe, there is the appearance of two ventricles ſimilar in ſhape to thoſe of the former claſs: but they may be conſidered as one cavity; for the ventricle ſends out not only the pulmonary artery, but likewiſe the aorta; for there is a paſſage in the ſeptum, by which the ventricles communicate freely, and the blood paſſes from the left into the right one. From the aorta, the blood returns into the right auricle, while that from the pulmonary artery returns to the left auricle, from which it is ſent to the left ventricle, &c. ſo that only a part of the blood is ſent to the lungs, the reſt going immediately into the aorta; hence the animal is not under the neceſſity of breathing ſo often as otherwiſe it would be.

282 Blood veſſels.

From the baſe of the right ventricle goes out the pulmonary artery and aorta. The pulmonary artery is ſpent upon the lungs. The aorta may be ſaid to be three in number; for the aorta ſiniſtra aſcends through the pericardium in company with the pulmonary artery; and afterwards turns down, and ſends off a conſiderable branch, which ſplits into two; one of which joins the right aorta, while the other is diſtributed upon the liver, ſtomach, inteſtines, &c. What remains of this aorta runs to the kidneys or poſterior extremities of that ſide. An aorta deſcendens, &c. after piercing the pericardium, runs down and communicates with the branch already mentioned, is diſtributed upon the right kidney and inferior extremity, and alſo upon the bladder and parts of generation. An aorta aſcendens, after getting out of the pericardium, ſupplies the fore-legs, neck, and head. The blood in the ſuperior part of the body returns to the right auricle by two jugular veins. which unite after perforating the pericardium. From the inferior part, it returns to the ſame auricle by two large veins; one on the right ſide receives the blood in the right lobe of the liver; the other on the left ſide receives the blood in the left lobe, and alſo a trunk which

Of Fiſhes. correſponds with the inferior vena cava in other animals. The pulmonary veſſels run in the left auricle in the common way.

The abſorbent ſyſtem in the turtle, like that in the former claſs, conſiſts of lacteals and lymphatics, with their common trunks the thoracic ducts; but differs from it in having no obvious lymphatic glands on any part of its body, nor plexus formed at the termination in the red veins.

283 Lacteals. The *lacteals* accompany the blood veſſels upon the meſentery, and form frequent net-works acroſs theſe veſſels: near the root of the meſentery a plexus is formed, which communicates with the lymphatics coming from the kidneys and parts near the anus. At the root of the meſentery on the left ſide of the ſpine, the lymphatics of the ſpleen join the lacteals; and immediately above this a plexus is formed, which lies upon the right aorta. From this plexus a large branch ariſes, which paſſes behind the right aorta to the left ſide, and gets before the left aorta, where it aſſiſts in forming a very large receptaculum, which lies upon that artery.

From this receptaculum ariſe the thoracic ducts. From its right ſide goes one trunk, which is joined by that large branch that came from the plexus to the left ſide of the right aorta, and then paſſes over the ſpine. This trunk is the thoracic duct of the right ſide; for having got to the right ſide of the ſpine, it runs upwards, on the inſide of the right aorta, towards the right ſubclavian vein; and when it has advanced a little above the lungs, it divides into branches, which near the ſame place are joined by a large branch, that comes up on the outſide of the aorta. From this part upwards, thoſe veſſels divide and ſubdivide, and are afterwards joined by the lymphatics of the neck, which likewiſe form branches before they join thoſe from below. So that between the thoracic duct and the lymphatics of the ſame ſide of the neck, a very intricate net-work is formed; from which a branch goes into the angle between the jugular vein and the lower part or trunk of the ſubclavian. This branch lies therefore on the inſide of the jugular vein, whilſt another gets to the outſide of it, and ſeems to terminate in it, a little above the angle, between that vein and the ſubclavian. Of Fiſhes.

284 Lymphatics. Into the above-mentioned receptaculum, the lymphatics of the ſtomach and duodenum likewiſe enter. Thoſe of the duodenum run by the ſide of the pancreas, and probably receive its lymphatics and a part of thoſe of the liver. The lymphatics of the ſtomach and duodenum have very numerous anaſtomoſes, and form a beautiful net-work on the artery which they accompany. From this receptaculum likewiſe (beſides the trunk already mentioned, which goes to the right ſide) ariſe two other trunks pretty equal in ſize; one of which runs upon the left ſide, and the other upon the right ſide of the left aorta, till they come within two or three inches of the left ſubclavian vein; where they join behind the aorta, and form a number of branches which are afterwards joined by the lymphatics of the left ſide of the neck; ſo that here a plexus is formed as upon the right ſide. From this plexus a branch iſſues, which opens into the angle between the jugular and ſubclavian vein.

SECT. III. *Serpent and Crocodile.*

285 Circulation in ſerpents, &c. THE circulation in theſe is ſimilar to that of the turtle; but we find only one ventricle. The blood goes from the right auricle to the ventricle which ſends out the pulmonary artery and aorta; the blood from the pulmonary artery returns to the left auricle, that from the aorta going to the right auricle, and both the auricles opening into the ventricle.

SECT. IV. *Frog and Lizard.*

THESE differ from the former animals, in having only one auricle and a ventricle: and beſides, the ventricle ſends out a ſingle artery, which afterwards ſplits into two parts; one to ſupply the lungs, the other runs to all the reſt of the body: from the lungs and from the other parts, the blood returns into the auricle.

CHAP. VII. ANATOMY OF FISHES.

286 Cuticula, likeneſs to the human. OF theſe we may firſt obſerve, that they have a very ſtrong thick *cuticle*, covered with a great number of ſcales, laid one on another like the tiles of houſes. This among other arguments is ſuppoſed to prove the human epidermis to be of a ſquamous ſtructure: but the ſcales reſemble the hairs, wool, feathers, &c. of the creatures that live in air; and below theſe we obſerve their proper *cuticula* and *cutis*.

The generality of fiſhes, particularly thoſe ſhaped like the cod, haddock, &c. have a line running on each ſide. Theſe lines open externally by a number of ducts, which throw out a mucous or ſlimy ſubſtance that keeps them ſoft and clammy, and ſeems to ſerve the ſame purpoſe with the mucous glands or ducts which are placed within many of our internal organs.

In the next place, theſe creatures have neither atlantal nor ſacral extremities, as quadrupeds and fowls; for their progreſſion is performed in a different way from either of thoſe ſpecies of animals: for this purpoſe they are provided with machines, properly conſiſting of a great number of elaſtic beams, connected to one another by firm membranes, and with a tail of the ſame texture; their ſpine is very moveable towards the poſterior part, and the ſtrongeſt muſcles of their bodies are inſerted there. Their tails are ſo framed as to contract to a narrow ſpace when drawn together to either ſide, and to expand again when drawn to a ſtraight line with their bodies; ſo, by the aſſiſtance of this broad tail, and the fins on their ſides, they make their progreſſion much in the ſame way as a boat with oars on its ſides and rudder at its ſtern. The perpendicular fins ſituated on the ſuperior part of their body keep them *in æquilibrio*, hindering the belly from turning uppermoſt; which it would readily do, becauſe of the air-bag

287 Swimming, how performed. Several uſes of their fins, tail, air-bags, &c.

Of Fiſhes.

air-bag in the abdomen rendering their belly ſpecifically lighter than their back; but by the reſiſtance theſe fins meet with when inclined to either ſide, they are kept with their backs always uppermoſt.

It may be next obſerved, that theſe creatures have nothing that can be called a *neck*, ſeeing they ſeek their food in a horizontal way, and can move their bodies either upwards or downwards, as they have occaſion, by the contraction or dilatation of the air-bag; a long neck, as it would hinder their progreſſion, would be very diſadvantageous in the element they live in.

In the bony fiſhes the bodies of the vertebræ are ſometimes cylindrical, ſometimes angular, and frequently compreſſed: they are articulated only by their bodies, as there are no articulatory proceſſes. They may be divided into two claſſes; thoſe of the tail, which are furniſhed with a ſpinous proceſs both above and below; and thoſe of the belly or back which have it only above. Theſe laſt are uſually furniſhed at the ſides, with tranſverſe proceſſes for the attachment of the ribs. The ſpinous proceſſes, both dorſal and ſternal, are very long, eſpecially in the flat fiſh. At the baſe of the dorſal proceſſes there is a canal for lodging the ſpinal marrow, and the blood veſſels paſs through a ſimilar canal at the baſe of the ſternal proceſſes. There is nearly the ſame ſtructure in the cartilaginous fiſhes; but in theſe all the cartilages are ſo firmly fixed together, that only the ſpinous proceſſes can be diſtinguiſhed. The vertebra of a fiſh differs from that of other animals in the ſtructure of its body, at each extremity of which there is a conical cavity, ſo that between each pair of vertebræ there is a hollow ſpace formed by theſe two cones joined baſe to baſe, filled with a very ſoft cartilaginous or mucous ſubſtance on which the motions of the vertebræ are eaſily performed. The annexed table ſhows the proportional number of vertebra in ſeveral ſpecies of fiſh.

Of Fiſhes.

TABLE of the Number of VERTEBRÆ in ſeveral Species of FISHES.

SPECIES.	*Cervical Vertebræ.*	*Dorſal Vertebræ.*	*Lumbar Vertebræ.*	*Coccygian Vertebræ.*	*Total* N° *of Vertebræ.*
Raia bates. Ray,	ſ ſified into ne piece.	4	–	80+	–
Squalus. Shark,	–	–	–	–	207
Accipenſer ſturio. Sturgeon,	–	–	–	–	28
Syngnathus acus. Sea-needle,	–	–	–	–	50+
——— *hippocampus.* Sea-horſe,	–	–	–	–	62
Baliſtes.	–	7	–	10	–
Oſtracion quadricornis.	–	–	–	–	13
Muræna anguilla. Eel,	–	–	–	–	115
Anarrhichas lupus. Sea-wolf,	2	24	–	50	–
Trachinus draco. Sea-dragon,	2	13	–	30	–
Uranoſcopus. Uranoſcope,	1	9	–	15	–
Gadus merlangus. Whiting,	2	17	4	32	55
Cottus ſcorpius. Sea-ſcorpion,	–	8	2	15	–
Trigla loricata. Armed trigla,	–	12	–	23	–
——— *cuculus.* Red gurnard,	–	13	–	21	–
——— *volitans.* Flying trigla,	3	8	–	12	–
Echineis remora. Remora.	–	12	–	15	–
Pleuronectes plateſſa. Plaice,	–	13	–	30	–
Gaſteroſteus pungitius. Stickle-back,	–	70	–	22	–
Perca fluviatilis. Perch,	–	21	–	20	–
Zeus faber. Doree,	4	9	2	16	31
—— *vomer.*	–	10	–	13	–
Chætodon cornu. Horned chætodon.	–	9	–	12	–
——— *teïra.* Striped chætodon.	–	9	–	12	–
Cyprinus carpio. Carp,	1	15	9	16	41
——— *naſus.*	1	19	5	19	44
Clupea harengus. Herring,	4	38	–	18	–
Salmo rhombus. Rhomboid ſalmon,	1	12	–	20	–
Eſox lucius. Pike,	4	35	–	20	–
—— *braſilienſis.* Braſilian pike,	–	34	3	15	–
Silurus felis. Sea-cat,	1	12	1	30	44
Loricaria. Armour fiſh,	1	6	1	28	36
Fiſtularia tobaccaria. Tobacco-pipe fiſh,	–	59	–	22	–

Of Fiſhes.

The *brain* in fiſhes is formed pretty much in the ſame way as that of fowls; only we may obſerve, that the poſterior lobes bear a greater proportion to the anterior.

288 Cerebrum.

289 Organ of ſmell.

Their organ of *ſmelling* is large; and they have a power of contracting and dilating the entry into their noſe as they have occaſion. It ſeems to be moſtly by their acute ſmell that they diſcover their food; for their tongue ſeems not to have been deſigned for a very nice ſenſation, being of a pretty firm cartilaginous ſubſtance; and common experience evinces, that their ſight is not of ſo much uſe to them as their ſmell in ſearching for their nouriſhment. If you throw a freſh worm into the water, a fiſh will diſtinguiſh it at a conſiderable diſtance; and that this is not done by the eye, is plain from obſerving, that after the ſame worm has been a conſiderable time in the water, and loſt its ſmell, no fiſhes will come near it; but if you take out the bait, and make ſeveral little inciſions into it, ſo as to let out more of the odoriferous effluvia, it will have the ſame effect as formerly. Now it is certain, that had the creatures diſcovered this bait with their eyes, they would have come equally to it in both caſes. In conſequence of their ſmell being the principal means which they have of diſcovering their food, we may frequently obſerve their allowing themſelves to be carried down with the ſtream, that they may aſcend again leiſurely againſt the current of the water; thus the odoriferous particles ſwimming in that medium, being applied more forcibly to their ſmelling organs, produce a ſtronger ſenſation.

290 Optic nerve.

The *optic nerves* in theſe animals are not confounded with one another in their middle progreſs betwixt their origin and the orbit, but the one paſſes over the other without any communication; ſo that the nerve that comes from the left ſide of the brain goes diſtinctly to the right eye, and *vice verſa*.

Indeed it would ſeem not to be neceſſary for the optic nerves of fiſhes to have the ſame kind of connection with each other as thoſe of man have: for their eyes are not placed in the fore part, but in the ſides of their heads; and of conſequence, they cannot ſo conveniently look at any object with both eyes at the ſame time.

291 The cryſtalline humour a complete ſphere, and why.

The *cryſtalline lens* is here a complete ſphere, and more denſe than in terreſtrial animals, that the rays of light coming from water might be ſufficiently refracted.

As fiſhes are continually expoſed to injuries in the uncertain element in which they live, and as they are in perpetual danger of becoming a prey to the larger ones, it was neceſſary that their eyes ſhould never be ſhut; and as the cornea is ſufficiently waſhed by the element they live in, they are not provided with palpebræ: but then, as in the current itſelf the eye muſt be expoſed to ſeveral injuries, there was a neceſſity it ſhould be ſufficiently defended; which in effect it is by a firm pellucid membrane, that ſeems to be a continuation of the cuticula, being ſtretched over here. The epidermis is ſo very proper for this purpoſe, as being inſenſible and deſtitute of veſſels, and conſequently not liable to obſtructions, or, by that means, of becoming opaque. In the eye of the ſkate tribe, there is a digited curtain which hangs over the pupil, and may ſhut out the light when the animal reſts, and it is ſimilar to the tunica adnata of other animals.

Of Fiſhes.

292 Organs of hearing.

Although it was formerly much doubted whether fiſhes poſſeſſed a ſenſe of hearing, yet there can be little doubt of it now; ſince it is found that they have a complete organ of hearing as well as other animals, and likewiſe as the water in which they live is proved to be a good medium. Fiſhes, particularly thoſe of the ſkate kind, have a bag at ſome diſtance behind the eyes, which contains a fluid and a ſoft cretaceous ſubſtance, and ſupplies the place of veſtibule and cochlea. There is a nerve diſtributed upon it, ſimilar to the portio mollis in man. They have three ſemicircular canals, which are filled with a fluid, and communicate with the bag: they have likewiſe, as the preſent profeſſor of anatomy at Edinburgh has diſcovered, a meatus externus, which leads to the internal ear. The cod fiſh, and others of the ſame ſhape, have an organ of hearing ſomewhat ſimilar to the former; but inſtead of a ſoft ſubſtance contained in the bag, there is a hard cretaceous ſtone. In this kind of fiſh no meatus externus has been yet obſerved: And Dr Monro is inclined to think that they really have not one, from the conſideration that the common canal or veſtibule, where the three ſemicircular canals communicate, is ſeparated from the cavity of the cranium by a thin membrane only; that this cavity, in the greater number of fiſhes, contains a watery liquor in conſiderable quantity; and that, by the thinneſs of the cranium, the tremor excited by a ſonorous body may readily and eaſily be tranſmitted through the cranium to the water within it, and ſo to the ear.

The belly is covered on the inferior part with a black-coloured thin membrane reſembling our peritoneum. It is divided from the cheſt by a thin membranous partition, which has no muſcular appearance; ſo that we have now ſeen two different ſorts of animals that have no muſcular diaphragm.

293 Teeth, for what made.

Theſe creatures are not provided with *teeth* proper for breaking their aliment into ſmall morſels, as the food they uſe is generally ſmall fiſhes, or other animals that need no trituration in the mouth, but ſpontaneouſly and gradually diſſolve into a liquid chyle. Their teeth ſerve to graſp their prey, and hinder the creatures they have once catched from eſcaping again. For the ſame purpoſe, the internal cartilaginous baſis of the bronchi, and the two round bodies ſituated in the poſterior part of the jaws, have a great number of tenter-hooks fixed into them, in ſuch a manner as that any thing can eaſily get down, but is hindered from getting back. The water that is neceſſarily taken in along with their food in too great quantities to be received into their jaws in deglutition, paſſes betwixt the interſtices of the bronchi and the flap that covers them. The compreſſion of the water on the bronchi is of conſiderable uſe to the creature, as we ſhall explain by and by.

294 Digeſtion performed ſolely by a menſtruum.

The *gullet* in theſe creatures is very ſhort, and ſcarcely diſtinguiſhed from their ſtomach, ſeeing their food lies almoſt equally in both. The ſtomach is of an oblong figure. There are commonly found ſmall fiſhes in the ſtomach of large ones ſtill retaining their natural form; but when touched, they melt down into

Of Fiſhes.

into a jelly. From this, and the great quantity of liquors poured into their ſtomachs, we may conclude, that digeſtion is ſolely brought about in them by the diſſolving power of a menſtruum, and that no trituration happens here.

295 Inteſtina.

The *guts* in theſe animals are very ſhort, making only three turns; the leaſt of which ends in the common cloaca for the feces, urine, and ſemen, ſituated about the middle of the inferior part of their bodies.

297 Pancreas.

To what we call *pancreas*, ſome give the name of *inteſtinula cæca:* it conſiſts of a very great number of ſmall threads, like ſo many little worms, which all terminate at laſt in two larger canals that open into the firſt gut, and pour into it a viſcous liquor much about the place where the biliary ducts enter. That kind of pancreas formed of inteſtinula cæca is peculiar to a certain kind of fiſhes; for the cartilaginous, broad, and flat kind, as the ſkate, ſole, flounder, &c. have a pancreas reſembling that of the former claſs of animals. Their inteſtines are connected to the back bone by a membrane analogous to a meſentery.

298 Liver, gall-bladder, and their ducts.

Their *liver* is very large, of a whitiſh colour, and lies almoſt in the left ſide wholly, and contains a great deal of fat or oil.

The *gall-bladder* is ſituated a conſiderable way from their liver; and ſends out a canal, the cyſtic duct, which joins with the hepatic duct juſt at the entry into the gut. Some fibres being obſerved ſtretched from the liver to the gall-bladder, but without any apparent cavity, the bile was ſuppoſed not to be carried into the gall-bladder in the uſual way, but that it muſt either be ſecerned on the ſides of the ſac, or regurgitate into it from the canalis choledochus. It is certain, however, that hepato-cyſtic ducts exiſt in fiſh as well as in fowls. This, for example, is very obvious in the ſalmon, where large and diſtinct ducts run from the biliary ducts of the liver, and open into the gall bladder.

299 Spleen, its uſe drawn from analogy.

The *ſpleen* is placed near the back-bone, and at a place where it is ſubjected to an alternate preſſure from the conſtriction and dilatation of the air-bag, which is ſituated in the neighbourhood. Since, in all the different animals we have diſſected, we find the ſpleen attached to ſomewhat that may give it a conquaſſation; as in the human ſubject and quadrupeds, it is contiguous to the diaphragm; in fowls, it is placed betwixt the back-bone, the liver, and ſtomach; in fiſhes, it lies on the ſaccus aerius; and ſince we find it ſo well ſerved with blood veſſels, and all its blood returning into the liver; we muſt not conclude the ſpleen to be an *inutile pondus*, only to ſerve as a balance to the animal *pro æquilibrio*, but particularly deſigned for preparing the blood to the liver.

300 The heart has but one auricle and one ventricle.

The *heart* is of a triangular form, with its baſe downwards, and its apex uppermoſt; which ſituation it has becauſe of the *branchiæ*. It has but one *auricle* and one *ventricle*, becauſe they want lungs; and one great artery. The ſize of the auricle and that of the ventricle are much the ſame; the artery ſends out numberleſs branches to the branchiæ or gills. And what is rather curious, this artery, inſtead of ſupporting all parts as in the frog, is diſtributed entirely upon the gills; every branch terminating there, and becoming ſo extremely ſmall as at laſt to eſcape the naked eye.

Theſe creatures have a *membranous diaphragm*, which forms a ſac in which the heart is contained. It is very tenſe, and almoſt perpendicular to the vertebræ.

Of Fiſhes.

301 Diaphragm

The *branchiæ* lie in two large ſlits at each ſide of their heads, and ſeem to be all they have that bears any analogy to lungs. Their form is ſemicircular: they have a vaſt number of red fibrillæ ſtanding out on each ſide of them like a fringe, and very much reſemble the vane of a feather. Theſe branchiæ are perpetually ſubjected to an alternate motion and preſſure from the water; and we may here remark, that we have not found any red blood but in places ſubjected to this alternate preſſure. This obſervation will help us in explaining the action of the lungs upon the blood. Over theſe gills there is a large flap, allowing a communication externally; by which the water they are obliged to take into their mouths with their food finds an exit without paſſing into their ſtomach; it is owing to theſe flaps coming ſo far down that the heart is ſaid commonly to be ſituated in their heads. The blood is collected again from the gills by a vaſt number of ſmall veins, ſomewhat in the ſame manner as our pulmonary vein; but inſtead of going back to the heart a ſecond time, they immediately unite, and form an aorta deſcendens, without the intervention of an auricle and ventricle. Hence a young anatomiſt may be puzzled to find out the power by which the blood is propelled from the gills to the different parts of the body; but the difficulty will be conſiderably leſſened when we conſider the manner in which the blood is carried through the liver from the inteſtines in man and quadrupeds. The aorta in fiſhes ſends off branches which ſupply all the parts of the body excepting the gills. From the extremity of thoſe branches the blood returns to the heart ſomewhat in the ſame manner as in the former claſs of animals; only there are two inferior venæ cavæ, whereas the former has but one.

302 The branchiæ, their ſtructure and uſe.

Abſorbent Syſtem in Fiſhes. We ſhall take the haddock as a general example; for the other fiſhes, particularly thoſe of the ſame ſhape, will be found in general to agree with it.

303 Lymphatic veſſels.

On the middle of the belly of a haddock, immediately below the outer ſkin, a lymphatic veſſel runs upwards from the anus, and receives branches from the parietes of the belly, and from the fin below the anus; near the head this lymphatic paſſes between the two pectoral fins; and having got above them, it receives their lymphatics. It then goes under the ſymphyſis of the two bones which form the thorax, where it opens into a net-work of very large lymphatics, which lie cloſe to the pericardium, and almoſt entirely ſurrounds the heart. This net-work, beſides that part of it behind the heart, has a large lymphatic on each ſide, which receives lymphatics from the kidney, runs upon the bone of the thorax backwards; and when it has got as far as the middle of that bone, it ſends off a large branch from its inſide to join the thoracic duct. After detaching this branch, it is joined by the lymphatics of the thoracic fins, and ſoon after by a lymphatic which runs upon the ſide of the fiſh. It is formed of branches, which give it a beautiful penniform appearance.

Beſides theſe branches, there is another ſet deeper which

Of Fiſhes.

which accompanies the ribs. After the large lymphatic has been joined by the above-mentioned veſſels, it receives lymphatics from the gills, orbit, noſe, and mouth. A little below the orbit, another net-work appears, conſiſting in part of the veſſels above deſcribed, and of the thoracic duct. This net-work is very complete, ſome of its veſſels lie on each ſide of the muſcles of the gills; and from its internal part a trunk is ſent out, which terminates in the jugular vein.

304 The lacteals.

The lacteals run on each ſide of the meſenteric arteries, anaſtomoſing frequently acroſs theſe veſſels. The receptaculum into which they enter is very large, in proportion to them; and conſiſts at its lower part of two branches, of which one lies between the duodenum and ſtomach, and runs a little way upon the pancreas, receiving the lymphatics of the liver, pancreas, thoſe of the lower part of the ſtomach, and the lacteals from the greateſt part of the ſmall inteſtines. The other branch of the receptaculum receives the lymphatics from the reſt of the alimentary canal. The receptaculum formed by theſe two branches lies on the right ſide of the upper part of the ſtomach, and is joined by ſome lymphatics in that part, and alſo by ſome from the ſound and gall-bladder, which in this fiſh adheres to the receptaculum. This thoracic duct takes its riſe from the receptaculum, and lies on the right ſide of the œſophagus, receiving lymphatics from that part; and running up about half an inch, it divides into two ducts, one of which paſſes over the œſophagus to the left ſide, and the other goes ſtraight upon the right ſide, paſſes by the upper part of the kidney, from which it receives ſome ſmall branches, and ſoon afterwards is joined by a branch from the large lymphatic that lies above the bone of the thorax, as formerly mentioned: near this part it likewiſe ſends off a branch to join the duct of the oppoſite ſide; and then, a little higher, is joined by thoſe large lymphatics from the upper part of the gills, and from the fauces.

The thoracic duct, after being joined by theſe veſſels, communicates with the net-work near the orbit, where its lymph is mixed with that of the lymphatics from the poſterior part of the gills, and from the ſuperior fins, belly, &c. and then from this net-work a veſſel goes into the jugular vein juſt below the orbit. This laſt veſſel, which may be called the termination of the whole ſyſtem, is very ſmall in proportion to the net-work from which it riſes; and indeed the lymphatics of the part are ſo large, as to exceed by far the ſize of the ſanguiferous veſſels.

The thoracic duct from the left ſide, having paſſed under the gullet from the right, runs on the inſide of the vena cava of the left ſide, receives a branch from its fellow of the oppoſite ſide, and joins the large lymphatics which lie on the left ſide of the pericardium, and a part of thoſe which lie behind the heart; and afterwards makes, together with the lymphatics from the gills, upper fins, and ſide of the fiſh, a net-work, from which a veſſel paſſes into the jugular vein of this ſide. In a word, the lymphatics of the left ſide agree exactly with thoſe of the right ſide above deſcribed. Another part of the ſyſtem is deeper ſeated, lying between the roots of the ſpinal proceſſes of the back-bone. This part conſiſts of a large trunk that begins from the lower part of the fiſh, and as it aſcends receives branches from the dorſal fins and adjacent parts of the body. It goes up near the head, and ſends a branch to each thoracic duct near its origin.

Of Fiſhes.

305 Organs of generation.

The only *organs of generation* in this animal are two bags ſituated in the abdomen uniting near the podex. Theſe in the male are filled with a whitiſh firm ſubſtance called the *milt*, and in the female with an infinite number of little ova cluſtered together, of a reddiſh yellow colour, called the *roe*. Both theſe at ſpawning time we find very much diſtended; whereas at another time the male organs can ſcarce be diſtinguiſhed from the female; nor is there any proper inſtrument in the male for throwing the ſeed into the organs of the female, as in other creatures. We ſhall not take upon us to determine the way whereby the female ſperm is impregnated: but we find that the ſpawn of frogs conſiſts in the ſmall ſpecks wrapped up in a whitiſh glutinous liquor: theſe ſpecks are the rudiments of the young frogs, which are nouriſhed in that liquor till they are able to go in ſearch of their food. In the ſame way, the ova of fiſhes are thrown out and depoſited in the ſand, the male being for the moſt part ready to impregnate them, and they are incubated by the heat of the ſun. It is curious enough to remark with what care they ſeek for a proper place to depoſite their ova, by ſwimming to the ſhallow, where they can better enjoy the ſun's rays, and ſhun the large jaws of other fiſhes. The river-fiſhes, again ſpawn in ſome creek free from the hazard of the impetuous ſtream. But whether this mixture be brought about in fiſhes by a ſimple application of the genitals to each other, or if both of them throw out their liquors at the ſame time in one place, and thus bring about the deſired mixture, it is not eaſy to determine. Spallanzani has found, that the eggs of frogs, toads, and water newts, are not fecundated in the body of female; that the male emits his ſemen upon the ſpawn while it is flowing from the female; and that the fœtus pre-exiſts in the body of the female: but whether impregnation takes place in the ſame manner in fiſhes, he has not yet been able to determine, though he ſeems to think it probable. Theſe creatures are ſo ſhy, that we cannot eaſily get to obſerve their way of copulation, and are conſequently but little acquainted with their natural hiſtory. Frogs, it is very evident, do not copulate: at leaſt no farther than to allow both ſexes an opportunity of throwing their ſperm. Early in the ſpring the male is found for ſeveral days in cloſe contact upon the back of the female, with his fore legs round her body in ſuch a manner that makes it very difficult to ſeparate them, but there is no communication. At this time the female lays her ſpawn in ſome place that is moſt ſecure, while the male emits his ſperm upon the female ſpawn.

306 The air-bladder, and its uſes.

After raiſing up the black peritoneum in fiſhes, there comes in view an oblong white membranous bag, in which there is nothing contained but a quantity of elaſtic air. This is the *ſwimming-bladder*: it lies cloſe to the back-bone; and has a pretty ſtrong muſcular coat, whereby it can contract itſelf. By contracting this bag, and condenſing the air within it, they can make their bodies ſpecifically heavier than water, and ſo readily fall to the bottom; whereas the muſcular fibres ceaſing to act, the air is again dilated, and they become ſpecifically lighter than water, and ſo ſwim above.

Of Mollusca.

above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleaſure. Hence flounders, ſoles, raia or ſkate, and ſuch other fiſhes as want this ſac, are found always grovelling at the bottom of the water: it is owing to this that dead fiſhes (unleſs this membrane has been previouſly broke) are found ſwimming a-top, the muſcular fibres then ceaſing to act, and that with their bellies uppermoſt; for the back-bone cannot yield, and the diſtended ſac is protruded into the abdomen, and the back is conſequently heavieſt at its upper part, according to their poſture. There is here placed a glandular ſubſtance, containing a good quantity of red blood; and it is very probable that the air contained in the ſwimming-bladder is derived from this ſubſtance. From the anterior part of the bag go out two *proceſſes* or *appendices*, which, according to the gentlemen of the French academy, terminate in their fauces: in a variety of other fiſhes we find communications with ſome parts of the alimentary canal, particularly the œſophagus and ſtomach. The ſalmon has an opening from the fore end of the air-bag into the œſophagus, which is ſurrounded by a kind of muſcular fibres. The herring has a funnel-like paſſage leading from the bottom of the ſtomach into the air-bag; but it is not determined whether the air enters the air-bag by this opening, or comes out by it: the latter, however, ſeems to be the more probable opinion, as the glandular body is found in all fiſhes, whereas there are ſeveral without this paſſage of communication.

307 Its proceſſus, or communication with the ventriculus.

308 Ureters, veſica urinaria. Urethra.

At the ſuperior part of this bag there are other red-coloured bodies of a glandular nature, which are connected with the kindeys. From them the *ureters* go down to their inſertion in the *veſica urinaria*, which lies in the lower part of the abdomen; and the urethra is there produced, which terminates in the podex.

CHAP. VIII. OF MOLLUSCA.

IN theſe animals the muſcles or fleſhy fibres are white, and poſſeſſed of great irritability: they retain the power of motion even after being cut into ſmall pieces; and many parts of their bodies are capable of being reproduced after being ſeparated. Their external ſurface is always moiſt, as there commonly exudes from it a viſcous fluid. It is extremely ſenſible, and is furniſhed with organs called *tentacula*, which are capable of being lengthened out or contracted, ſo as to enable the animal to feel the better. It is uncertain whether or not theſe animals poſſeſs the ſenſation of ſmell, but if they do, the organ of this ſenſe is probably ſituated at the entrance of their pulmonary veſſels. Many of them have eyes, and ſome appear to be poſſeſſed of ears.

Their body is uſually provided with, or at leaſt partly enveloped by, a membranaceous covering. In many this covering is more or leſs cruſtaceous, produced from a calcareous juice exuding from the ſurface of the animal, and forming a ſhell compoſed of one or more pieces or valves. The body of the animal is attached to this ſhell by muſcles, which enable it to retire within the valves, or to ſhut theſe together. Theſe muſcles change their place, ſeparating from one part, and growing to another, ſo as always to preſerve the ſame relative poſition, notwithſtanding the unequal growth of the ſhell. Moſt of theſe animals are inhabitants of the ſea: ſome of them reſide in freſh water; and ſome of them reſide entirely on land.

The molluſca may be divided into three orders.

1. The *cephalopoda*, ſo called becauſe their feet, or at leaſt the organs with which they ſeize their prey, are ſituated in the head. Their body is in the form of a ſack, which, when the external covering is removed, exhibits the appearance of a compact network of fleſhy fibres in three diſtinct layers. Of theſe the outermoſt are placed lengthwiſe, the middle in a croſs direction, and the innermoſt in no regular order. By the various actions of theſe fibres the ſack of the animal is lengthened, contracted, bent, or twiſted in various directions.

Theſe animals are furniſhed below the ſkin of the back with a ſolid body, which is for the moſt part exceedingly elaſtic and tranſparent, and is ſometimes furrowed longitudinally. In all the ſpecies of ſepia or cuttle-fiſh, except the *S. octopus*, which wants it, this body is a ſort of bone, formed of thin concentric plates, ſeparated by ſmall columns, arranged ſo as to form a quincunx. It is oval and lenticular, or thickeſt in the middle.

The feet in this order are eight in number, and form a circle round the mouth; they end in ſuckers, by which the animal fixes itſelf to any ſubſtance, and are furniſhed with numerous muſcles, by which they are moved in every direction. The other ſpecies of ſepia (except the *octopus* and the calmar), have, beſides theſe eight feet, two others which are longer and ſmaller.

They have three hearts; their reſpiration is carried on in the water by means of branchiæ; they have very large eyes, and organs of hearing ſituated within the head; their ſtomach is very fleſhy, ſo as to reſemble the gizzard of a fowl, and they have a very large liver. They are alſo furniſhed with a peculiar gland for the purpoſe of ſecreting an inky fluid, which, when they wiſh to conceal themſelves, they throw out, and thus obſcure the water round them.

2. The *gaſteropoda*, which have upon the belly a muſcular plane, by the contractions of which they creep upon the belly, as may be obſerved in the ſnail; and hence their name. They have no heart; their branchiæ are ſituated ſometimes within the body, ſometimes they ſurround the body, and are often on the back; they are naked in the firſt caſe, and in the others are covered with a kind of lid, and are of various forms. The common trunk of the blood veſſels is ſubdivided for the purpoſe of diſtributing to the branchiæ the blood which has circulated through the body. The moſt of this order are hermaphrodite, but require reciprocal copulation. There is almoſt always ſituated near the matrix a bag, containing a fluid, which.

Of Cruſtacea, &c.

which is generally thought to be the ſubſtance employed by the ancients in the dying of purple; the uſe of this fluid in theſe animals is unknown. The inteſtines conſiſt of a ſtomach more or leſs fleſhy, and an alimentary canal; they have a very large liver, and a conſiderable number of them are provided with brain and nerves.

3. The *acephala*, ſo called becauſe they have no heads. Theſe animals are commonly contained within two ſhells, and have their body entirely enveloped in a membranaceous covering, which opens either in one part or two, and to this covering, eſpecially at that part where the water enters, are attached the tentacula, the only external organ of ſenſation which the animals of this order appear to poſſeſs. Their organs of reſpiration are compoſed of large vaſcular laminæ, ſituated at the two ſides, immediately beneath the covering; their heart is placed towards the back. The ſtomach and great part of the inteſtinal canal paſſes through the liver. Their mouth, which opens immediately into the ſtomach, is placed between the branchiæ, at the orifice oppoſite to that by which the water enters, and round it are placed four triangular bodies which appear to be tentacula. The brain, where it is preſent, is placed between the branchiæ and the inteſtinal canal. They appear to be all hermaphrodites, and do not require copulation.

Of Cruſtacea, &c.

CHAP. IX. OF THE CRUSTACEA.

THE animals which compoſe this order have commonly been ranked among the inſects, but we have thought it better to ſeparate them, as they are poſſeſſed of character by which they are ſufficiently diſtinguiſhed. They have the body enveloped in a ſort of armour compoſed of ſeveral pieces or ſcales, and are uſually provided with a great number of jointed limbs.

The head in theſe animals is immoveable, their principal motions being confined to the tail and feet. The tail forms a conſiderable portion of the animal, and is furniſhed with very large and ſtrong muſcles by the action of which the animal is enabled to leap and ſwim with great celerity.

Their feet are of different forms in the ſeveral ſpecies, and alſo vary in number, and in ſome ſpecies anſwer ſeveral very different purpoſes. What in theſe animals is analogous to the brain, is a long knotted nervous cord, from the knots of which the nerves are diſtributed to the body. Their eyes are hard and complex, and are uſually placed on a ſort of footſtalks, which enable them to move with great facility in all directions. They are furniſhed with feelers and antennæ as we ſhall ſee in inſects. Their organs of hearing are very imperfect. They have a heart, and both an arterial and a veinous ſyſtem of blood veſſels. They breathe by means of branchiæ. Their jaws are generally numerous, very ſtrong, and ſituated in a tranſverſe direction. They are of diſtinct ſexes, and the male has two penes.

CHAP. X. OF INSECTS.

AS under ENTOMOLOGY, now become a ſtudy ſo faſhionable, and which has been carried to a high degree of perfection, we propoſe to give a particular account of the ſtructure and economy of inſects, we ſhall at preſent only offer a ſhort ſketch of their anatomy.

Inſects differ from the former claſſes, by their bodies being covered with a hard cruſt or ſcale, by their having feelers or antennæ ariſing from their head, and many of them breathing the air through lateral pores. As to the ſhape of their bodies, though it ſomewhat differs from that of birds, being in general not ſo ſharp before to cut and make way through the air, yet it is well adapted to their manner of life. The baſe of their bodies is not formed of bone, as in many other animals, but the hard external covering ſerves them for ſkin and bone at the ſame time. Their feelers, beſide the uſe of cleaning their eyes, are a guard to them in their walk or flight. Their legs and wings are well fitted for their intended ſervice; but the latter vary ſo much in different inſects, that from them naturaliſts have given names to the ſeveral orders of the claſs. As, firſt, the

Coleoptera, or beetle tribe, which have a cruſtaceous elytra or ſhell, that ſhuts together, and forms a longitudinal ſuture down their back.

Hæmiptera—as in cimex, cockroach, bug, &c. which have the upper wings half cruſtaceous and half membranaceous; not divided by a longitudinal ſuture, but incumbent on each other.

Lepidoptera—as the butterfly, have four wings, covered with fine ſcales in the form of powder.

Neuroptera—as the dragon-fly, ſpring-fly, &c. have four membranaceous tranſparent naked wings, generally reticulated.

Hymenoptera—as waſps, bees, &c. have four membranaceous wings, and a tail furniſhed with a ſting.

Diptera—as the common houſe-fly, have only two wings.

Aptera—as the ſcorpion, ſpider, &c. have no wings.

The ſtructure of the eye in many inſects is a moſt curious piece of mechaniſm. The outer part is remarkably hard, to guard againſt injuries; and has commonly a reticular appearance, or the whole may be looked upon as an aſſemblage of ſmaller eyes; but whether they ſee objects multiplied before them, has not yet been determined.

Linnæus,

Of Worms, &c.

Linnæus, and ſeveral others following him, deny the exiſtence of a brain in theſe creatures.

Their ear has been lately diſcovered to be placed at the root of their antennæ or feelers, and can be diſtinctly ſeen in ſome of the larger kinds.

They have a ſtomach, and other organs of digeſtion.

They have a heart and blood veſſels, and circulation is carried on in them ſomewhat as in the former claſs; but the blood is without red globules; or, as naturaliſts ſpeak, is colourleſs. In ſome of the larger kind, when a piece of the ſhell is broken, the pulſation of the heart is ſeen diſtinctly, and that ſometimes for ſeveral hours after it has been laid bare.

Lungs. The exiſtence of theſe by ſome has been denied. But late experiments and obſervations ſhow that no ſpecies want them, or at leaſt ſomething ſimilar to them; and in many inſects, they are larger in proportion than in other animals; in moſt of them they lie on or near the ſurface of their body; and ſend out lateral pores or tracheæ, by which, if the animal is beſmeared with oil, it is inſtantly ſuffocated.

Generation. The ſame difference in ſex exiſts in inſects as in other animals, and they even appear more diſpoſed to increaſe their ſpecies; many of them, when become perfect, ſeeming to be created for no other purpoſe but to propagate their like. Thus the ſilkworm, when it arrives at its perfect or moth ſtate, is incapable of eating, and can hardly fly; it endeavours only to propagate its ſpecies: after which the male immediately dies, and ſo does the female as ſoon as ſhe has depoſited her eggs.

Beſides thoſe of the male and female, a third ſex exiſts in ſome inſects, which we call *neuter*. As theſe have not the diſtinguiſhing parts of either ſex, they may be conſidered as eunuchs or infertile. We know of no inſtance of this kind in any other claſs of animals; and it is only found among thoſe inſects, which form themſelves into ſocieties, as bees, waſps, and ants: and here theſe eunuchs are real ſlaves, as on them lies the whole buſineſs of the economy. No hermaphrodites have as yet been diſcovered among inſects.

Many have imagined that the generality of inſects were merely the production of putrefaction, becauſe they have been obſerved to ariſe from putrified ſubſtances; but a contrary opinion is now more generally adopted; and it is pretty certain, that if putrid bodies be ſhut up in a cloſe veſſel, no inſects are ever generated unleſs their ova have been originally depoſited there. They are oviparous animals, and lay their eggs in places moſt convenient for the nouriſhment of their young; ſome in water, others in fleſh; ſome in fruit and leaves: while others make neſts in the earth or in wood, and ſometimes even in the hardeſt ſtone. The eggs of all inſects firſt become (*larva*) caterpillar, or maggot; from which they are changed into (*pupa*) chryſalis or aurelia, ſo named from their being incloſed in a caſe; and theſe dying, or ſeeming to die, the (*imago*) fly, or butterfly, or perfect ſtate, ſucceeds; and during each of theſe changes their appearance differs wonderfully.

CHAP. XI. OF WORMS.

THE worms form a claſs in the ſyſtem of Linnè, comprehending the molluſca, and the next aſſemblage of which we are to ſpeak, viz. the *Zoophytes*, beſides the worms properly ſo called.

We have ſeen that inſects in one part of their exiſtence appear in the ſtate of larvæ, or organized beings reſembling the common caterpillar or larvæ of the butterfly. In ſome of theſe the organs of motion are very perfect, and they are furniſhed with regular articulated members, provided with ſolid parts. From theſe there is a gradation to the worms, which have no feet, but move forwards either by means of briſtles or hairs fixed in the ſurface of their bodies, as in the common earth-worm and the lumbricus of the inteſtines, or they are provided at each extremity with a circular ſucker, as in the leech, by which they faſten one end of their body to the ſurface on which they are to move, and proceed forward by the contractions of the muſcular rings of which their body is chiefly compoſed. Within their body is found a white nervous cord. Thoſe which inhabit the water carry on reſpiration by means of membranaceous branchiæ; in others there are pores or ſtigmata, analogous to thet racheæ of inſects; ſome of them are furniſhed with feelers. Of the moſt important of this claſs, the worms which inhabit the inteſtines of other animals, we propoſe to give a particular account in a future article.

CHAP. XII. OF THE ZOOPHYTES.

THE zoophytes form the loweſt claſs of animated nature; and many of them bear ſo cloſe a reſemblance to plants and minerals, that they would ſeem to belong rather to theſe kingdoms than to that in which modern naturaliſts have agreed to arrange them. The molluſca poſſeſs organs of digeſtion, ſenſation, circulation, and reſpiration, and are furniſhed with viſcera not very unlike thoſe of the vertebrale animals. Inſects form the next degree, which have no diſtinct circulation, and very imperfect reſpiratory organs; but in them we ſee ſomething like a brain, and well marked organs of ſenſation. We obſerve the ſame in many worms, in moſt of which they probably exiſt. But in the zoophytes there is no appearance of circulation; there are no nerves, and no ſenſorium or common centre of ſenſation; there is but little appearance

Of Zoophytes.

of reſpiration, and often ſcarcely any thing which may be termed an organ of digeſtion. Every point of their body ſeems independently to attract nouriſhment, and independently to poſſeſs the faculty of ſenſation; hence the extreme degree of irritability, the great power of vitality, and of reproduction, which we find in theſe animals. For propagation, they need only be cut in pieces, and do not require a difference of ſex or organs of generation to preſerve the ſpecies: They may be divided into two orders; the firſt of which, as bearing a reſemblance to both animals and plants, may be properly called *zoophytes*; and the laſt, as reſembling both plants and ſtones, may be called *lithophytes*. See LITHOPHYTES and ZOOPHYTES. We have in this comparative view of organized beings, purpoſely avoided giving any deſcription of the anatomy of plants. This would form a neceſſary part of a complete ſyſtem of comparative anatomy; but does not properly fall to be conſidered in a ſketch of this kind. It will be fully detailed in its proper place. See BOTANY.

Of Zoophytes.

INDEX.

Foot,

ANA

Anattom, Anaxagoras.

ANATTOM, in *Geography*, the moſt ſoutherly iſland of the New Hebrides, in the ſouthern Pacific ocean. S. Lat. 20. 3. E. Long. 170. 4.

ANAXAGORAS, an eminent philoſopher of antiquity, was born in the firſt year of the 70th Olympiad, or 500 years before Chriſt. In conſequence of the eminent talents of this philoſopher he obtained the appellation of *Mind*. Pythagoras repreſents philoſophers as mere ſpectators of the affairs of human life, and who, neglecting all other purſuits, devote their exertions to the inveſtigation of nature, and the ſearch after wiſdom. According to this definition of a philoſopher, Anaxagoras ſtrictly merited the honourable appellation; for though he was of a reſpectable deſcent, and poſſeſſed of a conſiderable fortune, yet he relinquiſhed both, ſo that, in the language of Cicero, he might "give himſelf wholly to the divine pleaſures of learning and inquiry." The ſons of wealth, and the lovers of money will probably unite in the ridicule caſt upon him by the age in which he lived, even "that he philoſophized very fooliſhly;" but the mind of Anaxagoras diſregarded their ſcorn, and perſevered in his plan; and although the reader may heſitate in giving applauſe to the man who deprives ſociety of the benefits of his ſocial talent, yet the eager thirſt of his mind after knowledge is entitled to becoming credit.

Leaving his lands to be cultivated and enjoyed by his friends, Anaxagoras placed himſelf under the care of Anaximenes the Mileſian. About the age of twenty he went to Athens and entered upon the ſtudy of philoſophy, where he continued 30 years. Some ſuppoſe that he was the firſt diſciple of the Ionian ſchool, founded by Thales a teacher of philoſophy in Athens. When Anaxagoras aſſumed the character of a public teacher of philoſophy, he quickly roſe to high eminence, and produced many famous ſcholars, among whom were Euripides the tragedian, Pericles the ſtateſman, and the renowned Socrates. This philoſopher contented himſelf with ſerving the republic in his own ſtation, without interfering in any of the public affairs of the ſtate. Both by the principles of wiſdom which he inſpired into the minds of the Athenian youth, and alſo by his daily advice in the moſt important affairs, particularly in the caſe of Pericles, he was of ſingular ſervice to his country. But neither the friendſhip of the famous Pericles, nor his own general diſintereſtedneſs of character, nor his immenſe ſtores of learning, could ward off the ſhafts of perſecution. Cleo accuſed him of impiety, and the introduction of new opinions concerning the gods, becauſe he taught that the ſun was a burning maſs of ſtone, or an inanimate fiery ſubſtance. By this opinion he was ſaid to rob the ſun of his divinity, becauſe in the popular opinion he was deemed Apollo, one of the greateſt deities. But although Cleo made religion the avowed cauſe of the accuſation of Anaxagoras, it is highly probable that civil cauſes chiefly operated towards his condemnation. It is, however, abundantly evident, that he did not heſitate to expoſe the vulgar ſuperſtitions on ſeveral occaſions; but the evidence is not ſufficient which pretends to prove that he was condemned for teaching the doctrine of a ſupreme intelligence, the creator of the world. His judges condemned him to death; but Pericles appearing in his defence, the ſentence was changed from that of death to baniſhment and a pecuniary fine.

Anaxagoras.

It is reported, that when one of his friends regretted his exile, he replied: "It is not I who have loſt the Athenians, but the Athenians who have loſt me." Whilſt a ſmall degree of vanity appears in this ſentiment, it nevertheleſs informs poſterity with what calmneſs of mind he endured the changes of fortune. But other ſayings tend more fully to unfold his character. During the courſe of a lecture one day, he was interrupted with the unpleaſant news of the death of a ſon: he calmly replied, "I knew that I begat him mortal." When he received the ſentence of condemnation, he conſoled himſelf by this conſideration: "Nature,

Anaxagoras.

ture, (ſaid he) long ago pronounced the ſame ſentence againſt me."

Expelled from Athens, Anaxagoras paſſed the remainder of his days at Lampſacus, teaching philoſophy in the ſchool of his deceaſed maſter Anaximenes, until the infirmities of nature terminated his uſeful life in the year 428 before Chriſt. Before his death his friends inquired if they ſhould carry his bones to his native city: he returned for anſwer, that this was quite "unneceſſary, the way to the regions below is everywhere alike open." When the magiſtrates of Lampſacus ſent a meſſage to him before his death, requeſting to know in what manner he wiſhed them to honour his memory, he ſaid, "Only let the day of my death be annually kept as a holiday by the boys in the ſchools of Lampſacus." This was complied with, and the cuſtom remained even in the time of Diogenes Laërtius. This great philoſopher died at the advanced age of 72, and the inhabitants of Lampſacus erected a tomb upon his remains, with the following epitaph.

Ενθαδε, πλειστον αληθειας επι τειρμα περησας
Ουρανιον κοσμυ, κειται Αναξαγορας.

This tomb great Anaxagoras confines,
Whoſe mind explor'd the paths of heavenly truth.

It is alſo reported, that there was an altar erected to his memory, upon which were inſcribed the words *Truth* and *Mind*.

Many fabulous reports are narrated concerning this philoſopher, of which it appears unneceſſary to take any particular notice; and Diogenes Laërtius has collected with little care and judgment, after an interval of more than 700 years, the remains concerning this philoſopher, which were ſcattered through various writings. With no ſmall degree of diffidence then the pen muſt record a ſummary of his doctrine collected from ſuch unſatisfactory information, eſpecially ſince his biographer himſelf has given full proof both of his ignorance and negligence; and as the whole narrative abounds with chronological contradictions and other inconſiſtencies.

It appears, however, that in the midſt of ſome extravagant conceptions Anaxagoras held opinions which indicate a conſiderable acquaintance with the laws of nature. His idea of the heavens appears to have been, that they were a ſolid vault, originally compoſed of ſtones, elevated from the earth by the violent motion of the ambient æther, inflamed by its heat, and by the rapid circular motion of the heavens fixed in their reſpective places. The teſtimonies of ſeveral writers, among which is that of the reſpectable Xenophon, unite in proving that he conſidered the ſun to be a large fiery ſtone; and Xenophon introduces Socrates as refuting that doctrine, and delivering an unfavourable opinion concerning his other writings. From his perceiving that the rainbow is the effect of the reflection of the ſolar rays from a dark cloud, and that wind is produced by the rarefaction, and ſound by the percuſſion, of the air, Anaxagoras ſeems to have paid conſiderable attention to the phenomena of nature. He muſt have had ſome knowledge of the nature of the atmoſphere, and the doctrine of eclipſes, if, according to report, he could predict a fall of rain and darkneſs at noonday.

Anaxarchus.

Our information is more correct concerning his opinions of the principles of nature and the origin of things. He imagined that in nature there are as many kinds of principles as there are ſpecies of compound bodies, and that the peculiar form of the primary particles of which any body is compoſed, is the ſame with the quality of the compound body itſelf. For inſtance, he ſuppoſed that a piece of gold is compoſed of ſmall particles which are themſelves gold, and a bone of a great number of ſmall bones; thus, according to Anaxagoras, bodies of every kind are generated from ſimilar particles. That part of his ſyſtem is more agreeable to reaſon which explains the active principle in nature. According to Diogenes Laërtius, Anaxagoras taught, that "the univerſe conſiſts of ſmall bodies compoſed of ſimilar parts, and that mind is the beginning of motion." "He was the firſt, (ſays the ſame writer), who ſuperadded mind to matter, opening his work in this pleaſing and ſublime language: 'All things were confuſed; then came mind, and diſpoſed them in order." Plato informs us that this philoſopher taught the exiſtence of a diſpoſing mind, the cauſe of all things. Anaxagoras, according to Ariſtotle, taught that mind was "the cauſe of the world, and of all order; and that while all things elſe are compounded, this alone is pure and unmixed; and that "he aſcribes to this principle two powers, to know, and to move, ſaying, that mind put the univerſe into motion." Cicero expreſsly aſſerts, that Anaxagoras was the firſt who taught, that "the arrangement and order of all things was contrived and accompliſhed by the underſtanding and power of an infinite mind." *(Gen. Biog.)*

ANAXARCHUS, a Grecian philoſopher, who lived under Philip of Macedon and Alexander, was born in Abdera, and belonged to the ſect generally known by the name of the Eleatic. He is ſaid to have been conducted in the progreſs of his early ſtudies by the ſkilful hands of Diomenes of Smyrna and Metrodorus of Chios. He had the honour to be a companion of Alexander; and a few anecdotes tranſmitted to poſterity concerning him render it evident that he treated him with the uſual freedom of a friend. This philoſopher candidly checked the vain glory of Alexander (when elated with pride he aſpired to the honours of divinity), by pointing to his finger when it bled, ſaying, "See the blood of a mortal, not of a god." It is likewiſe reported, that on another occaſion, while indulging immoderately at a banquet, he repeated a verſe from Euripides, reminding Alexander of his mortality. It is, however, to be regretted, that the fidelity of the philoſopher was wanting at the time when the mind of Alexander was tortured with remorſe at having ſlain his friend Clitus; for it is reported that he, on that occaſion, endeavoured to ſoothe the agitated mind of Alexander, by ſaying, that "kings, like the gods, could do no wrong." It is reported that Nicocreon, king of Cyprus, expoſed him to the torture of being pounded in a mortar, and that he endured this torture with incredible patience; but as the ſame fact is reported of Zeno the Eleatic, there is reaſon to ſuppoſe that it is fabulous; and it may be added, that this narrative is inconſiſtent with the general character of Anaxarchus, who, on account of his eaſy and peaceable life, received the appellation of "The Fortunate." *(Gen. Biog.)*

ANAXIMANDER,

Anaximander, Anaximenes.

ANAXIMANDER, a famous Greek philoſopher, born at Miletus in the 42d Olympiad, in the time of Polycrates tyrant of Samos. He was the firſt who publicly taught philoſophy, and wrote upon philoſophical ſubjects. He carried his reſearches into nature very far for the time in which he lived. It is ſaid, that he diſcovered the obliquity of the zodiac, was the firſt who publiſhed a geographical table, invented the gnomon, and ſet up the firſt ſun-dial in an open place at Lacedæmon. He taught, that infinity of things was the principal and univerſal element; that this infinite always preſerved its unity, but that its parts underwent changes; that all things came from it; and that all were about to return into it. According to all appearance, he meant by this obſcure and indeterminate principle the chaos of the other philoſophers. He aſſerted, that there is an infinity of worlds; that the ſtars are compoſed of air and fire, which are carried in their ſpheres, and that theſe ſpheres are gods; and that the earth is placed in the midſt of the univerſe, as in a common centre. He added, that infinite worlds were the product of infinity, and that corruption proceeded from ſeparation.

ANAXIMENES, born at Miletus, an eminent Greek philoſopher; friend, ſcholar, and ſucceſſor of Anaximander. He diffuſed ſome degree of light upon the obſcurity of his maſter's ſyſtem. He made the firſt principle of things to conſiſt in the air, which he conſidered as immenſe or infinite, and to which he aſcribed a perpetual motion. He aſſerted, that all things which proceeded from it were definite and circumſcribed; and that this air, therefore, was God, ſince the divine power reſided in it and agitated it. Coldneſs and moiſture, heat and motion, rendered it viſible, and dreſſed it in different forms, according to the different degrees of its condenſation. All the elements thus proceed from heat and cold. The earth was, in his opinion, one continued flat ſurface.

Anaximenes, a Greek hiſtorian and rhetorician, was born at Lampſacus about 580 years before Chriſt. Diogenes, the Cynic, laid the principles of erudition in the mind of this great man. Some writers aſcribe to him "A Treatiſe on the principles of Rhetoric," which bears the name of Ariſtotle; and it is reported that Philip of Macedon invited him to his court to inſtruct his ſon Alexander in that ſcience. Alexander was attended in his expedition againſt Perſia by this learned philoſopher and many other eminent men. The inhabitants of the city, which had the honour to give him birth, having eſpouſed the cauſe of Darius, upon Alexander's conquering them, they entreated their countryman Anaximenes to intercede with Alexander in their behalf. He humanely undertook to interpoſe for them; but the king being informed of his intention, as ſoon as he came into his preſence, ſwore that he would grant him nothing that he ſhould aſk. He inſtantly replied, "I entreat you to deſtroy Lampſacus, to burn its temples, and to ſell the inhabitants for ſlaves." Alexander, ſtruck with this dexterous reply, kept his word, and ſaved the city.

Another pleaſing anecdote is related of Anaximenes. For ſome unrecorded cauſe, he being diſpleaſed with the hiſtorian Theopompus, in order to revenge himſelf, wrote a ſevere ſatire againſt the Spartans and Thebans, in a ſtile exactly ſimilar to that of Theopompus, and under his name addreſſed it to the Athenians. Theopompus was generally believed to be the author of that work, and conſequently it brought upon him the odium and indignation of all Greece. Whilſt this action afforded an illuſtrious proof of the ſtrength of his talents, it afforded an equal evidence of the quality of his heart. The hiſtory of Philip, of Alexander, and likewiſe twelve books on the early hiſtory of Greece, were the productions of his pen, but are now unfortunately loſt. *(Gen. Biog.)*

Anaximandrians ‖ Anceſtors.

ANAXIMANDRIANS, in *the Hiſtory of Philoſophy*, the followers of Anaximander, the moſt ancient of the philoſophical atheiſts who admitted of no other ſubſtance in nature but matter.

ANAZARBUS (Pliny), Anazarba (Stephanus); a town of Cilicia, on the river Pyramus, the birthplace of Dioſcorides, and of the poet Oppian. It was ſometimes called *Cæſarea*, in honour either of Auguſtus or of Tiberius. The inhabitants are called *Anazarbeni* (Pliny), and on coins *Anazarbeis* after the Greek idiom. It was deſtroyed by a dreadful earthquake in the year 525, along with ſeveral other important cities: but they were all repaired at a vaſt expence by the emperor Juſtin; who was ſo much affected with their misfortune, that, putting off the diadem and purple, he appeared for ſeveral days in ſackcloth.

ANBERTKEND, in the eaſtern language, a celebrated book of the Brachmans, wherein the Indian philoſophy and religion are contained. The word in its literal ſenſe denotes the ciſtern wherein is the water of life. The anbertkend is divided into 50 beths or diſcourſes, each of which conſiſts of 10 chapters. It has been tranſlated from the original Indian into Arabic, under the title of *Morat al Maani*, q. d. "the marrow of intelligence."

ANCARANO, a town of Italy, in the marquiſate of Ancona. E. Long. 14. 54. N. Lat. 42. 48.

ANCASTER, a town of Lincolnſhire, ſituated in W. Long. 30. N. Lat. 52. 30. It gives title of duke to the noble family of Bertie.

ANCENIS, a town of France, in the province of Brittany. W. Long. 1. 9. N. Lat. 47. 20.

ANCESTORS, thoſe from whom a perſon is deſcended in a ſtraight line. The word is derived from the Latin *anceſſor*, contracted from *anteceſſor*, q. d. "goer before."

Moſt nations have paid honours to their anceſtors. It was properly the departed ſouls of their forefathers that the Romans worſhipped under the denominations of *lares*, *lemures*, and *houſehold gods*. Hence the ancient tombs were a kind of temples, or rather altars, whereon oblations were made by the kindred of the deceaſed.

The Ruſſians have ſtill their anniverſary feaſts in memory of their anceſtors, which they call *roditoli ſabot*, q. d. "kinsfolk's ſabbath;" wherein they make formal viſits to the dead in their graves, and carry them proviſions, eatables, and preſents of divers other kinds. They interrogate them, with loud lamentable cries, What they are doing? How they ſpend their time? What it is they want? and the like.

The Quojas, a people of Africa, offer ſacrifices of rice and wine to their anceſtors before ever they undertake any conſiderable action. The anniverſaries of their

Anceſtors. their deaths are always kept by their families with great ſolemnity. The king invokes the ſoul of his father and mother to make trade flouriſh and the chaſe ſucceed.

The Chineſe ſeem to have diſtinguiſhed themſelves above all other nations in the veneration they bear their anceſtors. By the laws of Confucius, part of the duty which children owe their parents conſiſts in worſhipping them when dead. This ſervice, which makes a conſiderable part of the natural religion of the Chineſe, is ſaid to have been inſtituted by the emperor Kun, the fifth in order from the foundation of that ancient empire. Bibl. Un. tom. vii. The Chineſe have both a ſolemn and ordinary worſhip which they pay their anceſtors. The former is held regularly twice a year, viz. in ſpring and autumn, with much pomp. A perſon who was preſent at it gives the following account of the ceremonies on that occaſion: The ſacrifices were made in a chapel well adorned, where there were ſix altars furniſhed with cenſers, tapers, and flowers. There were three miniſters, and behind them two young acolites. The three former went with a profound ſilence, and frequent genuflexions, towards the five altars, pouring out wine: afterwards they drew near to the ſixth, and when they came to the foot of the altar, half bowed down, they ſaid their prayers with a low voice. That being finiſhed, the three miniſters went to the altar; the officiating prieſt took up a veſſel full of wine, and drank; then he lifted up the head of a deer or goat; after which, taking fire from the altar, they all lighted a bit of paper; and the miniſter of the ceremonies turning towards the people, ſaid with a loud voice, That he gave them thanks in the name of their anceſtors for having ſo well honoured them; and in recompenſe he promiſed them, on their part, a plentiful harveſt, a fruitful iſſue, good health, and long life, and all thoſe advantages that are moſt pleaſing to men.

The Chineſe gave their anceſtors another ſimpler and more private worſhip. To this end they have in their houſes a niche or hollow place, where they put the names of their deceaſed fathers, and make prayers and offerings of perfumes and ſpices to them at certain times, with bowing, &c. They do the like at their tombs.

The Jews ſettled in China are ſaid to worſhip their anceſtors like the heathens, and with the ſame ceremonies, except that they offer not ſwines fleſh. Near their ſynagogue they have a hall, or court of anceſtors, wherein are niches for Abraham, Iſaac, &c. The Jeſuits alſo conformed, and were permitted by their general to conform to this and many other ſuperſtitious cuſtoms of the Chineſe.

There is one peculiarity of another kind, wherein the Chineſe ſhow their regard for their anceſtors; in proportion as any of their deſcendants are preferred to a higher degree or dignity, their dead anceſtors are at the ſame time preferred and ennobled with them. The kings Ven Van, Veu Van, and Cheu Cum, who were deſcended from vaſſal kings, when they mounted the imperial throne, raiſed their anceſtors from the vaſſal or depending ſtate wherein theſe had lived to the dignity of emperors; ſo that the ſame honours were for the future rendered them as if they had been emperors of China. The ſame example was followed by the ſubſequent kings, and now obtains among the grandees and literati: all now worſhip their anceſtors, according to the rank which they themſelves hold in the world. If the ſon be a mandarin, and the father only a doctor, the latter is buried as a doctor, but ſacrificed to as a mandarin. The like holds in degradations, where the condition of the fathers is that of their ſons. Anchilops ‖ Anchor.

ANCHILOPS, *αγκυλη, contraction*, and *ωψ, eye*; in *Medicine*, denotes an abſceſs, or collection of matter, between the great angle of the eye and the noſe. If ſuffered to remain too long, or unſkilfully managed, it degenerates, the ſtagnating humours corrupt, and an ulcer is produced. When the tumor is broke, and the tears flow involuntarily, whilſt the os lachrymale is not carious, it is an *ægylops*; but when the ulcer is of a long ſtanding, deep, fetid, and the os lachrymale becomes carious, it is a *fiſtula*. The cure is by reſtriction and exciſion, tying it at the root on the glandula lachrymalis, and, when ready, cutting it off. See SURGERY, *Index*.

ANCHISES, in *Fabulous Hiſtory*, a Trojan prince, deſcended from Dardanus, and the ſon of Capys. Venus made love to him in the form of a beautiful nymph; and bore him Æneas, the hero of Virgil's Æneid.

ANCHOR (*anchora*, Lat. from *αγκυρα*, Greek), a heavy, ſtrong, crooked inſtrument of iron, dropped from a ſhip into the bottom of the water, to retain her in a convenient ſtation in a harbour, road, or river.

The moſt ancient anchors are ſaid to have been of ſtone; and ſometimes of wood, to which a great quantity of lead was uſually fixed. In ſome places, baſkets full of ſtones, and ſacks filled with ſand, were employed for the ſame uſe. All theſe were let down by cords into the ſea, and by their weight ſtayed the courſe of the ſhip. Afterwards they were compoſed of iron, and furniſhed with teeth, which, being faſtened to the bottom of the ſea, preſerved the veſſel immoveable; whence *οδοντης* and *dentes* are frequently taken for anchors in the Greek and Latin poets. At firſt there was only one tooth, whence anchors were called *πετροσομοι*; but, in a ſhort time, the ſecond was added by Eupalamus, or Anacharſis the Scythian philoſopher. The anchors with two teeth were called *αμφιδολοι* or *αμφισομοι*; and from ancient monuments appear to have been much the ſame with thoſe uſed in our days, only the tranſverſe piece of wood upon their handles (the ſtock) is wanting in all of them. Every ſhip had ſeveral anchors; one of which, ſurpaſſing all the reſt in bigneſs and ſtrength, was peculiarly termed *ιερα* or *ſacra*, and was never uſed but in extreme danger; whence *ſacram anchoram ſolvere*, is proverbially applied to ſuch as are forced to their laſt refuge.

The anchors now made are contrived ſo as to ſink into the ground as ſoon as they reach it, and to hold a great ſtrain before they can be looſened or diſlodged from their ſtation. They are compoſed of a ſhank, a ſtock, a ring, and two arms with their flukes. The ſtock, which is a long piece of timber fixed acroſs the ſhank, ſerves to guide the flukes in a direction perpendicular to the ſurface of the ground; ſo that one of them ſinks into it by its own weight as ſoon as it falls, and is ſtill preſerved ſteadily in that poſition by the

ſtock,

Anchor. ſtock, which, together with the ſhank, lies flat on the bottom. In this ſituation it muſt neceſſarily ſuſtain a great effort before it can be dragged through the earth horizontally. Indeed this can only be effected by the violence of the wind or tide, or both of them, ſometimes increaſed by the turbulence of the ſea, and acting upon the ſhip ſo as to ſtreteh the cable to its utmoſt tenſion, which accordingly may diſlodge the anchor from its bed, eſpecially if the ground be ſoft and oozy, or rocky. When the anchor is thus diſplaced, it is ſaid, in the ſea phraſe, to *come home*.

Plate XXXIII. Fig. 2. N°1. That the figure of this uſeful inſtrument may be more clearly underſtood, let us ſuppoſe a long maſſy beam of iron erected perpendicularly, *b*, at the lower end of which are two arms, *d e*, of equal thickneſs with the beam (uſually called the *ſhank*), only that they taper towards the points, which are elevated above the horizontal plane at an angle of 30 degrees, or inclined to the ſhank at an angle of 60 degrees; on the upper part of each arm (in this poſition) is a fluke or thick plate of iron, *g h*, commonly ſhaped like an iſoſceles triangle whoſe baſe reaches inwards to the middle of the arm. On the upper end of the ſhank is fixed the ſtock tranſverſed with the flukes; the ſtock is a long beam of oak, *f*, in two parts, ſtrongly bolted and hooped together with iron rings. See alſo N° 2. Cloſe above the ſtock is the ring *a*, to which the cable is faſtened or *bent;* the ring is curiouſly covered with a number of pieces of ſhort rope, which are twiſted about it ſo as to form a very thick texture or covering called the *puddening*, and uſed to preſerve the cable from being fretted or chafed by the iron.

Every ſhip has, or ought to have, three principal anchors, with a cable to each, viz. the ſheet, *maitreſſe-ancre* (which is the *anchora ſacra* of the ancients); the beſt bower, *ſecond ancre;* and ſmall bower, *ancre d' affourche*, ſo called from their uſual ſituation on the ſhip's bows. There are beſides ſmaller anchors, for removing a ſhip from place to place in a harbour or river, where there may not be room or wind for ſailing; theſe are the ſtream anchor, *ancre de tone;* the kedge and grappling, *grapin:* this laſt, however, is chiefly deſigned for boats.

Method of Making ANCHORS. The goodneſs of the anchor is a point of great importance. Great care is therefore to be taken, that the metal it is made of be neither too ſoft nor too brittle; the latter rendering it liable to break, and the former to ſtraighten.

The ſhank, arms, and flukes, are firſt forged ſeparately; then the hole is made at one end of the ſhank for the ring, which being alſo previouſly forged, is put into the hole of the ſhank, and the two ends ſhut together. After which the arms are ſhut to the ſhank one after the other, and the anchor is finiſhed.

Proof is made of anchors by raiſing them to a great height, and then letting them fall again on a kind of iron block placed acroſs for the purpoſe. To try whether the flukes will turn to the bottom and take hold of the ground, they place the anchor on an even ſurface, with the end of one of the flukes, and one of the ends of the ſtock reſting on the ſurface: in caſe the another turns, and the point of the fluke riſes upwards, the anchor good.

In England, France, and Holland, anchors are made of forged iron; but in Spain there are ſometimes made of copper, and likewiſe in ſeveral parts of the South ſea. Anchor.

For the proportion of anchors, according to Manwaring, the ſhank is to be thrice the length of one of the flukes, and half the length of the beam. According to Aubin, the length of the anchor is to be fourtenths of the greateſt breadth of the ſhip; ſo that the ſhank, *e. gr.* of an anchor in a veſſel 30 feet wide, is to be 12 feet long. When the ſhank is, for inſtance, eight feet long, the two arms are to be ſeven feet long, meaſuring them according to their curvity. As to the degree of curvity given the arms, there is no rule for it: the workmen are here left to their own diſcretion.

The latter writer obſerves, that the anchor of a large heavy veſſel is ſmaller in proportion than that of a leſſer and lighter one. The reaſon he gives is, that though the ſea employs an equal force againſt a ſmall veſſel as againſt a great one, ſuppoſing the extent of wood upon which the water acts to be equal in both, yet the little veſſel, by reaſon of its ſuperior lightneſs, does not make ſo much reſiſtance as the greater; the defect whereof muſt be ſupplied by the weight of the anchor.

From theſe and other hydroſtatic principles, the following table has been formed; wherein is ſhown, by means of the ſhip's breadth within, how many feet the beam or ſhank ought to be long, giving it fourtenths or two-fifths of the ſhip's breadth within: by which proportion might be regulated the length of the other parts of the anchor. In this table is repreſented likewiſe the weight an anchor ought to be for a ſhip from eight feet broad to 45, increaſing by one foot's breadth; ſuppoſing that all anchors are ſimilar, or that their weights are as the cubes of the lengths of the ſhanks.

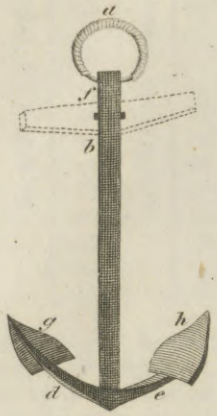
Breadth of the Veſſel. Feet.	Length of the Anchor. Feet.	Weight. Pounds.
8	3 1/5	33
9	3 3/5	47
10	4	64
11	4 2/5	84
12	4 4/5	110
13	5 1/5	140
14	5 2/5	175
15	6	216
16	6 2/5	262
17	6 4/5	314
18	7 2/5	373
19	7 3/5	439
20	8	512
21	8 2/5	592
22	8 4/5	681
23	9 1/5	778
24	9 3/5	884
25	10	1000
26	10 2/5	1124
27	10 4/5	1259
28	11 1/5	1405
29	11 3/5	1562
30	12	1728
31	12 2/5	1906

Breadth

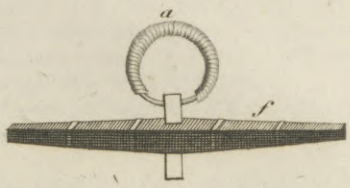
Anchor.

Fig. 1.

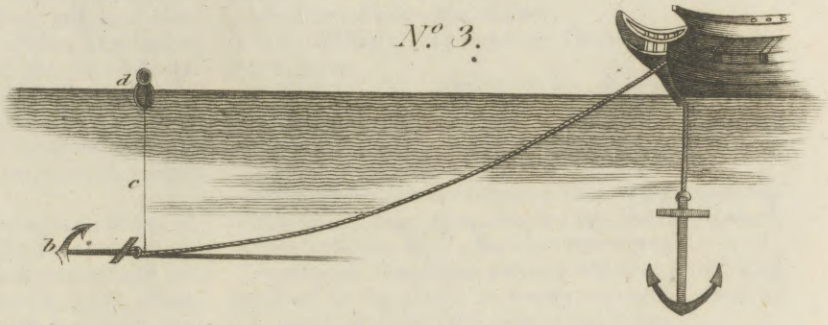
N.° 1.



N.° 2.

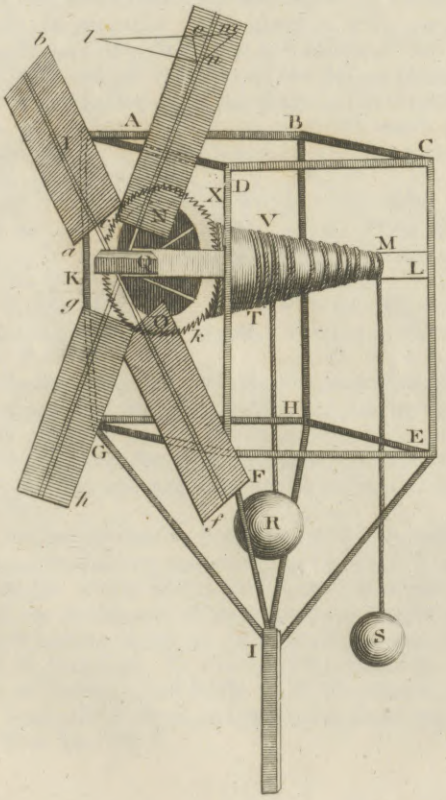


N.° 3.



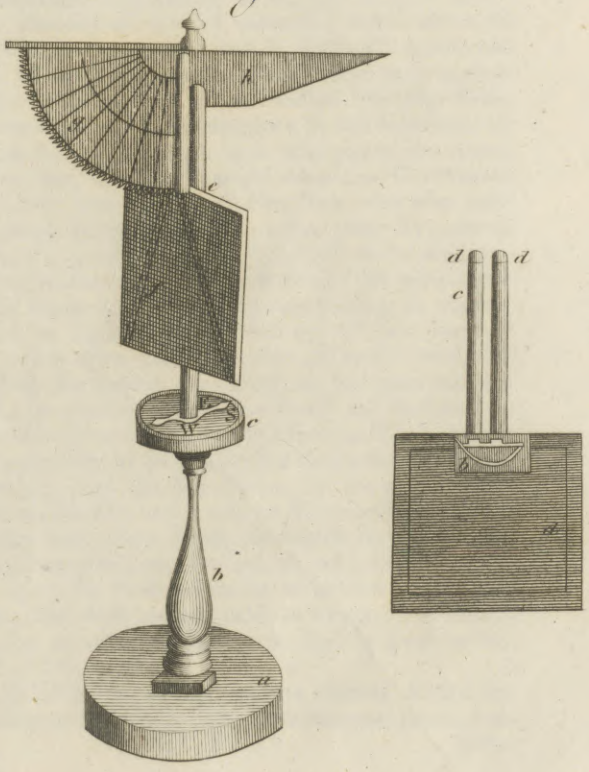
Anemometer.

Fig. 2.

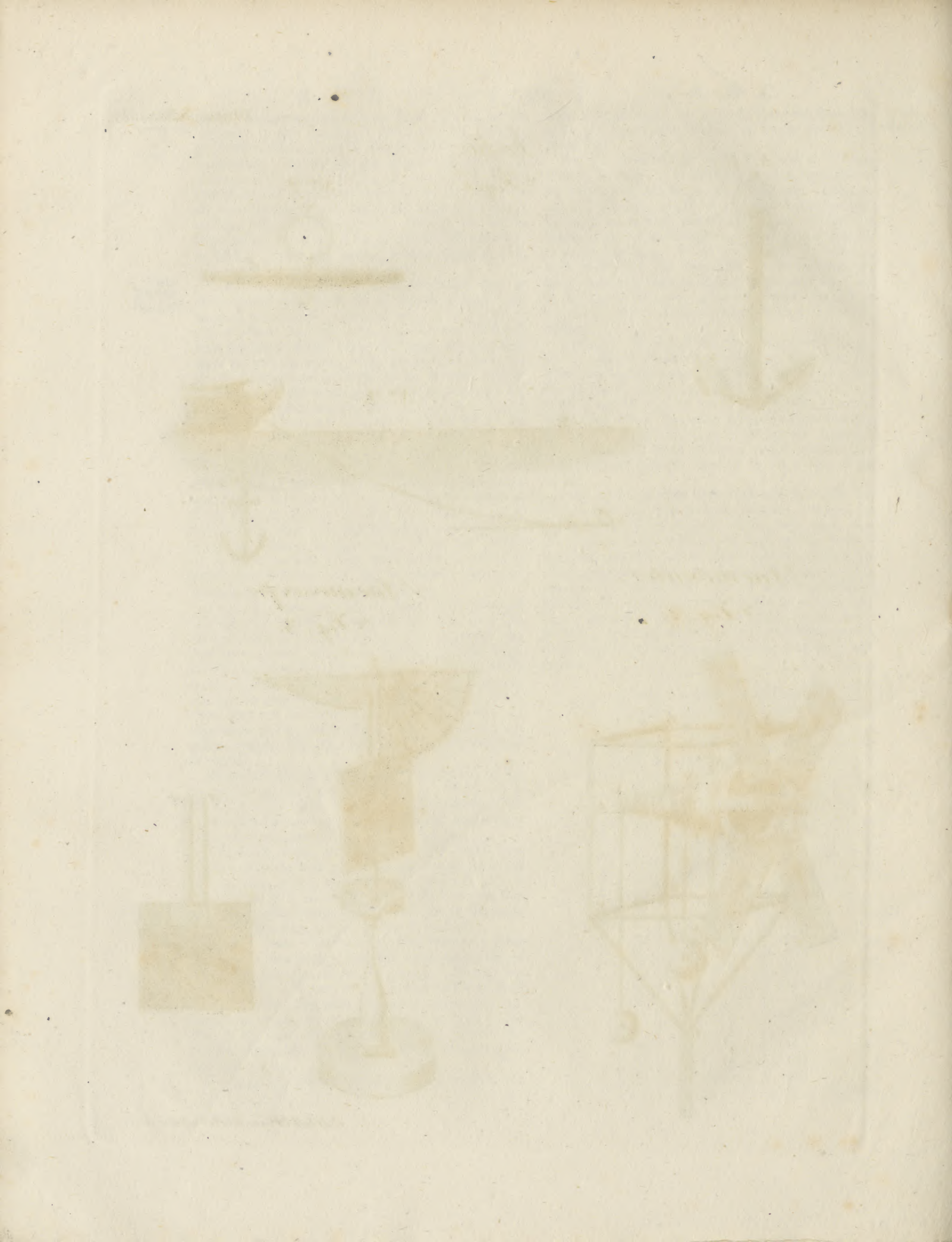


Anemoscope.

Fig. 3.



J. Bell Prin. Mal. Sculptor fecit.



Anchor.

Breadth of the Veſſel. Feet.	Length of the Anchor. Feet.	Weight. Pounds.
32	12 4/7	2097
33	13 1/7	2300
34	13 3/7	2515
35	14	2742
36	14 2/7	2986
37	14 4/7	3242
38	15 1/7	3512
39	15 3/7	3796
40	16	4096
41	16 2/7	4426
42	16 4/7	4742
43	17 1/7	5088
44	17 3/7	5451
45	18	5832

M. Bouguer, in his *Traité de Navire*, directs to take the length of the ſhank in inches, and to divide the cube of it by 1160 for the weight. The reaſon is obvious; becauſe the quotient of the cube of 201 inches, which is the length of an anchor weighing 7000 lb. divided by the weight, is 1160; and therefore, by the rule of three, this will be a common diviſor for the cube of any length, and a ſingle operation will ſuffice.

The ſame author gives the following dimenſions of the ſeveral parts of an anchor. The two arms generally form the arch of a circle, whoſe centre is three-eighths of the ſhank from the vertex, or point where it is fixed to the ſhank; and each arm is equal to the ſame length, or the radius; ſo that the two arms together make an arch of 120 degrees: the flukes are half the length of the arms, and their breadth two-fifths of the ſaid length. With reſpect to the thickneſs, the circumference at the throat, or vertex of the ſhank, is generally made about a fifth part of its length, and the ſmall end two-thirds of the throat; the ſmall end of the arms of the flukes, three-fourths of the circumference of the ſhank at the throat. Theſe dimenſions ſhould be greater when the iron is of a bad quality, eſpecially if caſt iron is uſed inſtead of forged iron.

At ANCHOR, the ſituation of a ſhip which rides by her anchor in a road or haven, &c. Plate XXXIII. fig. 1. N° 3. repreſents the fore part of a ſhip as riding in this ſituation. See alſo BUOY-ROPE.

To fiſh the ANCHOR, to draw up the flukes upon the ſhip's ſide after it is catted. See the articles DAVIT and FISH.

To ſteer the ſhip to her ANCHOR, is to ſteer the ſhip's head towards the place where the anchor lies when they are heaving the cable into the ſhip; that the cable may thereby enter the hauſe with leſs reſiſtance, and the ſhip advance towards the anchor with greater facility.

ANCHOR-Ground is a bottom which is neither too deep, too ſhallow, nor rocky; as in the firſt the cable bears too nearly perpendicular, and is thereby apt to jerk the anchor out of the ground; in the ſecond, the ſhip's bottom is apt to ſtrike at low water, or when the ſea runs high, by which ſhe is expoſed to the danger of ſinking; and in the third, the anchor is liable to hook the broken and pointed ends of rocks, and tear away its flukes, whilſt the cable, from the ſame cauſe, is conſtantly in danger of being cut through as it rubs on their edges.

Anchor ‖ Ancienty.

ANCHOR, in *Architecture*, is a ſort of carving, ſomewhat reſembling an anchor. It is commonly placed as part of the enrichments of the boultins of capitals of the Tuſcan, Doric, and Ionic orders, and alſo of the boultins of bed mouldings of the Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately through the whole building.

ANCHORS, in *Heraldry*, are emblems of hope, and are taken for ſuch in a ſpiritual as well as a temporal ſenſe.

ANCHORAGE, in *Law*, is a duty upon ſhips for the uſe of the port or harbour where they caſt anchor.

ANCHOVY, in *Ichthyology*, the Engliſh name of the clupea encraſicolus. See CLUPEA, ICHTHYOLOGY *Index*.

ANCHOVY-Pear. See GRIAS.

ANCHUSA, ALKANET or BUGLOSS. See BOTANY *Index*.

ANCHYLOBLEPHARON. See ANCYLOBLEPHARON.

ANCHYLOPS. See ANCHILOPS.

ANCHYLOSIS. See ANCYLOSIS.

ANCIENT, or ANTIENT, a term applied to things which exiſted long ago; thus we ſay, ancient nations, ancient cuſtoms, &c. See ANTIQUITIES.

ANCIENT, ſometimes denotes elderly, or of long ſtanding, in oppoſition to young, or new; thus we ſay, an ancient barriſter, ancient buildings.

ANCIENT, in a military ſenſe, denotes either the enſign or colours.

ANCIENT, in ſhips of war, the ſtreamer or flag borne in the ſtern.

ANCIENT DEMESNE, in *Engliſh Law*, is a tenure, whereby all manors belonging to the crown in William the Conqueror's and St Edward's time were held. The numbers, names, &c. hereof were entered by the Conqueror, in a book called *Domeſday Book*, yet remaining in the Exchequer; ſo that ſuch lands as by that book appeared to have belonged to the crown at that time, are called *ancient demeſne*.—The tenants in ancient demeſne are of two ſorts; one who hold their lands frankly by charter; the other by copy of court-roll, or by the verge, at the will of the lord, according to the cuſtom of the manor.—The advantages of this tenure are, 1. That tenants holding by charter cannot be rightfully impleaded out of their manor; and, when they are, they may abate the writ, by pleading the tenure. 2. They are free from toll for all things relating to their livelihood and huſbandry; nor can be impannelled on any inqueſt.—Theſe tenants held originally by ploughing the king's land, plaſhing his hedges, and the like ſervice, for the maintenance of his houſehold; and it was on this account that ſuch liberties were given them, for which they may have writs of *monſtraverunt* to ſuch as take the duties of toll, &c.—No lands are to be accounted ancient demeſne, but ſuch as are held in ſocage. Whether land be ancient demeſne or not, ſhall be tried by the book of DOMESDAY.

ANCIENTY, in ſome ancient ſtatutes, is uſed for elderſhip or ſeniority. The elder ſiſter can demand no more

Ancillon. more than her other ſiſters, beſide the chief meſne, by reaſon of her ancienty. This word is uſed in the ſtatute of Ireland, 14 Henry III.

ANCILLON, David, a miniſter of the reformed church at Metz, where he was born the 17th of March 1617. He ſtudied from the ninth or tenth year of his age in the Jeſuits college, where he gave ſuch proofs of his genius, that the heads of the ſociety tried every means to draw him over to their religion and party; but he continued firm againſt their attacks. He went to Geneva in 1633; and ſtudied divinity under Spanheim, Diodati, and Tronchin, who conceived a very great eſteem for him. He left Geneva in April 1641, and offered himſelf to the ſynod of Charenton in order to take upon him the office of a miniſter: his abilities were greatly admired by the examiners, and the whole aſſembly were ſo highly pleaſed with him, that they gave him the church of Meaux, the moſt conſiderable then unprovided for. Here he acquired a vaſt reputation for his learning, eloquence, and virtue, and was even highly reſpected by thoſe of the Roman Catholic communion. He returned to his own country in the year 1653, where he remained till the revocation of the edict of Nantes in 1685. He retired to Francfort after this fatal blow; and having preached in the French church at Hanau, the whole congregation were ſo edified by it, that they immediately called together the heads of the families, in order to propoſe that he might be invited to accept of being miniſter there. The propoſition was agreed to; and he began the exerciſe of his miniſtry in that church about the end of the year 1685. His preaching made ſo great a noiſe at Hanau, that the profeſſors of divinity, and the German and Dutch miniſters, attended his ſermons frequently: the count of Hanau himſelf, who had never before been ſeen in the French church, came thither to hear Mr Ancillon: they came from the neighbouring parts, and even from Francfort; people who underſtood nothing of French flocked together with great eagerneſs, and ſaid they loved to ſee him ſpeak. This occaſioned a great jealouſy in the two other miniſters; which tended to make his ſituation uneaſy. He therefore went to Berlin; where he met with a kind reception from his highneſs the elector, and was made miniſter of the city. Here he had the pleaſure of ſeeing his eldeſt ſon made judge and director of the French in the ſame city, and his other ſon rewarded with a penſion and entertained at the univerſity of Francfort upon the Oder. He had likewiſe the ſatisfaction of ſeeing his brother made judge of all the French in the ſtates of Brandenburg; and Mr Cayart his ſon-in-law, engineer to his electoral highneſs. He enjoyed theſe agreeable circumſtances, and ſeveral others, till his death, which happened at Berlin the 3d of September 1692, when he was 75 years of age.—Mr Ancillon having got a conſiderable fortune by marriage, was enabled thereby to gratify his paſſion for books; his library was accordingly very curious and large, and he increaſed it every day with all that appeared new and important in the republic of letters, ſo that at laſt it was one of the nobleſt collections in the hands of any private perſon in the kingdom. He publiſhed a book, in quarto, in which the whole diſpute concerning Traditions is fully examined: he alſo wrote an apology for Luther, Zuinglius, Calvin, and Beza, and ſeveral other pieces.

Anclam ‖ Ancony. ANCLAM, a ſtrong town of Germany, in the circle of Upper Saxony, and duchy of Pomerania, remarkable for its excellent paſtures. It is ſeated on the river Pene. E. Long. 14. 5. N. Lat. 54. 10.

ANCLE, or Ankle. See Ankle.

ANCONA, Marquisate of, a province in the pope's territories in Italy. It lies between the gulf of Venice and the Appenines, which bound it on the north; Abruzzo on the eaſt; the duchy of Spoletto, and that of Urbino, on the weſt. The air is indifferent; but the ſoil is fruitful, particularly in hemp and flax; and there is great plenty of wax and honey. It contains ſeveral large towns, as Fermo, Loretto, Recanati, Macerata, Jeſi, Tolentino, Aſcoli, Oſimo, St Severino, Monte Alto, Camerino, and Ripatranſone, which are all archiepiſcopal or epiſcopal ſees.

Ancona, a ſea-port town of Italy, the capital of the marquiſate of that name, and the ſee of a biſhop. It was formerly the fineſt port in all Italy, being built by the emperor Trajan, about the year 115; but was almoſt ruined, and its trade loſt: however, it has again begun to revive. Its harbour is the beſt in all the pope's dominions. The town lies round it on two hills; one of which is at the point of Cape St Syriaco, from whence there is a delightful proſpect. On the other ſtands the citadel, which commands the town and harbour. The ſtreets of this city are narrow and uneven; and the public and private buildings inferior to thoſe of the other great towns in Italy. The cathedral is a low dark ſtructure; and though the front is covered with fine marble, the architecture has neither beauty nor regularity. The church of St Dominic, and that of the Franciſcans, have each an excellent picture by Titian. The exchange, where the merchants meet, is a handſome ſquare portico, in which is an equeſtrian ſtatue of Trajan, who firſt built the port. At the four corners are four other ſtatues. The triumphal arch of Trajan remains almoſt entire, with its inſcription. The common people in this town are a little particular and fantaſtical in their dreſs, but the better ſort follow the French mode. It is a great thoroughfare from the north of Italy to Loretto; which renders proviſions very dear. The tide does not riſe here above a foot, and near the Mediterranean it is ſcarce viſible. E. Long. 15. 5. N. Lat. 43. 36.

ANCONES, in *Architecture*, the corners or quoins of walls, croſs-beams, or rafters.—Vitruvius calls the *conſoles* by the ſame name.

ANCONY, in the iron-works, a piece of half-wrought iron, of about three-quarters of 100 weight, and of the ſhape of a bar in the middle, but rude and unwrought at the ends. The proceſs for bringing the iron to this ſtate is this: They firſt melt off a piece from a ſow of caſt iron, of the proper ſize; this they hammer at the forge into a maſs of two feet long, and of a ſquare ſhape, which they call a *bloom;* when this is done, they ſend it to the finery; where, after two or three heats and workings, they bring it to this figure, and call it an *ancony*. The middle part beat out at the finery, is about three feet long, and of the ſhape and thickneſs the whole is to be; this is then ſent to the chafery, and there the ends are wrought to the ſhape of

Ancorarum || Ancyle.

of the middle, and the whole made into a bar. See Bar.

ANCORARUM URBS, Ανκυρων Πολις, a city in the Nomos Aphroditopolites, towards the Red ſea; ſo called becauſe there was in the neighbourhood a ſtone quarry, in which they hewed ſtone anchors (Ptolemy) before iron anchors came to be uſed. The gentilitious name is *Ancyropolites* (Stephanus).

ANCOURT, Florent Carton d', an eminent French actor and dramatic writer, was born at Fontainbleau, October 1661. He ſtudied in the Jeſuits college at Paris under Father de la Rue; who, diſcovering in him a remarkable vivacity and capacity for learning, was extremely deſirous of engaging him in their order; but Ancourt's averſion to a religious life rendered all his efforts ineffectual. After he had gone through a courſe of philoſophy, he applied himſelf to the civil law, and was admitted advocate at 17 years of age. But falling in love with an actreſs, he was induced to go upon the ſtage, and he married her. As he had all the qualifications neceſſary for the theatre, he ſoon greatly diſtinguiſhed himſelf: and not being ſatisfied with the applauſe only of an actor, he began to write pieces for the ſtage; many of which had ſuch prodigious ſucceſs, that moſt of the players grew rich from the profits of them. His merit in this way procured him a very favourable reception at court; and Louis XIV. ſhowed him many marks of his favour. His ſprightly converſation and polite behaviour made his company agreeable to all the men of figure both at court and in the city, and the moſt conſiderable perſons were extremely pleaſed to have him at their houſes. Having taken a journey to Dunkirk, to ſee his eldeſt daughter who lived there, he took the opportunity of paying his compliments to the elector of Bavaria, who was then at Bruſſels: this prince received him with the utmoſt civility; and having detained him a conſiderable time, diſmiſſed him with a preſent of a diamond valued at 1000 piſtoles: he likewiſe rewarded him in a very generous manner, when, upon his coming to Paris, Ancourt compoſed an entertainment for his diverſion. Ancourt began at length to grow weary of the theatre, which he quitted in Lent 1718, and retired to his eſtate of Courcelles le Roy, in Berry, where he applied himſelf wholly to devotion, and compoſed a tranſlation of David's Pſalms in verſe, and a ſacred tragedy, which were never printed. He died the 6th of December 1726, being 65 years of age.—The plays which he wrote are 52 in all; moſt of which were printed ſeparately at the time when they were firſt repreſented: they were afterwards collected into five volumes, then into ſeven, and at laſt into nine. This laſt edition is the moſt complete.

ANCRE, a ſmall town of France, in Picardy, with the title of a marquiſate, ſeated on a little river of the ſame name. E. Long. 2. 45. N. Lat. 49. 59.

ANCUS Martius, the fourth king of the Romans, ſucceeded by Tullus Hoſtilius, 639 years before Chriſt. He defeated the Latins, ſubdued the Fidenates, conquered the Sabines, Volſci, and Veientines, enlarged Rome by joining to it Mount Janiculum, and made the harbour of Oſtia. He died about 615 years before the Chriſtian era.

ANCYLE, in *Antiquity*, a kind of ſhield that fell, as was pretended, from heaven, in the reign of Numa Pompilius; at which time, likewiſe, a voice was heard declaring that Rome ſhould be miſtreſs of the world as long as ſhe ſhould preſerve this holy buckler. It was kept with great care in the temple of Mars, under the direction of twelve prieſts; and leſt any ſhould attempt to ſteal it, eleven others were made ſo like, as not to be diſtinguiſhed from the ſacred one. Theſe ancylia were carried in proceſſion every year round the city of Rome.

Ancyle || Ancyra.

Ancyle, in *Surgery*. See Ancylosis.

ANCYLOBLEPHARON, (from αγκυλος, *bent*, and βλεφαρον, an *eyelid*); a diſeaſe of the eye, which cloſes the eyelids. Sometimes the eyelids grow together, and alſo to the tunica albuginea of the eye, from careleſſneſs when there is an ulcer in theſe parts. Both theſe caſes are called *ancyloblepharon* by the Greeks. This diſorder muſt be diſtinguiſhed from that coalition of the eyelids which happens from viſcid matter gluing them together. If the coheſion is on the corner, the ſight is inevitably loſt. This hath ſometimes happened in the ſmall pox. If there is only a growing together of the eyelids, they may be ſeparated with the ſpecillum, and pledgets kept between them to prevent their reunion. If the eyelids adhere to the eye, they are to be ſeparated by a fine edged knife; and their reunion is to be prevented by a proper uſe of injections, and lint placed between them, after dipping it in ſome proper liniment.

ANCYLOGLOSSUM, (from αγκυλος, *crooked*, and γλωσσα, *the tongue*); a contraction of the ligaments of the tongue. Some have this imperfection from their birth, others from ſome diſeaſe. In the firſt caſe, the membrane which ſupports the tongue is too ſhort or too hard: in the latter, an ulcer under the tongue, healing and forming a cicatrix, is ſometimes the cauſe: Theſe ſpeak with ſome difficulty. The ancyloglofſi by nature are late before they ſpeak; but when they begin, they ſoon ſpeak properly. Theſe we call *tongue-tied*. Mauriceau ſays, that in this caſe it is a ſmall membranous production, which extends from the frænulum to the tip of tongue, that hinders the child from ſucking, &c. He juſtly condemns the cruel practice among nurſes, of tearing this membrane with their nails; for thus ulcers are ſometimes formed, which are of difficult cure: he adviſes to ſnip it with ſciſſars in two or three places, taking care not to extend the points of the ſciſſars ſo far as the frænulum. The inſtances rarely occur which require any kind of aſſiſtance; for if the child can thruſt the tip of its tongue to the outer edge of its lip, this diſeaſe does not exiſt; and if the tongue is not greatly reſtrained, the frænulum will ſtretch by the child's ſucking and crying.

ANCYLOSIS, in *Surgery*, implies a diſtortion or ſtiffneſs of the joints, cauſed by a ſettlement of the humours, or a diſtention of the nerves; and therefore remedies of a mollifying and relaxing nature are required.

ANCYRA, the capital of Galatia, (Livy, Pliny, Ptolemy); at no great diſtance from the river Halys, (Livy): ſaid to be built by Midas, king of Phrygia, and to take its name from an anchor found there (Pauſanias). It was greatly improved by Auguſtus, deem-

Ancyſtrum ‖ Andely.

ed the ſecond founder of it, as appears from the *Marmor Ancyranum*. It is now called *Angura*, or *Angoura*. E. Long. 33°. N. Lat. 41. 20.

ANCYSTRUM. See BOTANY *Index*.

ANDABATÆ, in *Antiquity*, a ſort of gladiators, who, mounted on horſeback or in chariots, fought hoodwinked, having a helmet that covered their eyes.

ANDALUSIA, is the moſt weſtern province of Spain, having Eſtremadura and La Mancha on the north; the kingdom of Granada, the ſtraits of Gibraltar, and the ocean, on the eaſt and ſouth; and on the weſt, the kingdom of Algarva in Portugal, from which it is ſeparated by the river Guadiana. It is about 182 miles long, and 150 broad. The chief cities and towns are Seville the capital, Baeza, Gibraltar, Cordova, Cadiz, Medina Sidonia, Jaen, Port St Mary, &c. It is the beſt, moſt fruitful, and the richeſt part of all Spain. There is a good air, a ſerene ſky, a fertile ſoil, and a great extent of ſea coaſt fit for commerce.

New ANDALUSIA, a diviſion of the province of Terra Firma in South America, whoſe boundaries cannot be well aſcertained, as the Spaniards pretend a right to countries in which they have never eſtabliſhed any ſettlements. According to the moſt reaſonable limits, it extends in length 500 miles from north to ſouth, and about 270 in breadth from eaſt to weſt. The interior country is woody and mountainous, variegated with fine valleys that yield corn and paſturage. The produce of the country conſiſts chiefly in dying drugs, gums, medicinal roots, brazil wood, ſugar, tobacco, and ſome valuable timber. To this province alſo belonged five valuable pearl fiſheries. The capital of New Andaluſia is Comana, Cumana, or New Corduba, ſituated in N. Lat. 9. 55. about nine miles from the north ſea. Here the Spaniards laid the foundation of a town in the year 1520. The place is ſtrong by nature, and fortified by a caſtle capable of making a vigorous defence; as appeared in the year 1670, when it was aſſaulted by the Bucaniers, who were repulſed with very great ſlaughter.

ANDAMAN, or ANDEMAN Iſlands, in the Eaſt Indies, ſituated about 80 leagues diſtance from Tanaſſerim on the coaſt of Siam. They are but little known. The Eaſt India ſhips ſometimes touch at them, and are ſupplied by the natives with rice, herbs, and fruits. The inhabitants are by ſome repreſented as a harmleſs inoffenſive race of men, and by others as cannibals. E. Long. 92. 0. N. Lat. from 10° to 15°.

ANDANTE, in *Muſic*, ſignifies a movement moderately ſlow, between *largo* and *allegro*.

ANDECAVI, (Tacitus); ANDEGAVI, (Pliny); ANDES, (Cæſar); ANDI, (Lucan): A people of Gallia Celtica, having the Turones to the eaſt, the Namnetes to the weſt, the Pictones to the ſouth, and the Aulerci Cœnomani to the north: now *Anjou*.

ANDEGAVI, or ANDEGAVUS, a town of Gallia Celtica, (Pliny, Ptolemy); now *Angiers*. Called *Andecavi*, (Tacitus). W. Long. 30. N. Lat. 47. 30.

ANDELY, a town of Normandy in France, parted in two by a paved cauſeway. Here is a fountain to which pilgrims flock from all parts, to be cured of their diſorders, on the feaſt day of the ſaint to which it is dedicated. It is 20 miles ſouth-eaſt of Rouen, and five north-weſt of Paris. E. Long. 1. 30. N. Lat. 49. 20.

Andena ‖ Anderſon.

ANDENA, in old writings, denotes the ſwath made in mowing of hay, or as much ground as a man could ſtride over at once.

ANDEOL, SAINT, a town of France, in the Vivarais, five miles ſouth of St Viviers, whoſe biſhop formerly reſided there. E. Long. 2. 50. N. Lat. 44. 24.

ANDERAB, the moſt ſouthern city of the province of Balkh, poſſeſſed by the Uſbeck Tartars. It is very rich and populous, but a place of no great ſtrength. The neighbouring mountains yield excellent quarries of lapis lazuli, in which the Bukhars drive a great trade with Perſia and India.—This city is ſituated at the foot of the mountains dividing the dominions of the Great Mogul and Perſia from Great Bukharia. As there is no other way of croſſing theſe mountains but by the road through this city, all travellers with goods muſt pay 4 *per cent.* On this account the khan of Balkh maintains a good number of ſoldiers in the place.

ANDERNACHT, a city of Cologne, in the circle of the Lower Rhine. It is ſituated in a plain on the river Rhine; and is fortified with a wall, caſtle, and bulwarks. It has a trade in ſtone jugs and pitchers, which are ſent to the mineral waters at Dunchſtein. There are three monaſteries here and ſeveral churches. E. Long. 7. 4. N. Lat. 50. 27.

ANDERO, SAINT, a ſea-port town in the bay of Biſcay, in Old Caſtile, ſeated on a ſmall peninſula. It is a trading town, and contains about 700 houſes, two pariſh churches, and four monaſteries. Here the Spaniards build and lay up ſome of their men of war. W. Long. 4. 30. N. Lat. 43. 20.

ANDERSON, SIR EDMUND, a younger ſon of an ancient Scotch family ſettled in Lincolnſhire. He was ſome time a ſtudent of Lincoln-college, Oxford; and removed from thence to the Inner Temple, where he applied himſelf diligently to the ſtudy of the law, and became a barriſter. In the ninth of Queen Elizabeth he was both Lent and Summer reader, and in the 16th double reader. He was appointed her majeſty's ſerjeant at law in the 19th year of her reign; and ſome time after, one of the juſtices of the aſſize. In 1582 he was made lord chief juſtice of the common pleas, and in the year following was knighted. He held his office to the end of his life, died in the year 1605, and was buried at Eyworth in Bedfordſhire. He was an able, but punctilious lawyer; a ſcourge to the Puritans; and a ſtrenuous ſupporter of the eſtabliſhed church. His works are, 1. Reports of many principal caſes argued and adjudged in the time of Queen Elizabeth in the common bench. Lond. 1644, fol. 2. Reſolutions and judgments on the caſes and matter, agitated in all the courts of Weſtminſter, in the latter end of the reign of Queen Elizabeth. Publiſhed by John Goldſborough, Eſq; Lond. 1653, 4to. Beſides theſe, there is a manuſcript copy of his readings ſtill in being.

ANDERSON, *Adam*, a native of Scotland, was brother to the reverend James Anderſon, D. D. editor of the *Diplomata Scotiæ* and *Royal Genealogies*, many years ſince miniſter of the Scots Preſbyterian church in

Anderſon, Andes.

in Swallow-ſtreet, Piccadilly, and well known in thoſe days among the people of that perſuaſion reſident in London by the name of Biſhop Anderſon, a learned but imprudent man, who loſt a conſiderable part of his property in the fatal year 1720. He married, and had iſſue a ſon, and a daughter who was the wife of an officer in the army.

Adam Anderſon was for 40 years a clerk in the South Sea Houſe; and at length arrived at his acmé there, being appointed chief clerk of the Stock and New Annuities, which office he retained till his death. He was appointed one of the truſtees for eſtabliſhing the colony of Georgia in America; and was alſo one of the court of aſſiſtants of the Scots corporation in London. The time of the publication of his "Hiſtorical and Chronological Deduction of Trade and Commerce," a work replete with uſeful information, was about the year 1762. He was twice married; by the firſt wife he had iſſue a daughter, married to one Mr Hardy, an apothecary in the Strand, who are both dead without iſſue; he afterwards became the third huſband of the widow of Mr Coulter, formerly a wholeſale linendraper in Cornhill, by whom he had no iſſue. She was, like him, tall and graceful; and her face has been thought to have ſome reſemblance to that of the ever-living counteſs of Deſmond, given in Mr Pennant's firſt Tour in Scotland. Mr Anderſon died at his houſe in Red Lion-ſtreet, Clerkenwell, January 10. 1775. He had a good library of books, which were ſold by his widow, who ſurvived him ſeveral years, and died in 1781.

ANDES, a great chain of mountains in South America, which running from the moſt northern part of Peru to the ſtraits of Magellan, between 3000 and 4000 miles, are the longeſt and moſt remarkable in the world. The Spaniards call them the *Cordillera de los Andes*. They form two ridges, the lowermoſt of which is overſpread with woods and groves, and the uppermoſt covered with everlaſting ſnow. Thoſe who have been at the top, affirm, that the ſky is always ſerene and bright; the air cold and piercing; and yet ſo thin, that they were ſcarce able to breathe, and the reſpiration, was much quicker than ordinary; and this is attended with retching and vomiting; which, however, has been conſidered by ſome as merely accidental. When they looked downwards, the country was hid by the clouds that hovered on the mountains ſides. The mountains juſt mentioned, which have been frequently aſcended, are much inferior in height to many others in this enormous chain. The following is the account given of the mountain called *Pichincha*, by the mathematicians ſent by the kings of France and Spain to make obſervations in relation to the figure of the earth.

Soon after our artiſts arrived at Quito, they determined to continue the ſeries of the triangles for meaſuring an arch of the meridian to the ſouth of that city: the company accordingly divided themſelves into two bodies, conſiſting of French and Spaniards, and each retired to the part aſſigned them. Don George Juan and M. Godin, who were at the head of one party, went to the mountain of Pambamarca; while M. Bouguer, de la Condamine, and Don Ulloa, together with their aſſiſtants, climbed up to the higheſt ſummit of Pichincha. Both parties ſuffered extremely, as well from the ſeverity of the cold as from the impetuoſity of the winds, which on theſe heights blow with inceſſant violence; difficulties the more painful, as they had been little uſed to ſuch ſenſations. Thus in the torrid zone, nearly under the equinoctial, where it is natural to ſuppoſe they had moſt to fear from the heat, their greateſt pain was cauſed by the exceſſiveneſs of the cold. Andes.

Their firſt ſcheme for ſhelter and lodging in theſe uncomfortable regions, was to pitch a field-tent for each company; but on Pichincha this could not be done from the narrowneſs of the ſummit; they were therefore obliged to be contented with a hut ſo ſmall that they could hardly all creep into it. Nor will this appear ſtrange, if the reader conſiders the bad diſpoſition and ſmallneſs of the place, it being one of the loftieſt crags of a rocky mountain, 100 fathoms above the higheſt part of the deſert of Pichincha. Such was the ſituation of their manſion, which, like all the other adjacent parts, ſoon became covered with ice and ſnow. The aſcent up this ſtupendous rock, from the baſe, or the place where the mules could come, to their habitation was ſo craggy as only to be climbed on foot; and to perform it coſt them four hours continual labour and pain, from the violent efforts of the body, and the ſubtlety of the air; the latter being ſuch as to render reſpiration difficult.

The ſtrange manner of living to which our artiſts were reduced during the time they were employed in a geometrical menſuration of ſome degrees of the meridian, may not perhaps prove unentertaining to the reader; and therefore the following account is given as a ſpecimen of it. The deſert of Pichincha, both with regard to the operations performed there and its inconveniences, differing very little from others, an idea may be very eaſily formed of the fatigues, hardſhips, and dangers, to which they were continually expoſed during the time they were proſecuting the enterpriſe, with the conduct of which they had been honoured. The principal difference between the ſeveral deſerts conſiſted in their greater or leſſer diſtance from places where they could procure proviſions; and in the inclemency of the weather, which was proportionate to the height of the mountains, and the ſeaſon of the year.

They generally kept within their hut. Indeed they were obliged to do this, both on account of the intenſeneſs of the cold, the violence of the wind, and their being continually involved in ſo thick a fog, that an object at ſix or eight paces was hardly diſcernible, When the fog cleared up, the clouds by their gravity moved nearer to the ſurface of the earth, and on all ſides ſurrounded the mountains to a vaſt diſtance, repreſenting the ſea, with their rock like an iſland in the centre of it. When this happened, they heard the horrid noiſes of the tempeſts, which then diſcharged themſelves on Quito and the neighbouring country. They ſaw the lightnings iſſue from the clouds, and heard the thunders roll far beneath them: and whilſt the lower parts were involved in tempeſts of thunder and rain they enjoyed a delightful ſerenity; the wind was abated, the ſky clear, and the enlivening rays of the ſun moderated the ſeverity of the cold. But their circumſtances were very different when the clouds roſe: their thickneſs rendered reſpiration difficult; the ſnow and hail fell continually; and the wind returned with all

Andes. all its violence; ſo that it was impoſſible entirely to overcome the fears of being, together with their hut, blown down the precipice, on whoſe edge it was built, or of being buried under it by the daily accumulations of ice and ſnow.

The wind was often ſo violent in theſe regions, that its velocity dazzled the ſight, whilſt their fears were increaſed from the dreadful concuſſions of the precipice, cauſed by the fall of enormous fragments of rocks. Theſe craſhes were the more alarming, as no other noiſes are heard in theſe deſerts; and during the night, their reſt, which they ſo greatly wanted, was frequently diſturbed by ſuch ſudden ſounds. When the weather was any thing fair with them, and the clouds gathered about ſome of the other mountains which had a connexion with their obſervations, ſo that they could not make all the uſe they deſired of this interval of good weather, they left their hut to exerciſe themſelves. Sometimes they deſcended to ſome ſmall diſtance; and at others, amuſed themſelves with rolling large fragments of rocks down the precipice; and theſe frequently required the joint ſtrength of them all, though they often ſaw the ſame effected by the mere force of the wind. But they always took care in their excurſions not to go ſo far out, but that on the leaſt appearance of the clouds gathering about their cottage, which often happened very ſuddenly, they could regain their ſhelter. The door of their hut was faſtened with thongs of leather, and on the inſide not the ſmalleſt crevice was left unſtopped; beſides which, it was very compactly covered with ſtraw: but notwithſtanding all their care, the wind penetrated through. The days were often little better than the nights; and all the light they enjoyed was that of a lamp or two, which they kept continually burning.

Though their hut was ſmall, and crowded with inhabitants, beſides the heat of the lamps; yet the intenſeneſs of the cold was ſuch, that every one of them was obliged to have a chafing-diſh of coals. Theſe precautions would have rendered the rigour of the climate ſupportable, had not the imminent danger of periſhing by being blown down the precipice rouſed them, every time it ſnowed, to encounter the ſeverity of the outward air, and ſally out with ſhovels to free the roof of their hut from the maſſes of ſnow which were gathering on it. Nor would it, without this precaution, have been able to ſupport the weight. They were not indeed without ſervants and Indians; but theſe were ſo benumbed with the cold, that it was with great difficulty they could get them out of a ſmall tent, where they kept a continual fire. So that all our artiſts could obtain from them was to take their turns in this labour; and even then they went very unwillingly about it, and conſequently performed it ſlowly.

It may eaſily be conceived what this company ſuffered from the aſperities of ſuch a climate. Their feet were ſwelled, and ſo tender, that they could not even bear the heat; and walking was attended with extreme pain. Their hands were covered with chilblains; their lips ſwelled and chopped; ſo that every motion in ſpeaking, or the like, drew blood; conſequently they were obliged to ſtrict taciturnity, and little diſpoſed to laugh, as, by cauſing an extenſion of the lips, it produced ſuch fiſſures as were very painful for two or three days after.

Their common food in this inhoſpitable region was a little rice boiled with ſome fleſh or fowl procured from Quito; and, inſtead of fluid water, their pot was filled with ice. They had the ſame reſource with regard to what they drank: and while they were eating, every one was obliged to keep his plate over a chafing-diſh of coals, to prevent his proviſions from freezing. The ſame was done with regard to the water. At firſt they imagined the drinking ſtrong liquors would diffuſe a heat through the body, and conſequently render it leſs ſenſible of the painful ſharpneſs of the cold; but, to their ſurpriſe, they felt no manner of ſtrength in ſuch liquors, nor were they any greater preſervative againſt the cold than common water. Andes.

At the ſame time, they found it impoſſible to keep the Indians together. On their firſt feeling of the climate, their thoughts were immediately turned on deſerting their maſters. The firſt inſtance they had of this kind was ſo unexpected, that, had not one, of a better diſpoſition than the reſt, ſtaid and acquainted them of their deſign, it might have proved of very bad conſequence. The affair was this: There being on the top of the rock no room for pitching a tent for the Indians, they uſed every evening to retire to a cave at the foot of the mountain; where, beſides a natural diminution of the cold, they could keep a continual fire; and conſequently enjoyed more comfortable quarters than their maſters. Before they withdrew at night, they faſtened on the outſide the door of the hut, which was ſo low that it was impoſſible to go in or out without ſtooping; and as every night the hail and ſnow which had fallen formed a wall againſt the door, it was the buſineſs of one or two of the Indians to come early and remove this obſtruction. For though the negro ſervants were lodged in a little tent, their hands and feet were ſo covered with chilblains, that they would rather have ſuffered themſelves to have been killed than move. The Indians therefore came conſtantly up to deſpatch this work betwixt nine and ten in the morning: but they had not been there above four or five days, when they were not a little alarmed to ſee ten, eleven, and twelve o'clock come, without any news of their labourers; when they were relieved by the honeſt ſervant mentioned above, who had withſtood the ſeduction of his countrymen, and informed his maſters of the deſertion of the four others. As ſoon as the ſnow was cleared away from the door, they deſpatched the Indian to the corregidor of Quito, who with equal deſpatch ſent other Indians, threatening to chaſtiſe them ſeverely if they were wanting in their duty.

But the fear of puniſhment was not ſufficient to induce them to ſupport the rigour of this ſituation; for within two days they deſerted. The corregidor therefore, to prevent any other inconvenience, ſent four Indians under the care of an alcade, and gave orders for their being relieved every fourth day.

Twenty-three tedious days our artiſts ſpent on this rock, viz. to the 6th of September, and even without any poſſibility of finiſhing their obſervations of the angles: for when it was fair and clear weather with them, the others, on whoſe ſummits the ſignals which formed the triangles for meaſuring the degrees of the meridian, were hid in the clouds; and when thoſe were clear, Pichincha was involved in clouds. It was therefore neceſſary to erect their ſignals in a lower ſituation,

and

Andes. and in a more favourable region. This, however, did not produce any change in their habitation till the beginning of December; when, having finiſhed the obſervations which particularly concerned Pichincha, they proceeded to others; but with no abatement either of inconveniences, cold, or fatigue; for the places where they made their obſervations being neceſſarily on the higheſt parts of the deſerts, the only reſpite in which they enjoyed ſome little eaſe was during the ſhort interval of paſſing from one to the other.

In all their ſtations ſubſequent to that on Pichincha, during their fatiguing menſuration of the degrees of the meridian, each company lodged in a field-tent, which, though ſmall, they found leſs inconvenient than the hut on Pichincha; though at the ſame time they had more trouble, being oftener obliged to clear it from the ſnow, as the weight of it would otherwiſe have demoliſhed the tent. At firſt, indeed, they pitched it in the moſt ſheltered places; but on taking a reſolution that the tents themſelves ſhould ſerve for ſignals, to prevent the inconvenience of having others of wood, they removed them to a more expoſed ſituation, where the impetuoſity of the winds ſometimes tore up the piquets, and blew them down.

Though this mountain is famous for its great height, it is conſiderably lower than the mountain of Cotopaxi: but it is impoſſible to conceive the coldneſs of the ſummit of the laſt mentioned mountain from that felt on this; ſince it muſt exceed every idea that can be formed by the human mind, though they are both ſeated in the midſt of the torrid zone. In all this range of mountains, there is ſaid to be a conſtant inferior boundary, beyond which the ſnow never melts: this boundary, in the midſt of the torrid zone, is ſaid by ſome to be 2434 fathoms above the level of the ſea; by others, only 2400 feet. The ſnow indeed falls much lower, but then it is ſubject to be melted the very ſame day. It is affirmed, that there are in the Andes 16 volcanoes or burning mountains, which throw out fire and ſmoke with a terrible noiſe. The height of Chimborazo, ſaid to be the higheſt peak of the Andes, has been determined by geometrical calculations to be 20,282 feet. But the great differences between the calculators of the height of mountains in other parts of the world, muſt very much diminiſh the credit of ſuch calculations. Inſtances of this we have already given under the article ÆTNA. No leſs remarkable are the differences concerning the height of the Peak of Teneriffe; which, according to the calculations of Varenius, is three miles and three quarters, or 19,800 feet; and according to thoſe of Dr Heberden, it is only 15,396 feet; and according to thoſe of M. Feuille, is no more than 13,128 feet. From theſe ſpecimens, we can ſcarce avoid concluding, that all the methods hitherto invented for calculating the exact height of mountains are inſufficient.

As all or moſt rivers have their ſource in mountains, it is no wonder a great number run down the ſides of the Andes. Some hurry along with a prodigious rapidity; while others form beautiful caſcades, or run through holes in rocks, which look like bridges of a ſtupendous height. There is a public road through the mountains, 1000 miles in length, part of which runs from Quito to Cuſco.

ANDES, a hamlet of Mantua in Italy, the birthplace of Virgil. Hence the epithet *Andinus* (Silius Italicus). Now called *Pietola*, two miles to the weſt of Mantua. Andetrium || Andrapodocapeli.

ANDETRIUM; ANDRETIUM (Strabo): ANDECRIUM, or ANDRECIUM (Ptolemy): An inland town of Dalmatia. The genuine name is *Andetrium* (Inſcription). It is deſcribed as ſituated near Salonæ, on a naturally ſtrong and inacceſſible rock, ſurrounded with deep valleys, with rapid torrents; from which it appears to be the citadel now called *Cliſſa*. E. Long. 17. 46. N. Lat. 43. 20.

ANDEUSE, a city of Languedoc in France, ſituated in E. Long. 3. 40. and N. Lat. 43. 45.

ANDOMADUNUM; ANDOMATUNUM (Ptolemy); and ANTEMATUNUM (Antonine); CIVITAS LINGONUM (Tacitus): A city of Gallia Belgica; now *Langres* in Champagne, ſituated on an eminence (which ſeems to juſtify the termination *dunum*), on the borders of Burgundy, at the ſprings of the Marne. Tacitus calls an inhabitant *Lingon*. E. Long. 5. 22. N. Lat. 48. 0.

ANDOVER, a large market town in Hampſhire, which is ſituated on a branch of the river Teſt. It has ſeveral inns, which afford good accommodation for travellers; and has a market on Saturday, well ſtocked with proviſions. It is governed by a bailiff, a ſteward, a recorder, ten approved men, and twenty-two capital burgeſſes, who yearly chooſe the bailiff, and he elects two ſerjeants at mace to attend him. The living is a vicarage, valued at 171l. 4s. 4d. in the king's books. W. Long. 0. 56. N. Lat. 51. 20.

ANDRACHNE, BASTARD ORPINE. See BOTANY *Index*.

ANDRADA, DIEGO DE PAYVA D', or ANDRADIUS, a learned Portugueſe, born at Coimbra, who diſtinguiſhed himſelf at the council of Trent, where King Sebaſtian ſent him as one of his divines. There is ſcarce any Catholic author who has been more quoted by the Proteſtants than he, becauſe he maintained ſome opinions a little extravagant concerning the ſalvation of the Heathens. Andrada was eſteemed an excellent preacher. His ſermons were publiſhed in three parts, the ſecond of which was tranſlated into Spaniſh by Benedict de Alcoran. Many encomiums have been beſtowed upon Andrada. Oſorius in his preface to the "Orthodox Explanations of Andradius," gives him the character of a man of wit, vaſt application, great knowledge in the languages, with all the zeal and eloquence neceſſary to a good preacher; and Roſweidus ſays, that he brought to the council of Trent the underſtanding of a moſt profound divine, and the eloquence of a conſummate orator.

ANDRAPODISMUS, in *Ancient Writers*, the ſelling of perſons for ſlaves. Hence alſo *andrapodiſtes*, a dealer in ſlaves, more particularly a kidnapper, who ſteals men or children to ſell them; a crime for which the Theſſalians were noted.

ANDRAPODOCAPELI, in *Antiquity*, a kind of dealers in ſlaves. The *Andrapodocapeli* had a particular proceſs for taking off moles and the like diſfigurements on the faces of the ſlaves they kept for ſale, by rubbing them with bran. At Athens, ſeveral places in the forum were appointed for the ſale of ſlaves. Upon the firſt day of every month, the merchants called

Andrea, Andreas.

ed Ανδραποδοκαπηλοι brought them into the market, and expoſed them to ſale; the crier ſtanding upon a ſtone erected for that purpoſe, called the people together.

ANDREA, St, a ſmall village on the Malabar coaſt in the Eaſt Indies, founded originally by the Portugueſe. It takes its name from a church dedicated to St Andrew, and ſerved by the prieſts of St Thomas.—On the ſhore of St Andrea, about half a league out in the ſea, lies Mud-bay, a place which few in the world can parallel. It is open to the wide ocean, and has neither iſland nor bank to break the force of the billows, which come rolling with great violence from all parts, in the ſouth-weſt monſoons: but on this bank of mud they loſe themſelves in a moment; and ſhips lie on it as ſecure as in the beſt harbour, without motion or diſturbance. It reaches about a mile along ſhore, and has been obſerved to ſhift its place from the northward about three miles in 30 years. From St Andrea to Kranganôr, about 12 leagues to the ſouth, the water has the bad property of cauſing ſwellings in the legs of thoſe who drink it conſtantly. Some it affects in one leg, and ſome in both. It cauſes no pain, but itching; nor does the ſwelled leg ſeem heavier to the owner than the ſmall one, though ſome have been ſeen a yard in circumference at the ancle. The Romiſh legends impute the cauſe of this diſtemper (for which no preventive or cure hath been hitherto found) to a curſe laid by St Thomas upon his murderers and their poſterity; though, according to the Romans themſelves, St Thomas was killed by the Tillinga prieſts at Meliaphûr, on the coaſt of Coromandel, about 400 miles diſtant, and where the natives have not this diſtemper.

ANDREAS, John, a celebrated canoniſt in the 14th century, was born at Mugello, near Florence; and was profeſſor of canon law at Padua, Piſa, and afterwards at Bologna. It is ſaid that he macerated his body with faſting; and lay upon the bare ground every night for 20 years together, covered only with the ſkin of a bear. This is atteſted by very good authors; but if the ſtory which Poggius tells of him in his jeſts be true, he muſt afterwards have relaxed much of this continency: "Joannem Andream (ſays he), doctorem Bonnonienſem, cujus fama admodum vulgata eſt, ſubagitantem ancillam domeſticam uxor deprehendit: re inſueta ſtupefacta mulier in virum verſa, Ubi nunc, ait, Joannes, eſt ſapientia veſtra? Ille nil amplius locutus, In vulva iſtius, reſpondit, loco admodum ſapientiæ accommodato." The French tranſlation of this perhaps will not be diſpleaſing.

Jean, dit André, fameux Docteur des Loix,
Fut pris un jour au péché d'amourette:
Il acolloit une jeune ſoubrette.
Sa femme vint, fit un ſigne de croix.
Ho ho, dit elle, eſt ce vous? non je penſe:
Vous, dont par-tout en vante la prudence.
Qu'eſt devenu cet eſprit ſi ſubtil?
Le bon André, pourſuivant ſon négoce,
Honteux pourtant, ma foi, repondit-il,
Prudence, eſprit, tout gît dans cette foſſe.

Since it is agreed that John Andreas had a baſtard, this ſtory is at the bottom very probable; and it was perhaps with the mother of Banicontius that his wife found him. Andreas had a beautiful daughter, named *Novella*, whom he loved extremely: and he is ſaid to have inſtructed her ſo well in all parts of learning, that when he was engaged in any affair which hindered him from reading lectures to his ſcholars, he ſent his daughter in his room; and leſt her beauty ſhould prevent the attention of the hearers, ſhe had a little curtain drawn before her. To perpetuate the memory of this daughter, he entitled his commentary upon the Decretals of Gregory IX. the *Novellæ*. He married her to John Calderinus, a learned canoniſt. The firſt work of Andreas was his Gloſs upon the Sixth Book of the Decretals, which he wrote when he was very young. He wrote alſo Gloſſes upon the Clementines; and a Commentary *in regulas Sexti*, which he entitled *Mercuriales*, becauſe he either engaged in it on Wedneſdays (*diebus Mercurii*), or becauſe he inſerted his Wedneſdays diſputes in it. He enlarged the Speculum of Durant, in the year 1347. This is all which Mr Bayle mentions of his writings, though he wrote many more. Andreas died of the plague at Bologna in 1348, after he had been a profeſſor 45 years; and was buried in the church of the Dominicans. Many eulogiums have been beſtowed upon him. He has been called *Archidoctor decretorum:* In his epitaph, *Rabbi doctorum; lux, cenſor, normaque morum;* "Rabbi of the doctors, the light, cenſor, and rule of manners:" And it is ſaid, that Pope Boniface called him *lumen mundi*, "the light of the world."

Andreas.

Andreas, *John*, was born a Mahometan, at Xativa in the kingdom of Valencia, and ſucceeded his father in the dignity of alfaqui of that city. He was enlightened with the knowledge of the Chriſtian religion by being preſent at a ſermon in the great church of Valencia on the day of Aſſumption of the Bleſſed Virgin, in the year 1487. Upon this he deſired to be baptized; and, in memory of the calling of St John and St Andrew, he received the name John Andreas. "Having received holy orders (ſays he), and from an alfaqui and a ſlave of Lucifer, become a prieſt and miniſter of Chriſt; I began, like St Paul, to preach and publiſh the contrary of what I had erroneouſly believed and aſſerted; and, with the aſſiſtance of Almighty God, I converted at firſt a great many ſouls of the Moors, who were in danger of hell, and under the dominion of Lucifer, and conducted them into the way of ſalvation. After this, I was ſent for by the moſt catholic princes King Ferdinand and Queen Iſabella, in order to preach in Grenada to the Moors of that kingdom, which their majeſties had conquered: by God's bleſſing on my preaching, an infinite number of Moors were brought to abjure Mahomet, and to turn to Chriſt. A little after this, I was made a canon by their grace; and ſent for again by the moſt Chriſtian Queen Iſabella to Arragon, that I might be employed in the converſion of the Moors of thoſe kingdoms, who ſtill perſiſted in their errors, to the great contempt and diſhonour of our crucified Saviour, and the prodigious loſs and danger of all Chriſtian princes. But this excellent and pious deſign of her majeſty was rendered ineffectual by her death." At the deſire of Martin Garcia, biſhop of Barcelona, he undertook to tranſlate from the Arabic, into the language of Arragon, the whole law of the Moors; and after having finiſhed this undertaking, he compoſed his famous work of *The Confuſion of the Sect of Mahumed;* it contains twelve chapters,

Andreini ‖ Andrew.

chapters, wherein he has collected the fabulous ſtories, impoſtures, forgeries, brutalities, follies, obſcenities, abſurdities, impoſſibilities, lies, and contradictions, which Mahomet, in order to deceive the ſimple people, has diſperſed in the writings of that ſect, and eſpecially in the Alcoran, which, as he ſays, was revealed to him in one night by an angel, in the city of Meke; though in another place he contradicts himſelf, and affirms that he was 20 years in compoſing it. Andreas tells us, he wrote this work, that not only the learned amongſt Chriſtians, but even the common people, might know the different belief and doctrine of the Moors; and on the one hand might laugh and ridicule ſuch inſolent and brutal notions, and on the other might lament their blindneſs and dangerous condition. This book, which was publiſhed at firſt in Spaniſh, has been tranſlated into ſeveral languages; all thoſe who write againſt the Mahometans quote it very much.

ANDREINI, Isabella, a native of Padua, was an excellent poeteſs, and one of the beſt comedians in Italy, towards the beginning of the 17th century. The Intenti of Pavia thought they did their ſociety an honour by admitting her a member of it; and ſhe, in acknowledgment of this honour, never forgot to mention amongſt her titles that of *Academica Infanta;* her titles were theſe, "Iſabella Andreini, comica geloſa, academica infanta, detta l'acceſſa." She was alſo a woman of extraordinary beauty; which, added to a fine voice, made her charm both the eyes and ears of the audience. She died of a miſcarriage, at Lyons, the 10th of June 1604, in the 42d year of her age. Her death being a matter of general concern and lamentation, there were many Latin and Italian elegies printed to her memory: ſeveral of theſe pieces were placed before her poems in the edition of Milan, in 1605. Beſides her ſonnets, madrigals, ſongs, and eclogues; there is a paſtoral of hers entitled Myrtilla, and letters, printed at Venice in 1610. She ſung extremely well, played admirably on ſeveral inſtruments, underſtood the French and Spaniſh languages, and was not unacquainted with philoſophy.

ANDRELINUS, Publius Faustus, born at Forli in Italy. He was long time profeſſor of poetry and philoſophy in the univerſity of Paris. Louis XII. of France made him his poet laureat; and Eraſmus tells us he was likewiſe poet to the queen. His pen was not wholly employed in making verſes; for he wrote alſo moral and proverbial letters in proſe, which were printed ſeveral times. His poems, which are chiefly in Latin, are inſerted in vol. i. of the *Deliciæ Poetarum Italorum*. M. de la Monnoie tells us, "that Andrelinus, when he was but 22 years old, received the crown of laurel: That his love verſes, divided into four books, entitled *Livia*, from the name of his miſtreſs, were eſteemed ſo fine by the Roman Academy, that they adjudged the prize of the Latin elegy to the author." He died in 1518. This author's manner of life was not very exemplary; yet he was ſo fortunate, ſays Eraſmus, that though he took the liberty of rallying the divines, he was never brought into trouble about it.

ANDREW, St, the apoſtle, born at Bethſaida in Galilee, brother to Simon Peter. He had been a diſciple of John the Baptiſt, and followed Jeſus upon the teſtimony given of him by the Baptiſt (John i. 30, 37, &c.) He followed our Saviour with another of John's diſciples, and went into the houſe where Jeſus lodged; here he continued from about four o'clock in the afternoon till it was night. This was the firſt diſciple whom our Saviour received into his train. Andrew introduced his brother Simon, and they paſſed a day with Chriſt, after which they went to the marriage in Cana (*id.* ii.), and at laſt returned to their ordinary occupation. Some months after, Jeſus meeting them while they were both fiſhing together, called them to him, and promiſed to make them fiſhers of men. Immediately they left their nets, followed him (Mat. iv. 19.), and never afterwards ſeparated from him.

Andrew ‖ Andrew's.

After our Saviour's aſcenſion, his apoſtles having determined by lot what parts of the world they ſhould ſeverally take, Scythia and the neighbouring countries fell to St Andrew, who, according to Euſebius, after he had planted the goſpel in ſeveral places, came to Patræ in Achaia, where, endeavouring to convert the proconſul Ægeas, he was by that governor's orders ſcourged, and then crucified. The particular time of his ſuffering martyrdom is not known; but all the ancient and modern martyrologies, both of the Greeks and Latins, agree in celebrating his feſtival upon the 30th of November. His body was embalmed, and decently interred at Patræ by Maximilla, a lady of great quality and eſtate. Afterwards it was removed to Conſtantinople by Conſtantine the Great, and buried in the great church, which he had built to the honour of the apoſtles. There is a croſs to be ſeen at this day in the church of St Victor at Marſeilles, which is believed by the Romaniſts to be the ſame that St Andrew was faſtened to. It is in the ſhape of the letter X, and is encloſed in a ſilver ſhrine. Peter Chryſologus ſays, that he was crucified upon a tree; and the ſpurious Hippolytus aſſures us it was an olive tree.

Andrew, or *Knights of St Andrew*, an order of knights, more uſually called the order of the thiſtle. See Thistle.

Knights of St Andrew, is alſo an order inſtituted by Peter the Great of Muſcovy in 1698; the badge of which is a golden medal; on one ſide whereof is repreſented St Andrew's croſs, with theſe words, *Cæzar Pierre monarque de tout le Ruſſie*. This medal, being faſtened to a blue ribbon, is ſuſpended from the right ſhoulder.

St Andrew's Croſs, one in form of the letter X. See Cross.

St Andrew's Day, a feſtival of the Chriſtian church, celebrated on the 30th of November, in honour of the apoſtle St Andrew.

ANDREW'S, St, a town of Fifeſhire in Scotland, once the metropolis of the Pictiſh kingdom, lying in W. Long. 2. 25. N. Lat. 56. 18. If we may credit legend, St Andrew's owes its origin to a ſingular accident. St Regulus (or St *Rule*, as he is likewiſe called), a Greek of Achaia, was warned by a viſion to leave his native country, and viſit Albion, an iſle placed in the remoteſt part of the world; and to take with him the arm-bone, three fingers, and three toes, of St Andrew. He obeyed, and ſet ſail with his companions, but had a very tempeſtuous paſſage. After being toſſed for ſome time on a ſtormy ſea, he was at laſt ſhipwrecked on the coaſt of Otholania, in the territories of Herguſtus king of the Picts, in the year 370. On hear-

Andrew's. ing of the arrival of the ſtrangers, with their precious relics, the king immediately gave orders for their reception, afterwards preſenting the ſaint with his own palace, and building near it the church, which ſtill bears the name of *St Regulus*.

At this time the place was ſtyled *Mucroſs*, or the *land of boars*: all round was foreſt, and the lands beſtowed on the ſaint were called *Byrehid*. The boars equalled in ſize the ancient Erymanthian; as a proof of which, two tuſks, each ſixteen inches long and four thick, were chained to the altar of St Andrew's. St Regulus changed the name to *Kilrymont*; and eſtabliſhed here the firſt Chriſtian prieſts of the country, called *Culdees*. The church was ſupreme in the kingdom of the Picts; Ungus having granted to God and St Andrew, that it ſhould be the head and mother of all the churches in his dominions. He alſo directed that the croſs of St Andrew ſhould become the badge of the country. In 518, after the conqueſt of the Picts, he removed the epiſcopal ſee to St Andrew's, and the biſhop was ſtyled *maximus Scotorum epiſcopus*. In 1441, it was erected into an archbiſhopric by Sextus IV. at the interceſſion of James III. In 1606, the priory was ſuppreſſed; and, in 1617, the power of election was transferred to eight biſhops, the principal of St Leonard's college, the archdeacon, the vicars of St Andrew's, Leuchars, and Cupar. This ſee contained the greateſt part of the ſhire of Fife, with a part of Perth, Forfar, and Kincardine ſhires, and a great number of pariſhes, churches, and chapels in other dioceſes.

The town of St Andrew's was erected into a royal borough by David I. in the year 1140, and its privileges afterwards confirmed. The charter of Malcolm II. is preſerved in the tolbooth; and appears written on a bit of parchment, but the contents equally valid with what would at this time require whole ſkins. Here alſo are kept the ſilver keys of the city; which, for form's ſake, are delivered to the king, if he ſhould viſit the place, or to a victorious enemy, in token of ſubmiſſion. In this place, likewiſe, is to be ſeen the monſtrous axe which, in 1646, took off the heads of Sir Robert Spotſwood and other diſtinguiſhed loyaliſts. The town underwent a ſiege in 1337; at which time it was poſſeſſed by the Engliſh and other partizans of Baliol; but the loyaliſts, under the earls of March and Fife, made themſelves maſters of it in three weeks, by the help of their battering machines.

St Andrew's is now greatly reduced in the number of its inhabitants; at preſent ſcarcely exceeding 2000. It is impoſſible to aſcertain the ſum when it was the ſeat of the primate: all that can be known is, that during the period of its ſplendour, there were between ſixty and ſeventy bakers; but now nine or ten are ſufficient for the place. It is a mile in circuit, and contains three principal ſtreets. On entering the weſt port, a well built ſtreet, ſtraight, and of a vaſt length and breadth appears; but ſo graſs-grown, and preſenting ſuch a dreary ſolitude, that it forms the perfect idea of having been laid waſte by the peſtilence.

The cathedral of St Andrew's was founded by Biſhop Arnold in 1161, but did not attain its full magnificence till 1318. Its length from eaſt to weſt was 370 feet; that of the tranſept, 322. But though this vaſt pile was 157 years in building, John Knox, in June 1559, effected its demolition in a ſingle day; and ſo effectually has it been deſtroyed, that nothing now remains but part of the eaſt and weſt ends, and of the ſouth ſide. Andrew's.

Near the eaſt end is the chapel of St Regulus; the tower of which is a lofty equilateral triangle, of 20 feet each ſide, and 103 feet high; the body of the chapel remains, but the two ſide chapels are ruined. The arches of the windows and doors are round, and ſome even more than ſemicircles; an undoubted proof of their antiquity.

The priory was founded by Alexander I. in 1122; and the monks (canons regular of St Auguſtine) were brought from Scone, in 1140, by Robert biſhop of this ſee. By an act of parliament, in the time of James I. the prior had precedence of all abbots and priors, and on the days of feſtival wore a mitre and all epiſcopal ornaments. Dependent on this priory were thoſe of Lochleven, Portmoak, Monimuſk, the Iſle of May, and Pittenweem, each originally a ſeat of the Culdees. The revenues of the houſe were vaſt, viz. In money 2237l. 2s. 10½d.; 38 chalders 1 boll 3 firlots of wheat; 132 ch. 7 bolls of bear; 114 ch. 3 bolls 1 peck of meal; 151 ch. 10 bolls 1 firlot 1 peck and a half of oats; 3 ch. 7 bolls of peaſe and beans: 480 acres of land alſo belonged to it. Nothing remains of the priory except the walls of the precinct, which ſhow its vaſt extent. In one part is a moſt artleſs gateway, formed only of ſeven ſtones. This encloſure begins near the cathedral, and extends to the ſhore.

The other religious houſes were, one of Dominicans founded in 1274, by Biſhop Wiſhart; another of Obſervantines, founded by Biſhop Kennedy, and finiſhed by his ſucceſſor Patrick Graham in 1478: and, according to ſome, the Carmelites had a fourth.

Immediately above the harbour ſtood the collegiate church of Kirk-heugh, originally founded by Conſtantine III. who, retiring from the world, became here a Culdee. From its having been firſt built on a rock, it was ſtyled, *Præpoſitura Sanctæ* MARIÆ *de rupe*.

On the eaſt ſide of the city are the poor remains of the caſtle, on a rock overlooking the ſea. This fortreſs was founded in 1401, by Biſhop Trail, who was buried near the high altar of the cathedral, with this ſingular epitaph:

Hic fuit eccleſiæ directa columna, feneſtra
Lucida, thuribulum redolens, campana ſonora.

The caſtle was the reſidence of Cardinal Beaton; who, after the death of George Wiſhart, apprehending ſome danger, cauſed it to be fortified ſo ſtrongly as to be at that time deemed impregnable. In this fortreſs, however, he was ſurpriſed and aſſaſſinated by Norman Leſly with 15 others. They ſeized on the gate of the caſtle early in the morning of May 29. 1546; it having been left open for the workmen who were finiſhing the fortifications: and having placed ſentinels at the door of the cardinal's apartment, they awakened his numerous domeſtics one by one; and, turning them out of the caſtle, they, without violence, tumult, or offering an injury to any other perſon, inflicted on Beaton the death he juſtly merited. The conſpirators were immediately beſieged in this caſtle by the regent, earl of Arran; and notwithſtanding they had acquired no greater ſtrength than 150 men, they reſiſted all his efforts for five months. This, however, was owing to the

Andrew's. the unskilfulness of the besiegers more than to the strength of the place or the valour of the besieged; for in 1547 the castle was reduced and demolished. The entrance of it is still to be seen; and the window is shown, out of which it is said the cardinal leaned to glut his eyes with the cruel martyrdom of George Wishart, who was burnt on a spot beneath.

In the church of St Salvator is a most beautiful tomb of Bishop Kennedy, who died, an honour to his family, in 1466. The Gothic work is uncommonly elegant. Within the tomb were discovered six magnificent maces, which had been concealed here in troublesome times. One was given to each of the other three Scotch universities, and three are preserved here. In the top is represented our Saviour; around are angels, with the instruments of the passion.

With these are shown some silver arrows, with large silver plates affixed to them, on which are inscribed the arms and names of the noble youth, victors in the annual competitions in the generous art of archery, which were dropt but a few years ago; and golf is now the reigning game. That sport, and foot-ball, were formerly prohibited, as useless and unprofitable to the public; and at all *weapon schawings*, or reviews of the people, it was ordered, that *fute-ball and golfe be utterly cryed down, and that bow-markes be made at ilk parish kirk, a pair of butts and schutting be used; and that ilk man schutte sex schottes at least, under the paine to be raiped upon them that cummis not, at least twa pennyes to be given to them that cummis to the bow-markes to drink.*

The celebrated university of this city was founded in 1411, by Bishop Wardlaw. It consisted once of three colleges. 1. St Salvator's, founded in 1458, by Bishop Kennedy. This is a handsome building, with a court or quadrangle within: on one side is the church, on another the library; the third contains apartments for students: the fourth is unfinished. 2. St Leonard's college was founded by Prior Hepburn, in 1522. This is now united with the last, and the buildings sold, and converted into private houses. 3. The new, or St Mary's college, was established by Archbishop Hamilton in 1553; but the house was built by James and David Bethune, or Beaton, who did not live to complete it. This is said to have been the site of a *schola illustris* long before the establishment even of the university, where several eminent clergymen taught, gratis, the sciences and languages. But it was called the *new college*, because of its late erection into a divinity college by the archbishop.

The university is governed by a chancellor, an office originally designed to be perpetually vested in the archbishops of St Andrew's; but since the Reformation, he is elected by the two principals, and the professors of both the colleges.

The rector is the next great officer; to whose care are committed the privileges, discipline, and statutes of the university. The colleges have their rectors, and professors of different sciences, who are indefatigable in their attention to the instruction of the students, and to that essential article their morals. This place possesses several very great advantages respecting the education of youth. The air is pure and salubrious; the place for exercise, dry and extensive; the exercises themselves are healthy and innocent. The university is fixed in a peninsulated country; remote from all commerce with the world, the haunt of dissipation. From the smallness of the society, every student's character is perfectly known. No little irregularity can be committed, but it is instantly discovered and checked: vice cannot attain a head in this place, for the incorrigible are never permitted to remain the corrupters of the rest. Andrew's, Andrews.

The trade of St Andrew's was once very considerable. So late as the reign of Charles I. this place had thirty or forty trading vessels, and carried on a considerable herring and white fishery, by means of busses, in deep water; which fisheries had for ages been the grand source of their commerce, wealth, and splendour. After the death of the king, this whole coast, and St Andrew's in particular, became a scene of murder, plunder, and rapine: every town suffered in proportion to its magnitude and opulence. Nor were those hypocritical ruffians satisfied with the shipping, merchandise, plate, cattle, and whatever came within their sight; they also laid the whole coast under contribution. St Andrew's was required to pay 1000l.; but the inhabitants not being able to raise that sum after being thus plundered, the general compounded for 500l. which was raised by a loan at interest, and hath remained a burden upon the corporation, it is believed, ever since.

The harbour is artificial, guarded by piers, with a narrow entrance, to give shelter to vessels from the violence of a very heavy sea, by the encroachments of which it has suffered much. The manufactures this city might in former times possess, are now reduced to one, that of golf balls; which, trifling as it may seem, maintains a great number of people. It is, however, commonly fatal to the artists; for the balls are made by stuffing a great quantity of feathers into a leathern case, by help of an iron rod, with a wooden handle, pressed against the breast, which seldom fails to bring on a consumption.

Andrews, *Lancelot*, bishop of Winchester, was born at London in 1555, and educated at Cambridge. After several preferments, he was made bishop, first of Chichester, then of Ely, and, in 1618, was raised to the see of Winchester. This very learned prelate, who was distinguished by his piety, charity, and integrity, may be justly ranked with the best preachers and completest scholars of his age; he appeared to much greater advantage in the pulpit than he does now in his works, which abound with Latin quotations and trivial witticisms. His sermons, though full of puns, were suited to the taste of the times he which he lived, and were consequently greatly admired. He was a man of polite manners and lively conversation: and could quote Greek and Latin authors, or even pun, with King James. There is a pleasant story related of him in the life of Waller the poet. When that gentleman was young, he had the curiosity to go to court, and stood in the circle to see King James dine; where, among other company, there sat at table two bishops, Neale and Andrews. The king proposed aloud this question, Whether he might not take his subjects money when he needed it, without all this formality of parliament? Neale replied, "God forbid you should not; for you are the breath of our nostrils." Whereupon the king turned, and said to the bishop of Winchester, "Well, my lord, what

Andrews ‖ Androgeus.

ſay you?" "Sir (repled the biſhop), I have no ſkill to judge of parliamentary caſes." The king anſwered, "No put-offs, my lord; anſwer me preſently." "Then, Sir (ſaid he), I think it lawful for you to take my brother Neale's money, for he offers it." Mr Waller ſays, the company was pleaſed with this anſwer, but the wit of it ſeemed to affect the king; for a certain lord coming ſoon after, his majeſty cried out, "O, my lord, they ſay you lig with my lady." "No, Sir (ſays his lordſhip, in confuſion), but I like her company becauſe ſhe has ſo much wit." "Why then (ſays the king) do not you lig with my lord of Wincheſter there?" This great prelate was in no leſs reputation and eſteem with King Charles I. than he had been with his predeceſſors. He died at Wincheſter houſe in Southwark, September 27. 1626, in the 71ſt year of his age; and was buried in the pariſh church of St Saviour's, where his executors erected to him a very fair monument of marble and alabaſter, on which is an elegant inſcription, in Latin, written by one of his chaplains. Mr Milton alſo, at 17 years of age, wrote a beautiful elegy on his death, in the ſame language. Biſhop Andrews had, 1. A ſhare in the tranſlation of the Pentateuch, and the hiſtorical books from Joſhua to the firſt book of Chronicles excluſively. He alſo wrote, 2. *Tortura Torti*, in anſwer to a work of Cardinal Bellarmine, in which that cardinal aſſumes the name of *Matthew Tortus*. 3. A Manual of Private Devotions; and, 4. A Manual of Directions for the Viſitation of the Sick; beſides the Sermons and Tracts, in Engliſh and Latin, publiſhed after his death.

ANDRIA, in *Grecian Antiquity*, public entertainments firſt inſtituted by Minos of Crete, and, after his example, appointed by Lycurgus at Sparta, at which a whole city or a tribe aſſiſted. They were managed with the utmoſt frugality; and perſons of all ages were admitted, the younger ſort being obliged by the lawgiver to repair thither as to ſchools of temperance and ſobriety.

ANDRIA, a city and a biſhop's ſee in the territory of Bari, in the kingdom of Naples. It is pretty large, well peopled, and ſeated in a ſpacious plain, four miles from the Adriatic coaſt. E. Long. 17. 4. N. Lat. 41. 15.

ANDRISCUS, a man of mean extraction, who, pretending to be the ſon of Perſeus laſt king of Macedonia, took upon him the name of *Philip*, for which reaſon he was called *Pſeudo-Philippus*, the *Falſe Philip*. After a complete victory over Juventus, the Roman prætor ſent againſt him, he aſſumed kingly power, but exerciſed it with vaſt cruelty. At laſt, the Romans obliged him to fly into Thrace, where he was betrayed and delivered into the hands of Metellus. This victory gained Macedonia once more into the power of the Romans, and to Metellus the name of *Macedonicus*, but coſt the Romans 25,000 men. Andriſcus adorned the triumph of Metellus, walking in chains before the general's chariot.

ANDROAS, or ANDRODAMAS, among *Ancient Naturaliſts*, a kind of pyritæ, to which they attributed certain magical virtues.

ANDROGEUS, in *Fabulous Hiſtory*, the ſon of Minos king of Crete, was murdered by the Athenian youth and thoſe of Megara, who envied his being always victor at the Attic games. But Minos having taken Athens and Megara, obliged the inhabitants to ſend him an annual tribute of ſeven young men and as many virgins, to be devoured by the Minotaur; but Theſeus delivered them from that tribute. Androgynes.

ANDROGYNES, in *Natural Hiſtory*, a name given to thoſe living creatures which, by a monſtrous formation of their generative parts, ſeem (for it is only ſeeming) to unite in themſelves the two ſexes, that of the male and of the female. This *luſus naturæ*, this defect, or perhaps redundancy, in the animal ſtructure, is deſcribed by medical authors in the following manner: "There is a depravation in the ſtructure of the parts intended by nature for propagation, when, beſides thoſe concealed parts that are found neceſſary for the diſcharge of prolific functions, the *pudenda* of the other ſex likewiſe appear. This monſtrous production of nature is diverſified in four different ways; of which three appear in males and one in females. In men, the female pudendum, clothed with hair, ſometimes appears contiguous to the perinæum; at other times, in the middle of the ſcrotum; at other times, which conſtitutes the third diverſity, through that part itſelf which in the midſt of the ſcrotum exhibits the form of a pudendum, urine is emitted. Near that part which is the teſt of puberty, and above the pudendum, even in females, the maſculine genitals appear in ſome, conſpicuous in all their three forms, one reſembling the *veretrum* or yard, the other like the two teſticles: but for the moſt part it happens, that, of the two inſtruments of generation, one is feeble and inert; and it is extremely rare that both are found ſufficiently valid and proper for feats of love; nay, even in a great many, both theſe members are deficient and impotent, ſo that they can perform the office neither of a male nor of a female."

With reſpect to them, it appears, from a collation of all the circumſtances which have been obſerved by naturaliſts worthy of credit, that there is no ſuch thing as a perfect *androgyne*, or real hermaphrodite; that is to ſay, a living creature, which, by its unnatural, or rather preternatural ſtructure, poſſeſſes the genuine powers of both ſexes, in ſuch a manner as to be qualified for performing the functions of either with ſucceſs: the irregularity of their fabrication almoſt always conſiſts in ſomething ſuperfluous added to one of the two ſexes, which gives it the appearance of the other, without beſtowing the real and characteriſtical diſtinction; and every *hermaphrodite* is almoſt always a very woman. Since this monſtrous exhibition of nature is not ſuch as to abrogate the rights or deſtroy the character of humanity amongſt human beings, this involuntary misfortune implies no right to deprive thoſe upon whom it is inflicted by nature of the privileges natural to every citizen; and as this deficiency is no more infectious than any other corporeal mutilation, it is not eaſy to ſee why marriage ſhould be prohibited to one of theſe unhappy beings, merely on account of its equivocal appearance, which acts in the character of its prevailing ſex. If ſuch a creature, by the defect of its conſtruction, ſhould be barren, this does not infer any right of diſſolving the marriage which it may have contracted, more than the ſame ſterility proceeding from any cauſe whether known or unknown, if his or her conſort ſhould not on that account require a divorce.

It

Androgynes. It is only the licentious abuſe either of one or the other ſex which can be ſubjected to the animadverſion of the police. See HERMAPHRODITE.

Such are the ſentiments of the authors of the French Encyclopedie. After all, we cannot forbear to add, that from ſuch heterogeneous matches nature ſeems to recoil with innate and inextinguiſhable horror. Nor are any of theſe invincible averſions implanted in our frame without a final cauſe worthy of its Author. We would gladly aſk theſe free-thinking gentlemen, In caſes where the ſexes are ſo unnaturally confounded, how the police can, by its moſt ſevere and rigorous animadverſions, either detect or prevent thoſe licentious abuſes againſt which they remonſtrate? Since, therefore, an evil ſo baneful to human ſociety could no otherwiſe be prevented than by the ſanction of Nature againſt ſuch horrible conjunctions, the inſtinctive antipathy which they inſpire was highly worthy of her wiſdom and purity.

ANDROGYNES, in *Ancient Mythology*, creatures of whom according to the fable, each individual poſſeſſed the powers and characters of both ſexes, having two heads, four arms, and two feet. The word itſelf is compounded of two Greek radical words; ανηρ, in genitive ανδρος, a *male;* and γυνη, a *female*. Many of the rabbinical writers pretend, that Adam was created double, one body being male, the other female, which in their origin not being eſſentially joined, God afterwards did nothing but ſeparate them.

The gods, ſays Plato in his *Banquet*, had formed the ſtructure of man round, with two bodies and two ſexes. This fantaſtic being, poſſeſſing in itſelf the whole human ſyſtem, was endowed with a gigantic force, which rendered it inſolent, inſomuch that it reſolved to make war againſt the gods. Jupiter, exaſperated, was going to deſtroy it; but, ſorry at the ſame time to annihilate the human race, he ſatisfied himſelf with debilitating this double being, by disjoining the male from the female, and leaving each half to ſubſiſt with its own powers alone. He aſſigned to Apollo the taſk of repoliſhing theſe two half bodies, and of extending their ſkins ſo that the whole ſurface might be covered. Apollo obeyed, and faſtened it at the *umbilicus:* If this half ſhould ſtill rebel, it was once more to be ſubdivided by another ſection, which would only leave it one of the parts of which it was then conſtituted; and even this fourth of a man was to be annihilated, if it ſhould perſiſt in its obſtinacy and miſchief. The idea of theſe *androgynes* might well be borrowed from a paſſage in Moſes, where that hiſtorian of the birth and infancy of nature, deſcribes Adam as calling Eve *bone of his bone* and *fleſh of his fleſh*. However this may be, the fable of Plato has been uſed with great ingenuity by a French poet, who has been rendered almoſt as conſpicuous by his misfortunes as by his verſes. With the ancient philoſopher, he attributes the propenſity which attracts one of the ſexes towards the other, to the natural ardour which each half of the *androgynes* feels for reunion; and their inconſtancy, to the difficulty which each of the ſeparated parts encounters in its efforts to recover its proper and original half. If a woman appears to us amiable, we inſtantly imagine her to be that moiety with whom we ſhould only have conſtituted one whole, had it not been for the inſolence of our original double-ſexed progenitor:

Androgynous, Androides.

> The heart, with fond credulity impreſs'd,
> Tells us the half is found, and hopes for reſt;
> But 'tis our curſe, that ſad experience ſhows,
> We neither find our half, nor gain repoſe.

ANDROGYNOUS, in *Zoology*, an appellation given to animals which have both the male and female ſex in the ſame individual.—In *Botany*, the term is applied to ſuch plants as bear both male and female flowers on the ſame root.

ANDROIDES, in *Mechanics*, a human figure, which, by certain ſprings or other movements, is capable of performing ſome of the natural motions of a living man. The motions of the human body are more complicated, and conſequently more difficult to be imitated, than thoſe of any other creature; whence the conſtruction of an *androides*, in ſuch a manner as to imitate any of theſe actions with tolerable exactneſs, is juſtly ſuppoſed to indicate a greater ſkill in mechanics than any other piece of workmanſhip whatever.

A very remarkable figure of this kind appeared in Paris, in the year 1738. It repreſented a flute-player, and was capable of performing many different pieces of muſic on the German flute; which, conſidering the difficulty of blowing that inſtrument, the different contractions of the lips neceſſary to produce the diſtinctions between the high and low notes, and the complicated motions of the fingers, muſt appear truly wonderful.

This machine was the invention of M. Vaucanſon, member of the Royal Academy of Sciences; and a particular deſcription of it was publiſhed in the Memoirs of the Academy for that year.

The figure itſelf was about five feet and a half in height, ſituated at the end of an artificial rock, and placed upon a ſquare pedeſtal four feet and a half high and three and a half broad. The air entered the body by three pipes ſeparated one from the other. It was conveyed to them by nine pair of bellows, three of which were placed above and ſix below. Theſe were made to expand and contract regularly in ſucceſſion by means of an axis of ſteel turned round by ſome clock-work. On this axis were different protuberances at proper diſtances, to which were fixed cords thrown over pulleys, and terminating in the upper boards of the bellows, ſo that, as the axis turned, theſe boards were alternately raiſed and let down. A contrivance was alſo uſed to prevent the diſagreeable hiſſing fluttering noiſe uſually attending the motion of bellows. This was by making the cord, by which the bellows was moved, preſs, in its deſcent, upon one end of a ſmaller lever, the other end of which aſcending forced open the ſmall leathern valve that admitted the air, and kept it ſo, till, the cord being relaxed by the deſcent of the upper board, the lever fell, and the air was forced out. Thus the bellows performing their functions conſtantly without the leaſt hiſſing, or other noiſe, by which it could be judged in what manner the air was conveyed to the machine. The upper boards of three of the pairs of bellows were preſſed down by a weight of four pounds, that of three others by a weight of two pounds,

and

Androides. and thoſe of the three remaining ones by nothing but their own weight.

The three tubes, by which the air entered, terminated in three ſmall reſervoirs in the trunk of the figure. There they united, and, aſcending towards the throat, formed the cavity of the mouth, which terminated in two ſmall lips adapted in ſome meaſure to perform their proper functions. Within this cavity alſo was a ſmall moveable tongue; which, by its play, at proper periods, admitted the air, or intercepted its paſſage to the flute.

The fingers, lips, and tongue, received their proper directions by means of a ſteel cylinder turned by clock-work. It was divided into 15 equal parts, which by means of pegs, preſſing upon the ends of 15 different levers, cauſed the other extremities to aſcend. Seven of theſe levers directed the fingers, having wires and chains affixed to their aſcending extremities, which being attached to the fingers, cauſed them aſcend in proportion as the other extremity was preſſed down by the motion of the cylinder, and *vice verſa*. Thus the aſcent or deſcent of one end of a lever produced a ſimilar aſcent or deſcent in the correſponding finger, by which one of the holes of the flute was occaſionally opened or ſtopped, as by a living performer. Three of the levers ſerved to regulate the ingreſs of the air, being contrived ſo as to open and ſhut, by means of valves, the three reſervoirs of air above-mentioned, ſo that more or leſs ſtrength might be given, and a higher or lower note produced as occaſion required. The lips were, by a ſimilar mechaniſm, directed by four levers, one of which opened them, to give the air a freer paſſage; the other contracted them; the third drew them backward; and the fourth puſhed them forward. The lips were projected upon that part of the flute which receives the air; and, by the different motions already mentioned, modified the tone in a proper manner.—The remaining lever was employed in the direction of the tongue, which it eaſily moved ſo as to ſhut or open the mouth of the flute.

Thus we ſee how all the motions neceſſary for a German flute player could be performed by this machine; but a conſiderable difficulty ſtill remains, namely, how to regulate theſe motions properly, and make each of them follow in juſt ſucceſſion. This, however, was effected by the following ſimple method. The extremity of the axis of the cylinder was terminated on the right ſide by an endleſs ſcrew, conſiſting of twelve threads, each placed at the diſtance of a line and a half from the other. Above this ſcrew was fixed a piece of copper, and in it a ſteel pivot, which, falling in between the threads of the ſcrew, obliged the cylinder to follow the threads, and, inſtead of turning directly round, it was continually puſhed to one ſide. Hence, if a lever was moved, by a peg placed on the cylinder, in any one revolution, it could not be moved by the ſame peg in the ſucceeding revolution, becauſe the peg would be moved a line and a half beyond it by the lateral motion of the cylinder. Thus, by an artificial diſpoſition of thoſe pegs in different parts of the cylinder, the ſtatue was made, by the ſucceſſive elevation of the proper levers, to exhibit all the different motions of a flute-player, to the admiration of every one who ſaw it.

The conſtruction of machines capable of imitating even the mechanical actions of the human body, ſhow exquiſite ſkill; but what ſhall we ſay of one capable, Androides. not only of imitating actions of this kind, but of acting as external circumſtances require, as though it were endued with life and reaſon? This, nevertheleſs, has been done. M. de Kempelen, a gentleman of Preſburg in Hungary, excited by the performances of M. de Vaucanſon, at firſt endeavoured to imitate them, and at laſt far excelled them. This gentleman conſtructed an Androides capable of playing at cheſs!—Every one who is in the leaſt acquainted with this game muſt know, that it is ſo far from being mechanically performed, as to require a greater exertion of the judgment and rational faculties than is ſufficient to accompliſh many matters of greater importance. An attempt, therefore, to make a wooden cheſs-player, muſt appear as ridiculous as to make a wooden preacher or counſellor of ſtate. That this machine really was made, however, the public have had ocular demonſtration. The inventor came over to Britain in 1783, where he remained above a year with his automaton.

It is a figure as large as life, in a Turkiſh dreſs, ſitting behind a table, with doors of three feet and a half in length, two in depth, and two and a half in height. The chair on which it ſits is fixed to the table, which runs on four wheels. The automaton leans its right arm on the table, and in its left hand holds a pipe: with this hand it plays after the pipe is removed. A cheſs board of 18 inches is fixed before it. This table, or rather cupboard, contains wheels, levers, cylinders, and other pieces of mechaniſm; all which are publicly diſplayed. The veſtments of the automaton are then lifted over its head, and the body is ſeen full of ſimilar wheels and levers. There is a little door in its thigh, which is likewiſe opened; and with this, and the table alſo open, and the automaton uncovered, the whole is wheeled about the room. The doors are then ſhut, and the automaton is ready to play; and it always takes the firſt move.

At every motion the wheels are heard; the image moves its head, and looks over every part of the cheſs board. When it checks the queen, it ſhakes its head twice, and thrice in giving check to the king. It likewiſe ſhakes its head when a falſe move is made, replaces the piece, and makes its own move; by which means the adverſary loſes one.

M. de Kempelen remarks as the moſt ſurpriſing circumſtance attending his automaton, that it had been exhibited at Preſburg, Vienna, Paris, and London, to thouſands, many of whom were mathematicians and cheſs-players, and yet the ſecret by which he governed the motion of its arm was never diſcovered. He prided himſelf ſolely on the conſtruction of the mechanical powers, by which the arm could perform ten or twelve moves. It then required to be wound up like a watch, after which it was capable of continuing the ſame number of motions.

The automaton could not play unleſs M. de Kempelen or his ſubſtitute was near it to direct its moves. A ſmall ſquare box, during the game, was frequently conſulted by the exhibiter; and herein conſiſted the ſecret, which he ſaid he could in a moment communicate. He who could beat M. de Kempelen was, of courſe, certain of conquering the automaton. It was made in 1769. His own account of it was:

" C'eſt

Androlepsy || Androna.

"C'eſt une bagatelle qui n'eſt pas ſans merite du côté du mechaniſme; mais les effets n'en paroiſſent ſi merveilleux que par la hardieſſe de l'idée, et par l'heureux choix des moyens employés pour faire illuſion."

The ſtrongeſt and beſt armed loadſtone was allowed to be placed on the machine by any of the ſpectators.

As the inventor of this admirable piece of mechaniſm hath not yet thought proper to communicate to the public the means by which it is actuated, it is in vain for any, except thoſe who are exquiſitely ſkilled in mechanics, to form conjectures concerning them.—Many other curious imitations of the human body, as well as that of other animals, have been exhibited, though none of them equal to the laſt mentioned one. See the article AUTOMATON.

ANDROLEPSY, in *Grecian Antiquity*, an action allowed by the Athenians againſt ſuch as protected perſons guilty of murder. The relations of the deceaſed were empowered to ſeize three men in the city or houſe whither the malefactor had fled, till he were either ſurrendered, or ſatisfaction made ſome way or other for the murder.

ANDROMACHE, the wife of the valiant Hector, the mother of Aſtyanax, and daughter of Eëtion king of Thebes in Cilicia. After the death of Hector and the deſtruction of Troy, ſhe married Pyrrhus; and afterwards Helenus the ſon of Priam, with whom ſhe reigned over part of Epirus.

ANDROMEDA, in *Aſtronomy*, a northern conſtellation, behind Pegaſus, Caſſiopeia, and Perſeus. It repreſents the figure of a woman chained; and is fabled to have been formed in memory of Andromeda, daughter of Cepheus and Caſſiopeia, and wife of Perſeus, by whom ſhe had been delivered from a ſea monſter, to which ſhe had been expoſed to be devoured for her mother's pride. Minerva tranſlated her into the heavens.

The ſtars in the conſtellation Andromeda, in Ptolemy's catalogue are 23, in Tycho's 22, in Bayer's 27, in Mr Flamſted's no leſs than 84.

ANDROMEDA, the name of a celebrated tragedy of Euripides, admired by the ancients above all the other compoſitions of that poet, but now loſt.

It was the repreſentation of this play, in a hot ſummer day, that occaſioned that epidemic fever, or phrenſy, for which the Abderites are often mentioned, wherein they walked about the ſtreets, rehearſing verſes, and acting parts of this piece. See ABDERA.

ANDROMEDA, or *Marſh Cyſtus*. See BOTANY *Index*.

ANDRON, in *Grecian Antiquity*, denotes the apartment in houſes deſigned for the uſe of men; in which ſenſe it ſtands oppoſed to *Gynæceum*.—The Greeks alſo gave their dining-rooms the title of *andron*, becauſe the women had no admittance to feaſts with the men.

ANDRONA, in ancient writers, denotes a ſtreet, or public place, where people met and converſed together. In ſome writers, *androna* is more expreſsly uſed for the ſpace between two houſes; in which ſenſe, the Greeks alſo uſe the term ἀνδῶνας, for the way or paſſage between two apartments.

ANDRONA is alſo uſed, in eccleſiaſtical writers, for that part in churches deſtined for the men. Anciently it was the cuſtom for the men and women to have ſeparate apartments in places of worſhip, where they performed their devotions aſunder; which method is ſtill religiouſly obſerved in the Greek church. The ἀνδῶν, or *androna*, was in the ſouthern ſide of the church, and the women's apartment on the northern. Andronicus.

ANDRONICUS I. Comnenus, emperor of the Eaſt, was the ſon of Iſaac, and grandſon of Alexus Comnenus. Naturally endowed with a vigorous habit of body, and a firm mind, active, temperate, martial, and eloquent, he ſhines as one of the moſt conſpicuous characters of his age. Following the bent of his inclination, he attended the Roman army in their retreat; but in their march through Aſia Minor, wandering into the mountains, he fell into the hands of ſome Turkiſh huntſmen, was carried to the ſultan, and remained his priſoner. But regaining his liberty, both his virtues and vices ſoon recommended him to the favour of his couſin Manuel, the reigning emperor. The vicious heart of Andronicus manifeſted itſelf clearly in maintaining a licentious correſpondence with Eudocia the the emperor's niece, while the emperor himſelf lived in public inceſt with her ſiſter Theodora. His martial ſpirit gained him a conſiderable command in Cilicia, where he laid ſiege to Mopſueſtia; but by a ſucceſsful ſally of the enemy, he was obliged to raiſe the ſiege, and retire in conſiderable diſorder. Inflamed with a deſire of revenging the infamy of their ſiſter in his blood, the brothers of Eudocia made an unſucceſsful attempt to aſſaſſinate Andronicus at midnight in his tent; but being providentially awakened, he defended himſelf with ſurpriſing bravery, forced his way through his enemies, and eſcaped in ſafety. Afterwards engaging in a treaſonable correſpondence, with the emperor of Germany and the king of Hungary, he was arreſted, and thrown into confinement. He remained in this ſtate about twelve years, and after ſeveral repeated attempts to eſcape, he at laſt effectuated his purpoſe, and fled for refuge to the court of the great duke of Ruſſia. The cunning of Andronicus ſoon found means to regain his favour with the emperor Manuel; for having exerted all his influence, he ſucceeded in obtaining the Ruſſian prince, to engage to join his troops with thoſe of Manuel, in the invaſion of Hungary. Accordingly, on account of his important ſervice, he obtained a free pardon from the emperor, and after an expedition to the Danube, returned with him to Conſtantinople. He again fell under the diſpleaſure of the emperor, by refuſing to take an oath of allegiance to the prince of Hungary, his intended ſon-in-law, and conſequently preſumptive heir to the crown, and was thereupon, returned to his former command in Cilicia. While reſiding here, his powerful addreſs captivated the heart of Philippa, daughter of the Latin prince of Antioch, and ſiſter to the empreſs Maria; and in her company, he ſpent his time in all the amuſements that country could afford, till the emperor's reſentment put a ſtop to their correſpondence. Thus circumſtanced, he collected a band of adventurers, and undertook a pilgrimage to the holy land, where by his inſinuating turn of mind, he ſo far ſucceeded in gaining the favour of the king and clergy, as to be inveſted with the lordſhip of Berytus on the coaſt of Phœnicia. In this neighbourhood, Theodora the beautiful widow of Baldwin, king of Jeruſalem, and nearly allied in blood to him, reſided. The perſonal accompliſhments and addreſs of Andronicus captivated her heart, and ſhe became

Andronicus.

came the third victim to his artful ſeduction, and lived publicly as his concubine. Still purſued by the emperor with unabating reſentment, he was forced to take refuge in Damaſcus, and then in ſeveral other places in the eaſt, till at length he ſettled in Aſia Minor. While reſiding here, he made frequent incurſions into the province of Trebizond, and ſeldom returned without ſucceſs. After ſeveral occurrences, Theodora was made captive, by the governor of Trebizond, along with her two children, and ſent to Conſtantinople: upon which Andronicus implored and obtained pardon. He acted the affected penitent in ſuch a manner, that he again ingratiated himſelf into the favours both of the church and ſtate: but was ſent to dwell at Oenoë, a town ſituated on the Euxine coaſt.

In the year 1177 Manuel died, and was ſucceeded by his ſon Alexius II. a youth about twelve or fourteen years of age, without wiſdom or experience, by which the ambition of Andronicus was again called into action. A civil war having been occaſioned, by the miſconduct of the empreſs in Conſtantinople, the public mind was directed towards Andronicus, as the only perſon whoſe rank and accompliſhments could reſtore the public tranquillity. Incited by the patriarchs and patricians, he marched towards Conſtantinople, which he entered, took poſſeſſion of the palace, confined the empreſs, conſigned her miniſter to death, aſſumed the office of protector, put to death many perſons of diſtinction, tried and executed the queen, on a charge of correſponding with the king of Hungary, and vowed fidelity to the young emperor upon his coronation, at the ſame time teaching the neceſſity of an experienced ruler, to aſſuage the evils that threatened the empire; upon which his adherents called out "Long live Alexius and Andronicus, Roman emperors." While he affected reluctance, he was elevated to a partnerſhip in the empire. This conjunction of the royal power was ſoon diſſolved, by the murder of the unfortunate Alexius. The body of the deceaſed being brought into his preſence, ſtriking it with his foot, he ſaid, "Thy father was a knave, thy mother a whore, and thyſelf a fool." Having arrived at the dignity of ſole emperor, A. D. 1183, he continued to ſway the ſceptre, with a mixture of juſtice and bounty towards his ſubjects at large, but thoſe whom he feared or hated he governed with the moſt cruel tyranny. The noble families that were either cut off, or exiled by him, were all allied to the Comneni. Some of theſe were engaged in revolt; and the public calamity was heightened, by an invaſion of the Sicilians, in which they took and ſacked Theſſalonica. A rival without merit, and a people without arms, at laſt overturned his throne. A deſcendant from the firſt Alexius, in the female line, named Iſaac Angelus, being ſingled out by Andronicus, as a victim to his cruelty, he with courage and reſolution defended his life and liberty, ſlew his executioner, fled to the church of St Sophia, and there took refuge with ſeveral of his friends. Iſaac was inſtantly raiſed by the populace, from a ſanctuary to a throne. When this event took place, Andronicus was abſent from Conſtantinople; but he no ſooner heard of it, than he with the utmoſt ſpeed returned. Upon his arrival there, he found himſelf deſerted by all, and was ſeized, and dragged in chains before the new emperor. All the eloquence he diſplayed was of no avail; for Iſaac delivered him into the hands of thoſe whom he had injured, and for the ſpace of three days, he endured with uncommon patience, all the inſults and torments that were inflicted upon him. In the midſt of theſe he would frequently cry out, "Lord have mercy upon me," and, "why will you bruiſe a broken reed." At laſt, two friendly or furious Italians, plunging their ſwords into his body put a period to his life. His death in the 73d year of his age, terminated the dynaſty of the Comneni. (*Gen. Biog.*)

Andronicus || Andros.

Andronicus of Cyrrhus, an Athenian aſtronomer, built at Athens an octagon tower, with figures carved on each ſide, repreſenting the eight principal winds. A braſs Triton at the ſummit, with a rod in its hand, turned round by the wind, pointed to the quarter from whence it blew. From this model is derived the cuſtom of placing weathercocks on ſteeples.

ANDROPHAGI, in *Ancient Geography*, the name of a nation whoſe country, according to Herodotus, was adjacent to Scythia. Their name, compounded of two Greek words, ſignifies *man-eaters*. Herodotus does not inform us whether their manner of ſubſiſting correſponded with their name: whether they were ſo ſavage as to eat human fleſh. See the article ANTHROPOPHAGI. They are reprefented, however, as the moſt barbarous and fierce of all nations. They were not governed by laws: the care of their cattle was their chief employment. Their dreſs was like that of the Scythians; and they had a language peculiar to themſelves.

ANDROPOGON, or MAN'S-BEARD. See BOTANY *Index*.

ANDROS, one of the ancient Cyclades, lying between Tenedos and Eubœa: being one mile diſtant from the former, and ten from the latter. The ancients gave it various names, viz. Cauros, Laſia, Nonagria, Epagris, Antandros, and Hydruſia. The name of *Andros* it received from one Andreus, appointed, according to Diodorus Siculus, by Rhadamanthus, one of the generals, to govern the Cyclades, after they had of their own accord ſubmitted to him. As to the name of *Antandros*, the ſame author tells us, that Aſcanius the ſon of Æneas, being taken priſoner by the Pelaſgians, gave them this iſland for his ranſom, which on that account was called *Antandros*, or "delivered for one man." The name of *Hydruſia* it obtained in common with other places well ſupplied with water. It had formerly a city of great note, bearing the ſame name, and ſituated very advantageouſly on the brow of a hill, which commanded the whole coaſt. In this city, according to Strabo and Pliny, ſtood a famous temple dedicated to Bacchus. Near this temple, Mutianus, as quoted by Pliny, tells us, there was a ſpring called the *gift of Jupiter*; the water of which had the taſte of wine in the month of January, during the feaſt of Bacchus, which laſted ſeven days. The ſame author adds, that the waters, if carried to a place whence the temple could not be ſeen, loſt their miraculous taſte. Pauſanias makes no mention of this ſpring; but ſays, that, during the feaſt of Bacchus, wine flowed, or was at leaſt by the Andrians believed to flow, from the temple of that god. The prieſts, no doubt, found their account in keeping up this belief, by conveying, through ſecret conduits, a great quantity of wine into the temple.

The Andrians were the firſt of all the iſlanders who joined

Andros. joined the Perſians at the time Xerxes invaded Greece; and therefore Themiſtocles, after the victory at Salamis, reſolved to attack the city of Andros, and oblige the inhabitants to pay large contributions for the maintenance of his fleet. Having landed his men on the iſland, he ſent heralds to the magiſtrates, acquainting them, that the Athenians were coming againſt them with two powerful divinities, *perſuaſion* and *force*; and therefore they muſt part with their money by fair means or foul. The Andrians replied, That they likewiſe had two mighty deities who were very fond of their iſland, viz. *poverty* and *impoſſibility*; and therefore could give no money. Themiſtocles, not ſatisfied with this anſwer, laid ſiege to the town; which he probably made himſelf maſter of and deſtroyed, as we are informed by Plutarch, that Pericles, a few years after, ſent thither a colony of 250 Athenians. It was, however, ſoon retaken by the Perſians; and, on the overthrow of that empire by Alexander the Great, ſubmitted to him, along with the other iſlands. On his death it ſided with Antigonus, who was driven out by Ptolemy. The ſucceſſors of the laſt mentioned prince held it to the times of the Romans; when Attalus, king of Pergamus, beſieged the metropolis at the head of a Roman army; and, having taken it, was by them put in poſſeſſion of the whole iſland. Upon the death of Attalus, the republic claimed this iſland, as well as his other dominions, in virtue of his laſt will.

Andros is now ſubject to the Turks; and contains a town of the ſame name, with a great many villages. It is the moſt fruitful iſland in all the Archipelago, and yields a great quantity of ſilk. There are ſaid to be about 12,000 inhabitants, beſides thoſe of the villages Arni and Amoldeos, who are about two hundred, have a different language and cuſtoms, and are called *Albanois*. There are ſeven monaſteries, a great number of churches, and a cathedral for the biſhops of the Roman Catholic perſuaſion; but moſt of the inhabitants are of the Greek communion. The Jeſuits had a houſe and a church in this iſland; but they were forced to quit them long ago. Here are ſome delightful valleys; but the air is bad, and the water of the city worſe. The women would be agreeable enough, if it was not for their dreſs, which is very unbecoming; for they ſtuff out their clothes without the leaſt regard to their ſhape: but the Albaneſe women make a much better appearance. The peaſants make wicker-baſkets, wherewith they ſupply the greateſt part of the Archipelago. They have all ſorts of game in the woods and mountains, but know not how to take them for want of guns. Their principal food is goats fleſh; for there is no fiſh to be met with on their coaſts. When they are ſick, they are obliged to let the diſeaſe take its natural courſe, having neither phyſician nor ſurgeon on the iſland. A cadi, aſſiſted by a few of the principal perſons of the iſland, has the management of civil affairs, and his reſidence is in the caſtle: an aga, who preſides over the military force, lives in a tower without the city. About two miles from the preſent town are ſtill to be ſeen the ruins of a ſtrong wall with the fragments of many columns, chapiters, baſes, broken ſtatues, and ſeveral inſcriptions, ſome of which mention the ſenate and people of Andros, and the prieſts of Bacchus; from which it is probable that this was the ſite of the ancient city. E. Long. 25. 30. N. Lat. 37. 50. Andros ‖ Anee.

Andros, in *Ancient Geography*, an iſland in the Iriſh ſea (Pliny), called *Hedros* by Ptolemy. Now *Bardſey*, diſtant about a mile from the coaſt of North Wales.

ANDROSACE. See Botany *Index*.

ANDRUM, a kind of hydrocele, to which the people of Malabar are very ſubject.—Its origin is derived from the bad quality of the country waters, impregnated with certain ſalts, the ſource of moſt other diſeaſes that affect the Malabarians. Its ſigns, or ſymptoms, are an eryſipelas of the ſcrotum, returning every new moon, by which the lymphatics, being eroded, pour a ſerous ſaline humour into its cavity. The andrum is incurable; thoſe once ſeized with it have it for life: but it is not dangerous, nor very troubleſome to thoſe uſed to it; though ſometimes it degenerates into an hydroſarcocele. The method of prevention is by a heap of ſand fetched from a river of the province Mangatti, and ſtrewed in the wells. This is practiſed by the rich. As to the cure, they have only a palliative one; which is by inciſion, or tapping, and drawing off the water from the ſcrotum, once in a month or two.

ANDRYALA, DOWNY SOW-THISTLE. See Botany *Index*.

ANDUXAR, a city in the province of Andaluſia, in Spain, ſeated on the Guadalquiver. It is pretty large, indifferently rich, and defended by a good caſtle. It is adorned with handſome churches and ſeveral religious houſes, and inhabited by many families of high rank. The land about it abounds in corn, wine, oil, honey, and fruit of all ſorts; and the inhabitants carry on a conſiderable trade in ſilk. W. Long. 4. 2. N. Lat. 37. 45.

ANDUZE, a town of France, in the department of the Gard, ſeated on the river Gardon. It carries on a conſiderable trade in ſerges and woollen cloth. E. Long. 3. 42. N. Lat. 43. 39.

ANECDOTE, Anecdota, a term uſed by ſome authors for the titles of *Secret Hiſtories*; but it more properly denotes a relation of detached and intereſting particulars. The word is Greek, ἀνέκδοτα, q. d. *things not yet known* or *hitherto kept ſecret*. Procopius gives this title to a book which he publiſhed againſt Juſtinian and his wife Theodora; and he ſeems to be the only perſon among the ancients who has repreſented princes ſuch as they are in their domeſtic relation.—Varillas has publiſhed Anecdotes of the Houſe of Medicis.

Anecdotes is alſo an appellation given to ſuch works of the ancients as have not yet been publiſhed. In which ſenſe, M. Muratori gives the name *Anecdota Græca* to ſeveral writings of the Greek fathers, found in the libraries, and firſt publiſhed by him.—F. Martene has given a *Theſaurus Anecdotarum Novus*, in folio, 5 vols.

ANEE, in *Commerce*, a meaſure for grain, uſed in ſome provinces of France. At Lyons, it ſignifies alſo a certain quantity of wine, which is the load an aſs can carry at once: which is fixed at 80 Engliſh quarts, wine meaſure.

Anemometer ‖ Anemoſcope.

ANEMOMETER, in *Mechanics*, implies a machine for meaſuring the force and velocity of the wind.

Various machines of this kind have been invented at different times, and by different perſons. The following has been often experienced, and found to anſwer the intention.

* Plate XXXIII. fig. 2.

An open frame of wood, ABCDEFGHI *, is ſupported by the ſhaft or arbor I. In the two croſs-pieces HK, LM, is moved a horizontal axis QM, by means of the four ſails *ah*, *cm*, *Of*, *gh*, expoſed to the wind in a proper manner. Upon this axis is fixed a cone of wood, MNO; upon which, as the ſails move round, a weight R, or S, is raiſed by a ſtring round its ſuperficies, proceeding from the ſmaller to the larger end NO. Upon this larger end or baſe of the cone, is fixed a rocket wheel *k*, in whoſe teeth the click X falls, to prevent any retrograde motion from the depending weight.

The ſtructure of this machine ſufficiently ſhows that it may be accommodated to eſtimate the variable force of the wind; becauſe the force of the weight will continually increaſe as the ſtring advances on the conical ſurface, by acting at a greater diſtance from the axis of motion; conſequently, if ſuch a weight be added on the ſmaller part M, as will juſt keep the machine in equilibrio in the weakeſt wind, the weight to be raiſed, as the wind becomes ſtronger, will be increaſed in proportion, and the diameter of the cone NO may be ſo large in compariſon to that of the ſmaller end at M, that the ſtrongeſt wind ſhall but juſt raiſe the weight at the greater end.

If, for example, the diameter of the axis be to that of the baſe of the cone NO as 1 to 28; then, if S be a weight of one pound at M on the axis, it will be equivalent to 28 pounds when raiſed to the greater end: if therefore, when the wind is weakeſt, it ſupports one pound on the axis, it muſt be 28 times as ſtrong to raiſe the weight to the baſe of the cone. If therefore a line of ſcale of 28 equal parts be drawn on the ſide of the cone, the ſtrength of the wind will be indicated by that number on which the ſtring reſts.

ANEMONE, WIND-FLOWER. See BOTANY *Index*.

Sea-ANEMONE. See *ANIMAL-Flower*.

ANEMOSCOPE, a machine that ſhows either the courſe or velocity of the wind. (See alſo the article *Wind* GAUGE.)

The machine which ſhows the courſe of the wind, or from what point of the compaſs it blows, conſiſts of an index moving about an upright circular plate, like the dial of a clock, on which the 32 points of the compaſs are drawn inſtead of the hours. The index, which points to the diviſions on the dial, is turned by a horizontal axis, having a trundle-head at its external extremity. This trundle-head is moved by a cog-wheel on a perpendicular axis; on the top of which a vane is fixed, that moves with the courſe of the wind, and puts the whole machine in motion. The whole contrivance is extremely ſimple; and nothing required in the conſtruction, but that the number of cogs in the wheel, and rounds in the trundle-head, be equal; becauſe it is neceſſary, that, when the vane moves entirely round, the index of the dial alſo make a complete revolution.—An anemoſcope of this kind is placed in one of the turrets of the queen's palace. The anemoſcope, calculated for indicating the force or velocity of the wind, is the ſame with what moſt writers call an *anemometer*; and we have accordingly deſcribed one of thoſe machines under that article. We ſhall here add another, contrived by the late Mr Pickering, and publiſhed in the *Philoſophical Tranſactions*, N° 473. This anemoſcope is a machine four feet and a quarter high, conſiſting of a broad and weighty pedeſtal, a pillar faſtened into it, and an iron axis of about half an inch diameter faſtened into the pillar. Upon this axis turns a wooden tube; at the top of which is placed a vane, of the ſame materials, 21 inches long, conſiſting of a quadrant, graduated, and ſhod with an iron rim, notched to each degree; and a counterpoiſe of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are faſtened two ſmall round pieces of wood, which ſerve as moveable radii to deſcribe the degrees upon the quadrant, and as handles to a velum or ſail, whoſe pane is one foot ſquare, made of canvas, ſtretched upon four battens, and painted. On the upper batten, next to the ſhod rim of the quadrant, is a ſmall ſpring which catches at every notch correſponding to each degree, as the wind ſhall, by preſſing againſt the ſail, raiſe it up; and prevents the falling back of the ſail, upon leſſening of the force of the wind. At the bottom of the wooden tube, is an iron index, which moves round a circular piece of wood faſtened to the top of the pillar on the pedeſtal, on which are deſcribed the 32 points of the compaſs. The figure of this machine is given on Plate XXXIII. fig. 3. where *a* is the pedeſtal; *b*, the pillar on which the iron axis is fitted; *c*, the circle of wood, on which are deſcribed the 32 points of the compaſs; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoiſe of the vane. The adjoining figure repreſents the velum, which takes off: *a* is the plane of the velum; *b*, the ſpring; *cc*, the wooden radii; *dd*, the holes through which the pin in the centre of the quadrant goes. Its uſes are the following:

Anemoſcope.

1. Having a circular motion round the iron axis, and being furniſhed with a vane at top and index at the bottom, when once you have fixed the artificial cardinal points, deſcribed on the round piece of wood on the pillar, to the ſame quarters of the heavens, it gives a faithful account of that quarter from which the wind blows. 2. By having a velum or ſail elevated by the wind along the arch of the quadrant to a height proportionable to the power of the column of wind preſſing againſt it, the relative force of the wind, and its comparative power, at any two times of examination, may be accurately taken. 3. By having a ſpring fitted to the notches of the iron with which the quadrant is ſhod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the higheſt blaſt, ſince the laſt time of examination, without the trouble of watching it.

The ingenious contriver of this machine tells us, that he carefully examined what dependence may be had upon it, during the ſtorms of February 1743-4, and found that it anſwered exceedingly well; for that, in ſuch winds as the ſailors call *violent ſtorms*, the machine had ſix degrees to ſpare for a more violent guſt, before it comes to a horizontal poſition. It is certainly

Anethum ‖ Angel.

tainly to be depended upon in ordinary weather, the velum being hung ſo tenderly as to feel the moſt gentle breeze. There is however reaſon to fear, that the expoſing the anemoſcope to all winds for a continuance, muſt diſorder it, eſpecially irregular blaſts and ſqualls. It may not therefore be amiſs, in violent weather, for the obſerver to take the tube with its vane and velum in his hand, in order to know the force of the wind; and when he has finiſhed his obſervations, to carry the machine into the houſe, till the violence of the ſtorm is abated, when it may be replaced in its former ſituation.

ANETHUM, DILL and FENNEL. See BOTANY *Index*.

ANEURISM, in *Surgery*, a throbbing tumor, diſtended with blood, and formed by a dilatation or rupture of an artery. See SURGERY *Index*.

ANGARI, or ANGARII, in *Antiquity*, denote public couriers, appointed for the carrying of meſſages. The ancient Perſians, Budæus obſerves, had their αγγαρειον δρομημα; which was a ſet of couriers on horſeback, poſted at certain ſtages or diſtances, always in readineſs to receive the deſpatches from one, and forward them to another, with wonderful celerity, anſwering to what the moderns call *poſts*, q. d. *poſiti*, as being poſted at certain places or ſtages. The angari were alſo called by the Perſians *aſtandæ*; by the Greeks ἡμεροδρομοι, on account of the long journeys they made in one day, which, according to Suidas, amounted not to leſs than 1500 ſtadia.

ANGARIA, in *Roman Antiquity*, a kind of public ſervice impoſed on the provincials, which conſiſted in providing horſes and carriages for the conveyance of military ſtores and other public burdens. It is ſometimes alſo uſed for a guard of ſoldiers, poſted for the defence of a place. In a more general ſenſe it is uſed for any kind of oppreſſion or ſervices performed through compulſion.

ANGAZYA, one of the Comora iſlands, lying between the north end of Madagaſcar and the coaſt of Zanguebar in Africa, from Lat. 10° to 15° S. It is inhabited by Moors, who trade with divers parts of the continent, in cattle, fruits, and other commodities of the iſland; which they exchange for callicoes and other cotton cloths. The houſes here are built of ſtone, and lime made of calcined oyſter ſhells; with which the walls and roof are plaſtered in a very elegant manner. The government of Angazya is a pure ariſtocracy; the iſland being ſubject to 10 lords, who have all the title of *Sultan*. The people are very careful of their women; never permitting ſtrangers to ſee them, without permiſſion from a ſultan, or an order which the ſtranger brings with him. Many of them read and write Arabic with great facility; and ſome even underſtand Portugueſe, which they learn from their intercourſe with Moſambique, whither they trade in veſſels of 40 tons burthen.

ANGEIOTOMY, in *Surgery*, implies the opening a vein or artery, as in bleeding; and conſequently includes both arteriotomy and phlebotomy.

ANGEL, a ſpiritual intelligent ſubſtance, the firſt in rank and dignity among created beings. The word *angel* is Greek, and ſignifies a *meſſenger*: the Hebrew מלאר ſignifies the ſame thing. The angels are in Daniel (chap. iv. ver. 13, &c.) called ישים, or *watchers*, from their vigilance: for the ſame reaſon they are, in the remains we have of the prophecy attributed to Enoch, named *Egregori*; which word imports the ſame in Greek. Angel.

Angels, therefore, in the proper ſignification of the word, do not import the nature of any being, but only the office to which they are appointed, eſpecially by way of meſſage or intercourſe between God and his creatures; in which ſenſe they are called the *miniſters of God*, who do his pleaſure, and *miniſtering ſpirits* ſent forth to miniſter for them who ſhall be heirs of ſalvation. That there are ſuch beings as we call *angels*, that is, certain permanent ſubſtances, inviſible and imperceptible to our ſenſes, endued with underſtanding and power ſuperior to that of human nature, created by God, and ſubject to him as the Supreme Being; miniſtring to his divine providence in the government of the world by his appointment, and more eſpecially attending the affairs of mankind; is a truth ſo fully atteſted by Scripture, that it cannot be doubted. Nay, the exiſtence of ſuch inviſible beings was generally acknowledged by the ancient heathens, though under different appellations: the Greeks called them *demons*; and the Romans *genii*, or *lares*. Epicurus ſeems to have been the only one among the old philoſophers who abſolutely rejected them. Indeed, the belief of middle intelligences influencing the affairs of the world, and ſerving as miniſters or interpreters between God and man, is as extenſive as the belief of a God; having never, ſo far as we know, been called in queſtion by thoſe who had any religion at all.

When created.

The creation of angels is not indeed expreſsly mentioned by Moſes in the firſt of Geneſis, yet it is generally conſidered by judicious expoſitors as implied. The reaſon why the ſacred hiſtorian is ſilent on this ſubject, is ſuppoſed by Berrington to be the natural proneneſs of the Gentile world, and even of the Jews, to idolatry *. And it is thought, if they worſhipped mere material elements, which was the caſe, much more might they be inclined to worſhip ſuch ſuperior and ſublime beings as angels. But a better reaſon is perhaps given by other writers, viz. that this firſt hiſtory was purpoſely and principally for information concerning the viſible world; the inviſible, of which we know but in part, being reſerved for a better life †.

* *On the Creation*, p. 81. See alſo *Severianus on the Creation*.

† *Aſſembly's Annot. on Gen.* i. 30.

On what day they were created has been matter of conjecture. It is a point on which learned men have differed. The Socinians, indeed, hold, ſays Biſhop Hopkins ‡, that it was long before the account given by Moſes: but it muſt have been within the ſix days creation; becauſe, as we are informed, that within this ſpace God made heaven and earth, and all things that are therein. All the writers that we have ſeen on this ſubject, think they were included in the firſt day's work, when the heavens were framed.

‡ *Works*, p. 505.

It has been thought by ſome perſons, that the words of Job, "When the morning ſtars ſang together, and all the ſons of God ſhouted for joy," militate againſt the creation of angels within the ſix days. About the meaning of theſe words, however, expoſitors are not agreed; but admitting that they refer literally to angels, Dr Lightfoot, Caryl, and others, ſee no difficulty in the paſſage. The Doctor thinks they were created on the firſt day, with the heavens; and that they were ſpectators of God's works in the other parts of creation,

Angel. and praiſed and magnified the Lord for his works all along; ſinging and ſhouting when God laid the foundation of the temple, Ezra iii.

On a ſubject of this nature, it would be imprudent to *indulge* a ſpirit of conjecture: Scripture is the only ſtandard by which truth and error can be tried, and to this we muſt ultimately appeal. In is acknowledged that Moſes has not expreſsly mentioned angels by name; yet, as we have remarked, their creation is undoubtedly implied; for the heavens muſt include all that are in them; and therefore it is that the divine penman ſays, in the concluſion of his narrative, "Thus the heavens and the earth were finiſhed, and *all* the hoſt of them." Of the *hoſt* of heaven, the angels muſt form a conſiderable part; they are expreſsly called the *heavenly hoſt*, and the *armies of heaven*, Dan. iv. 35. Luke ii. 13. And if divine authority be admitted as deciſive, the reaſons adduced by Jehovah for the ſanctification of a ſabbath, demonſtrate that they did not exiſt previous to the creation of the heavens. It is, ſurely, aſſerted with propriety, that in *ſix days* the Lord made heaven and earth, the ſea, and ALL that *in them is*. Similar to which is a declaration of the divine hiſtorian relating to the ſame fact.—"And God bleſſed the ſeventh day, and ſanctified it; *becauſe* that in it he had reſted from ALL his work which God created and made," Gen. ii. 3. Now if angels exiſted prior to the ſix days of creation, the language of Moſes is far from being accurate and intelligible; and eſpecially when it is conſidered that the obſcurity might have been removed by adding, "from all the work which God had *then* created and made."

But if angels were created before the heavens, where could they exiſt? For, as the learned Gill || has remarked, "though angels have no bodies, and ſo are not in place circumſcriptively; yet as they are creatures, they muſt have an *ubi*, a ſomewhere in which they are definitively; ſo that they are here, and not there, and much leſs everywhere: Now where was there an *ubi*, a ſomewhere, for them to exiſt in, before the heavens and the earth were made? It is moſt reaſonable, therefore, to conclude, that as God prepared an habitation for all the living creatures before he made them; as the ſea for the fiſhes, the expanſe, or air, for the fowls, and the earth for men and beaſts; ſo he made the heavens firſt, and then the angels to dwell in them."

|| *Bod. Divin.* vol. i. p. 422.

That this was the fact, will appear very evident, if the words of Moſes be impartially conſidered. "In the beginning (ſays he), God created the heavens and the earth;" which words muſt refer to either the beginning of *creation* or of *time:* if to the former, and angels previouſly exiſted, the language is neither *intelligible* nor conformable to *truth;* if to the latter, the difficulty remains; for what is time but the meaſure of created exiſtence. "Time (ſays the judicious Charnock *) began with the foundation of the world: before the beginning of the creation and the beginning time, there could be nothing but eternity; nothing but what was uncreated, that is, nothing but what was without beginning." But if angels were in a pre-exiſtent ſtate, the hiſtorian's language is unaccountably ſtrange and inaccurate: for if the phraſe *in the beginning*, which is remarkably emphatical, refer to the creation of the heavens and the earth *only*, they are unhappily expreſſed; ſo expreſſed, indeed, as to convey no meaning to thoſe who conſider words as the vehicle of thought, and as intended to expreſs clearly to others the meaning of the writer. For the *natural obvious* ſenſe is as follows—"In the beginning of the creation of the heavens and the earth, God created the heavens and the earth;" which language is not only a departure from that perſpicuity and preciſion which diſtinguiſh all his narrations, but entirely irrational and abſurd.

* *Works*, vol. i. 112.

Angel.

That the words *in the beginning* refer to the firſt creation, cannot be doubted, if it be remembered. that JEHOVAH himſelf founds a claim to *eternity* on this very ground: "Before the day was, I am he."—"Before the mountains were brought forth, or ever thou hadſt formed the earth and the world, even from everlaſting to everlaſting, thou art God," Iſ. xliii. 13. Pſ. ix. 2. See alſo Prov. viii. 22, 23, &c. Now there could be no propriety in this kind of reaſoning, if angels or any other creature exiſted before the creation of the world, becauſe all claims to eternity from ſuch premiſes would apply even to Gabriel as well as to JEHOVAH. "Before the world was," is, in Scripture language, a phraſe always expreſſive of eternity; and on this principle the evangeliſt John aſſerts the divinity of Jeſus Chriſt in the firſt chapter of his hiſtory. For this purpoſe he alludes to the words of Moſes, and introduces his divine maſter to notice by celebrating the firſt act of his creative power. "In the beginning (ſays he) was the Word;" that is, Dr Doddridge remarks §, before the foundation of the world, or the firſt production of any creature: and Dr Sherlock ‡ is clearly of opinion, that the words, in their moſt common and uſual acceptation, ſignify the firſt creation of all things, and are a demonſtration of the divinity of Chriſt. Of the ſame mind was Dr Owen. He ſays, that if the phraſe *beginning* does not abſolutely and formally expreſs *eternity*, yet it doth a pre-exiſtence to the whole creation, which amounts to the ſame thing; for nothing can pre-exiſt before all creatures but the nature of God, which is eternal, unleſs we ſuppoſe a creature before the creation of any. But what is meant by this expreſſion is fully declared by other paſſages of Scripture: "I was ſet up from everlaſting, before the *beginning*, or ever the earth was;" "Glorify thou me with thine own ſelf, with the glory which I had with thee before the world was;" both which paſſages not only explain the text, but undeniably prove the pre-exiſtence of Chriſt the Son of God *. It ſhould be remembered, that, in the paſſage under conſideration, the evangeliſt's argument for the *divinity* of Jeſus Chriſt is grounded on his pre-exiſting the creation of the world; and it is conſequently aſſerted, that he is the creator of all things: but if angels had a being before the period to which he alludes, the argument loſes all its force, and no more proves the divinity of Chriſt than the divinity of an angel (A).

§ *Family Expoſitor.*

‡ *Script. Proof of Chriſt's Divin.* p. 129. See alſo *Whitby on John* i. 1.

* *On the Trinity*, p. 43.

If, therefore, the words of Moſes be impartially viewed

(A) Of this Socinus and his followers were aware; and therefore artfully endeavoured to evade the force of the

Angel. viewed in their obvious natural meaning, and compared with other paſſages of Scripture that relate to the ſame ſubject, we have no doubt but every unprejudiced mind will perceive, that as he intended to give a ſummary hiſtory of the creation of all things both in heaven and in earth, he has done it in language intelligible and accurate, and in terms ſufficiently explicit.

Their nature, power, employment, &c.

As to the nature of theſe beings, we are told, that they are ſpirits: but whether pure ſpirits diveſted of all matter, or united to ſome thin bodies, or corporeal vehicles, has been a controverſy of long ſtanding. Not only the ancient philoſophers, but ſome of the Chriſtian fathers, were of opinion, that angels were clothed with ethereal or fiery bodies, of the ſame nature with thoſe which we ſhall one day have when we come to be equal to them. But the more general opinion, eſpecially of later times, has been, that they are ſubſtances entirely ſpiritual, though they can at any time aſſume bodies, and appear in human or other ſhapes.

That the angelical powers and abilities vaſtly excel thoſe of man, cannot be denied, if we conſider, that their faculties are not clogged or impeded, as ours are, by any of thoſe imperfections which are inſeparable from corporeal being: ſo that their underſtandings are always in perfect vigour; their inclinations regular; their motions ſtrong and quick; their actions irreſiſtible by material bodies, whoſe natural qualities they can controul, or manage to their purpoſes, and occaſion either bleſſings or calamities, public or private, here below; inſtances of which are too numerous to mention.

Beſides their attendance on God, and their waiting and executing of his commands, they are alſo preſumed to be employed in taking care of mankind and their concerns: and that every man had ſuch a tutelar or guardian angel, even from his birth, was a firm belief and tradition among the Jews; and our Saviour himſelf ſeems to have been of the ſame ſentiment. The heathens were alſo of the ſame perſuaſion, and thought it a crime to neglect the admonitions of ſo divine a guide. Socrates publicly confeſſed himſelf to be under the direction of ſuch an angel, or demon, as ſeveral others have ſince done. And in this tutelar genius of each perſon they believed his happineſs and fortune depended. Every genius did his beſt for the intereſt of his client; and if a man came by the worſt, it was a ſign the ſtrength of his genius was inferior to that of his opponent, that is, of an inferior order; and this was governed by chance. There were ſome genii, whoſe aſcendant was ſo great over others, that their very preſence entirely diſconcerted them; which was the caſe of that of Auguſtus in reſpect of that of Mark Anthony; and for the ſame reaſon, perhaps, ſome perſons have wit, and ſpeak well, when others are abſent, in whoſe preſence they are confounded, and out of countenance. The Romans thought the tutelar genii of thoſe who attained the empire, to be of an eminent order; on which account they had great honours ſhown them. Nations and cities alſo had their ſeveral genii. The ancient Perſians ſo firmly believed the miniſtry of angels, and their ſuperintendance over human affairs, that they gave their names to their months, and the days of their month; and aſſigned them diſtinct offices and provinces: and it is from them the Jews confeſs to have received the names of the months and angels, which they brought with them when they returned from the Babyloniſh captivity. After which, we find they alſo aſſigned charges to the angels, and in particular the patronage of empires and nations; Michael being the prince of the Jews, as Raphael is ſuppoſed to have been of the Perſians. Angel.

The Mahometans have ſo great a reſpect for the angels, that they account a man an infidel who either denies their exiſtence, or loves them not. They believe them to be free from ſin, enjoying the preſence of God, to whom they are never diſobedient: that they have ſubtle pure bodies, being created of light; and have no diſtinction of ſexes, nor do they need the refreſhment of food or ſleep. They ſuppoſe them to have different forms and offices: That ſome adore God in ſeveral poſtures; others ſing his praiſes, and intercede for men; ſome carry and encompaſs his throne; others write the actions of men, and are aſſigned guardians to them.

As the numbers of theſe celeſtial ſpirits are very great, it is likewiſe reaſonable to believe that there are ſeveral orders and degrees among them; which is alſo confirmed by Scripture; whence ſome ſpeculative men have diſtributed them into nine orders, according to the different names by which they are there called; and reduced thoſe orders into three *hierarchies*, as they call them; to the firſt of which belong ſeraphim, cherubim, and thrones; to the ſecond, dominions, virtues, and powers; and to the third principalities, archangels, and angels. They imagine farther, that there are ſome who conſtantly reſide in heaven; others who are miniſters, and ſent forth, as there is occaſion, to execute the orders they receive from God by the former. The Jews reckon but four orders or companies of angels, each headed by an archangel; the firſt order being that of Michael, the ſecond of Gabriel, the third of Uriel, and the fourth of Raphael; but though the Jews believe them to be four, yet it ſeems there were rather ſeven. The Perſians alſo held, there were ſubordinate degrees among the angels.

Of the fallen angels.

Although the angels were originally created perfect, good, and obedient to their Maſter's will, yet ſome of them ſinned, and kept not their firſt eſtate, but left their habitation; and ſo, of the moſt bleſſed and glorious, became the moſt vile and miſerable of all God's creatures. They were expelled the regions of light, and caſt down to hell, to be reſerved in everlaſting chains under darkneſs, until the day of judgment. With heaven they loſt their heavenly diſpoſition, which delighted once in doing good and praiſing God; and fell into a ſettled rancour againſt him, and malice againſt

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the apoſtle's reaſoning, by interpreting the phraſe *in the beginning* either in a figurative ſenſe, or as referring to the beginning of John the Baptiſt's miniſtry. We will only ſubjoin, that we do not remember to have ſeen any writer deviate from the primary obvious meaning of the paſſage, who had not ſome hypotheſis to ſupport inimical to truth.

Angel. against men: their inward peace was gone; all desire of doing good departed from them; and, instead thereof, revengeful thoughts and despair took possession of them, and created an eternal hell within them.

When, and for what offence, these apostate spirits fell from heaven, and plunged themselves into such an abyss of wickedness and woe, are questions very hard, if not impossible, to be determined by any clear evidence of Scripture. As to the time, we are certain that it could not be before the sixth day of creation; because on that day it is said, "God saw every thing that he had made, and behold it was very good:" but that it was not long after it is very probable, as it must have preceded the fall of our first parents. Some have imagined it to have been after; and that carnality, or lusting to converse with women upon earth, was the sin which ruined them: an opinion (B) built upon a mistaken interpretation of Scripture, as if angels were meant by *the sons of God* who are said to have begotten the mighty men of old on the daughters of men. Others have supposed, that the angels, being informed of God's intention to create man after his own image, and to dignify his nature by Christ's assuming of it, and thinking their glory to be eclipsed thereby, envied man's happiness, and so revolted; and with this opinion that of the Mahometans has some affinity; who are taught, that the devil, who was once one of those angels who are nearest to God's presence, and named *Azazil*, forfeited paradise for refusing to pay homage to Adam at the command of God. But on what occasion soever it first showed itself, pride seems to have been the leading sin of the angels; who, admiring and valuing themselves too much on the excellence of their nature and the height of their station, came at length to entertain so little respect for their Creator, as to be guilty of downright rebellion and apostasy.

It is certain from Scripture, that these fallen angels were in great numbers, and that there were also some order and subordination preserved among them; one especially being considered as their prince, and called by several names, *Beelzebub*, *Satan*, or *Sammael* by the Jews; *Ahârimam* by the Persians; and *Eblis* by the Mahometans. Their constant employment it not only doing evil themselves, but endeavouring by all arts and means to seduce and pervert mankind, by tempting them to all kind of sin, and thereby bringing them into the same desperate state with themselves.

ANGEL is likewise a title given to bishops of several churches. In this sense St Paul is understood by some authors, where he says, *Women ought to be covered in the church, because of the angels.* The learned Dr Prideaux observes, that the minister of the synagogue, who officiated in offering up the public prayers, being the mouth of the congregation, delegated by them as their representative, messenger, or angel, to speak to God in prayer for them, was therefore, in the Hebrew language, called the *angel* of the church; and from thence the bishops of the seven churches of Asia are, by a name borrowed from the synagogue, called the *angels* of those churches. Angel ‖ Ites.

ANGEL, in *Commerce*, the name of a gold coin formerly current in England. It had its name from the figure of an angel represented upon it, weighed four pennyweights, and was twenty-three and a half carats fine. It had different values in different reigns; but is at present only an imaginary sum, or money of account, implying ten shillings.

ANGEL-Fish. See SQUALUS, ICHTHYOLOGY *Index.*

ANGELIC, or ANGELICAL, something belonging to, or that partakes of, the nature of angels. We say an *angelical* life, &c. St Thomas is styled the *angelical doctor.* The angelical salutation is called by the Romanists *Ave Maria;* sometimes simply *angelus.*

ANGELIC Garment (*Angelica vestis*), among our ancestors, was a monkish garment, which laymen put on a little before their death, that they might have the benefit of the prayers of the monks. It was from them called *angelical*, because they were called *angeli*, who by these prayers *animæ saluti succurrebant.* Hence, where we read the phrase *monachus ad succurrendum* in our old books, it must be understood of one who had put on the habit when he was at the point of death.

ANGELICA. See BOTANY *Index.*

ANGELICS, ANGELICI, in *Church History*, an ancient sect of heretics, supposed by some to have got this appellation from their excessive veneration of angels; and by others, from their maintaining that the world was created by angels.

ANGELICS is also the name of an order of knights, instituted in 1191, by Angelus Flavius Comnenus emperor of Constantinople.

ANGELICS is also a congregation of nuns, founded at Milan in 1534, by Louisa Torelli, countess of Guastalla. They observe the rule of St Augustine.

ANGELITES, in *Ecclesiastical History*, a sect of Christian heretics, in the reign of the emperor Anastasius, and the pontificate of Symmachus, about the year 494, so called from Angelium, a place in the city of Alexandria, where they held their first meetings. They were called likewise *Severites*, from one Severus, who was the head of their sect; as also *Theodosians*, from one

(B) This opinion seems to have been originally occasioned by some copies of the Septuagint, which, in the days of St Austin, had in this place *the angels of God.* Lactantius supposes the angels, who were guilty of this enormity, had been sent down by God to guard and take care of mankind; and being endued with free-will, were charged by him not to forfeit the dignity of their celestial nature, by defiling themselves with the corruptions of the earth; but that the devil at length enticed them to debauch themselves with women. He adds, that, not being admitted into heaven by reason of the wickedness into which they had plunged themselves, they fell down to the earth, and became the devil's ministers; but that those who were begotten by them, being neither angels nor men, but of a middle nature, were not received into hell, no more than their parents were into heaven. Hence arose two kinds of demons, celestial and terrestrial. These are unclean spirits, the authors of whatever evils are committed, and whose prince is the devil. From hence very probably proceeded the notions of *Incubi*, or demons who are supposed to have carnal knowledge of women.

Angelo, Angelos.

one among them named Theodoſius, whom they made pope at Alexandria. They held, that the perſons of the Trinity are not the ſame; that none of them exiſts of himſelf, and of his own nature; but that there is a common god or deity exiſting in them all, and that each is God, by a participation of this deity.

ANGELO, Michael. There were five celebrated Italian painters of this name, who flouriſhed in the 16th and 17th centuries; but the two moſt diſtinguiſhed of them are theſe.—Firſt, Michael Angelo Buonarotti, who was a moſt incomparable painter, ſculptor, and architect, born in 1474, in the territory of Arezzi in Tuſcany. He was the diſciple of Dominico Ghirlandaio; and erected an academy of painting and ſculpture in Florence, under the protection of Lorenzo di Medicis; which, upon the troubles of that houſe, was obliged to remove to Bologna. About this time he made an image of Cupid, which he carried to Rome, broke off one of its arms, and buried the image in a place he knew would ſoon be dug up, keeping the arm by him. It was accordingly found, and ſold to Cardinal St Gregory for an antique; until Michael, to their confuſion and his own credit, diſcovered his artifice, and confirmed it by the deficient arm which he produced: it is rather unuſual for the manufacturers of antiques to be ſo ingenuous. His reputation was ſo great at Rome, that he was employed by Pope Sixtus to paint his chapel; and by the command of Pope Paul III. executed his moſt celebrated piece, *The Laſt Judgment*. He has the character of being the greateſt deſigner that ever lived; and it is univerſally allowed that no painter ever underſtood anatomy ſo well. He died immenſely rich at Rome, in 1564.—Secondly, Michael Angelo de Caravaggio, born at that village in Milan, in 1569. He was at firſt no more than a bricklayer's labourer; but he was ſo charmed with ſeeing ſome painters at work, that he immediately applied himſelf to the art; and made ſuch progreſs in a few years, that he was admired as the author of a new ſtyle of painting. It was obſerved of Michael Angelo Buonarotti, that he was incomparable in deſigning, but knew little of colouring; and of Caravaggio, that he had as good a goût in colouring as he had a bad one in deſigning. There is one picture of his in the Dominican church at Antwerp, which Rubens uſed to call his maſter. It is ſaid of this painter, that he was ſo ſtrangely contentious, that the pencil was no ſooner out of his hand but his ſword was in it. He died in 1609.

ANGELO, St, a ſmall but ſtrong town of Italy, in the Capitanata. There are ſeveral other towns and caſtles of the ſame name in Italy, and particularly the caſtle of St Angelo at Rome. E. Long. 15. 56. N. Lat. 41. 43.

ANGELOS, Los, a province of Mexico, the ancient republic of Tlaſcala, of which a city called *Tlaſcala* was once the capital. That city is now reduced to an inconſiderable village, and has given place to another called *Puebla des los Angelos*, or the city of Angels. It is ſituated in W. Long. 103. 12. and N. Lat. 19. 13. It was formerly an Indian town; but in 1530 was entirely abandoned by the natives, on account of the cruelties of the Spaniards. A ſucceeding viceroy of Mexico, by a milder treatment, recalled them; and the town is now exceedingly rich and populous, ſo as even to vie with Mexico itſelf in magnificence. It is ſituated on the river Zacatula, in a fine valley, about 25 leagues to the eaſtward of Mexico. In the middle is a beautiful and ſpacious ſquare, from whence run the principal ſtreets in direct lines, which are croſſed by others at right angles. One ſide is almoſt entirely occupied by the magnificent front of the cathedral; while the other three conſiſt of piazzas, under which are the ſhops of tradeſmen. The city is the ſee of a biſhop, ſuffragan to the archbiſhop of Mexico, and we may form a judgment of the wealth of the place by the revenue of the cathedral and chapter, which amounts to 300,000 pieces of eight annually. It muſt be remembered, however, that in all popiſh countries the wealth of the laity by no means bears the ſame proportion to that of the clergy as in Britain. What contributes greatly to increaſe the riches of this province is, that here is ſituated the city of Vera Cruz, the natural centre of all the American treaſures belonging to Spain. See Vera Cruz.

Angelot, Anger.

ANGELOT, an ancient Engliſh gold coin, ſtruck at Paris, while under ſubjection to the Engliſh. It was thus called from the figure of an angel ſupporting the ſcutcheon of the arms of England and France. There was another coin of the ſame denomination ſtruck under Philip de Valois.

Angelot is alſo uſed in *Commerce* to denote a ſmall, fat, rich ſort of cheeſe, brought from Normandy. Skinner ſuppoſes it to have been thus called from the name of the perſon who firſt made it up in that form, and perhaps ſtamped it with his own name. Menage takes it to have been denominated from the reſemblance it bears to the Engliſh coin called *angelot*. It is made chiefly in the Pays de Bray, whence it is alſo denominated *angelot de Bray*. It is commonly made in vats, either ſquare or ſhaped like a heart.

ANGER, a violent paſſion of the mind, conſiſting in a propenſity to take vengeance on the author of ſome real or ſuppoſed injury done the offended party.

Anger is either deliberative or inſtinctive; and the latter kind is raſh and ungovernable, becauſe it operates blindly, without affording time for deliberation or foreſight. Biſhop Butler very juſtly obſerves, that anger is far from being a ſelfiſh paſſion, ſince it is naturally excited by injuries offered to others as well as to ourſelves; and was deſigned by the Author of nature not only to excite us to act vigorouſly in defending ourſelves from evil, but to intereſt us in the defence or reſcue of the injured and helpleſs, and to raiſe us above the fear of the proud and mighty oppreſſor.

Neither, therefore, is all anger ſinful: hence the precept, "Be ye angry and ſin not."—It becomes ſinful, however, and contradicts the rule of Scripture, when it is conceived upon ſlight and inadequate provocations, and when it continues long. It is then contrary to the amiable ſpirit of charity, which "ſuffereth long, and is not eaſily provoked." Hence theſe other precepts, "Let every man be ſlow to anger;" and, "Let not the ſun go down upon your wrath."

Theſe precepts, and all reaſoning indeed upon the ſubject, ſuppoſe the paſſion of anger to be within our power: and this power conſiſts not ſo much in any faculty we have of appeaſing our wrath at the time (for we are paſſive under the ſmart which an injury or affront occaſions, and all we can then do is to prevent its breaking out into action), as in ſo mollifying our minds

Anger. minds by habits of juſt reflection, as to be leſs irritated by impreſſions of injury, and to be ſooner pacified.

As reflections proper for this purpoſe, and which may be called the *ſedatives* of anger, the following are ſuggeſted by Archdeacon Paley in his excellent treatiſe of *Moral and Political Philoſophy**—"The poſſibility of miſtaking the motives from which the conduct that offends us proceeded; how often *our* offences have been the effect of inadvertency, when they were miſtaken for malice; the inducement which prompted our adverſary to act as he did, and how powerfully the ſame inducement has, at one time or other, operated upon ourſelves; that he is ſuffering perhaps under a contrition, which he is aſhamed, or wants opportunity, to confeſs; and how ungenerous it is to triumph by coldneſs or inſult over a ſpirit already humbled in ſecret; that the returns of kindneſs are ſweet, and that there is neither honour nor virtue nor uſe in reſiſting them—for ſome perſons think themſeves bound to cheriſh and keep alive their indignation, when they find it dying away of itſelf. We may remember that others have their paſſions, their prejudices, their favourite aims, their fears, their cautions, their intereſts, their ſudden impulſes, their varieties of apprehenſion, as well as we: we may recollect what hath ſometimes paſſed in our own minds, when we have got on the wrong ſide of a quarrel, and imagine the ſame to be paſſing in our adverſary's mind now; when we became ſenſible of our miſbehaviour, what palliations we perceived in it, and expected others to perceive; how we were affected by the kindneſs, and felt the ſuperiority, of a generous reception and ready forgiveneſs; how perſecution revived our ſpirits with our enmity, and ſeemed to juſtify the conduct in ourſelves which we before blamed. Add to this, the indecency of extravagant anger; how it renders us, whilſt it laſts, the ſcorn and ſport of all about us, of which it leaves us, when it ceaſes, ſenſible and aſhamed; the inconveniences and irretrievable miſconduct into which our irraſcibility has ſometimes betrayed us; the friendſhips it has loſt us; the diſtreſſes and embarraſſments in which we have been involved by it, and the ſore repentance which on one account or other it always coſts us.

* Book III. Part ii. chap. 7.

"But the reflection calculated above all others to allay that haughtineſs of temper which is ever finding out provocations, and which renders anger ſo impetuous, is that which the goſpel propoſes; namely, that we ourſelves are, or ſhortly ſhall be, ſuppliants for mercy and pardon at the judgment ſeat of God. Imagine our ſecret ſins all diſcloſed and brought to light; imagine us thus humbled and expoſed; trembling under the hand of God; caſting ourſelves on his compaſſion; crying out for mercy—imagine ſuch a creature to talk of ſatisfaction and revenge, refuſing to be entreated, diſdaining to forgive, extreme to mark and to reſent what is done amiſs; imagine, I ſay, this; and you can hardly feign to yourſelf an inſtance of more impious and unnatural arrogance."

Phyſicians and naturaliſts have recorded inſtances of very extraordinary effects of this paſſion. Borrichius cured a woman of an inveterate tertian ague, which had baffled the art of phyſic, by putting the patient in a furious fit of anger. Valeriola made uſe of the ſame means, with the like ſucceſs, in a quartan ague. The ſame paſſion has been equally ſalutary to paralytic, gouty, and even dumb perſons; to which laſt it has ſometimes given the uſe of ſpeech. Etmuller gives divers inſtances of very ſingular cures wrought by anger; among others, he mentions a perſon laid up in the gout, who being provoked by his phyſician, flew upon him, and was cured. It is true, the remedy is ſomewhat dangerous in the application, when a patient does not know how to uſe it with moderation. We meet with ſeveral inſtances of princes to whom it has proved mortal; e. g. Valentinian the firſt, Wenceſlaus, Matthius Corvinus king of Hungary, and others. There are alſo inſtances wherein it has produced the epilepſy, jaundice, cholera morbus, diarrhœa, &c. In fact, this paſſion is of ſuch a nature, that it quickly throws the whole nervous ſyſtem into preternatural commotions, by a violent ſtricture of the nervous and muſcular parts: and ſurpriſingly augments not only the ſyſtole of the heart and of its contiguous veſſels, but alſo the tone of the fibrous parts in the whole body. It is alſo certain, that this paſſion, by the ſpaſmodic ſtricture it produces in the parts, exerts its power principally on the ſtomach and inteſtines, which are highly nervous and membranous parts; whence the ſymptoms are more dangerous, in proportion to the greater conſent of the ſtomach and inteſtines, with the other nervous parts, and almoſt with the whole body. The unhappy influence of anger likewiſe, on the biliary and hepatic ducts, is very ſurpriſing; ſince by an intenſe conſtriction of theſe, the liver is not only rendered ſcirrhous, but ſtones alſo are often generated in the gall-bladder and biliary ducts: theſe accidents have ſcarcely any other origin than an obſtruction of the free motion and efflux of the bile, by means of this violent ſtricture. From ſuch a ſtricture of theſe ducts likewiſe proceeds the jaundice, which in proceſs of time lays a foundation for calculous concretions in the gall-bladder. Laſtly, By increaſing the motion of the fluid, or the ſpaſms of the fibrous parts, by means of anger, a larger quantity of blood is propelled with an impetus to certain parts; whence it happens that they are too much diſtended, and the orifices of the veins diſtributed there opened. It is evident from experience, that anger has a great tendency to excite enormous hæmorrhages, either from the noſe, the aperture of the pulmonary artery, the veins of the anus; or in women, from the uterus, eſpecially in thoſe previouſly accuſtomed and diſpoſed to ſuch evacuations.

Anger ‖ Angerona.

ANGERMANNIA, or ANGERMANLAND, a province of Sweden, bounded on the north by Lapland and Bothnia, on the eaſt by the gulf of Bothnia and Medelpadia, and on the weſt by Jempti and Herndel. It is full of rocks, mountains, and foreſts; and there is one very high mountain called *Scull*. It has excellent iron works, and lakes abounding with fiſh.

ANGERMOND, a town of the duchy of Berg, in Germany, on the eaſt ſide of the Rhine, ſubject to the Elector Palatine. E. Long. 6. 20. N. Lat. 51. 10.

ANGERONA, in *Mythology*, the name of a Pagan deity whom the Romans prayed to for the cure of the *quinſy*, in Latin, *angina*. Pliny calls her the *goddeſs of ſilence* and *calmneſs of mind*, who baniſhes all uneaſineſs and melancholy. She is repreſented with her mouth covered, to denote patience and refraining from complaints. Her ſtatue was ſet up, and ſacrificed to, in the temple of the goddeſs Volupia, to

ſhow

Angerona-lia || Anghiera.

ſhow that a patient enduring of affliction leads to pleaſure.

ANGERONALIA, in *Antiquity*, ſolemn feaſts held by the Romans the 21ſt of December, in honour of Angerona, or Angeronia, the goddeſs of patience and ſilence. Feſtus and Julius Modeſtus, quoted by Macrobius, Saturn. Lib. I. cap. 10. derive the name from *angina*, "quinſy;" and ſuppoſe the goddeſs to have been thus denominated, becauſe ſhe preſided over that diſeaſe.—Others ſuppoſe it formed from *angor*, "grief, pain;" to intimate that ſhe gave relief to thoſe afflicted therewith.—Others deduce it from *angeo*, "I preſs, I cloſe," as being reputed the goddeſs of ſilence, &c.

ANGERS, a city of France, and capital of the former duchy of Anjou, now the department of the Maine and Loire. It is ſeated a little above the place where the Sarte and the Loire loſe themſelves in the Maine. This laſt river divides the city into two equal parts, called the High and the Low Town. There are twelve pariſhes in the city, and four in the ſuburbs, which contain upwards of 36,000 inhabitants. Beſides theſe, there are eight chapters, and a great number of convents for both ſexes. Its greateſt extent is along the declivity of a hill, which reaches quite down to the river ſide. The caſtle was built by St Louis, about the middle of the 13th century. The walls, foſſes, and numerous towers which yet ſubſiſt, evince its former magnificence: and its ſituation in the centre of the city, on a rock overhanging the river, conduces to give it an air of grandeur, though at preſent in decay. It was the principal reſidence of the kings of Sicily, as dukes of Anjou, but is now in a ſtate of total ruin. The cathedral of Angers is a venerable ſtructure; and although it has undergone many alterations in the courſe of ages ſince its conſtruction, yet the architecture is ſingular, and deſerves attention. Here lies interred with her anceſtors the renowned Margaret, daughter of René king of Sicily, and queen of Henry VI. of England. She expired, after her many intrepid, but ineffectual, efforts, to replace her huſband on the throne, in the year 1482, at the caſtle of Dampierre in Anjou. Near the church of St Michael is the handſomeſt ſquare in the city, from whence runs a ſtreet which has the name of the church. On one ſide of this ſtreet is the town-houſe; which has a fine tower, with a clock, raiſed upon an arch, which ſerves for a paſſage into the great ſquare. There are two large bridges, which keep up a communication between the two parts of the city; and in the leſſer of theſe there is another ſquare, which ſerves for a market. The univerſity of Angers was founded in 1398, and the academy of belles lettres in 1685. This laſt conſiſts of thirty academicians. At the end of the ſuburb of Breſigny are the quarries of Angers, ſo famous for the fine ſlate which is got from thence. The pieces are of the thickneſs of a crown piece, and a foot ſquare. All the houſes in Angers are covered with this ſtate, which has gained it the appellation of the *Black City*. The walls with which King John of England ſurrounded it in 1214 remain nearly entire, and are of very great circumference. W. Long. 0. 30. N. Lat. 47. 28.

ANGHIERA, a town of Italy, in the duchy of Milan, and capital of a county of the ſame name. It is ſeated on the eaſtern ſide of the lake Maggiore, in E. Long. 9. 5. N. Lat. 45. 42.

Angina || Angleſey.

ANGINA, in *Medicine*, a violent inflammation of the throat, otherwiſe called *quinſy*. See MEDICINE *Index*.

Angina Pectoris. See MEDICINE *Index*.

ANGIOSPERMIA, in the Linnæan ſyſtem of botany, the ſecond order in the claſs didynamia. It conſiſts of thoſe plants, of that claſs, whoſe ſeeds are encloſed in a pericarpium. In this order the ſtigma is generally obtuſe. Theſe are the *perſonati* of Tournefort.

ANGITIÆ LUCUS or NEMUS, (Virg.), ſituated on the weſt ſide of the Lacus Fucinus. The inhabitants are called *Lucenſes*, by Pliny. Angitia was ſiſter of Medea, who taught antidotes againſt poiſon and ſerpents, according to Sil. Italicus. But Servius on Virgil ſays, that the inhabitants called Medea by this name for the ſame reaſon. The town is now called *Luco*.

ANGLE, the inclination of two lines meeting one another in a point. See GEOMETRY.

Angle of Incidence, in *Optics*, the angle which a ray of light makes with a perpendicular to that point of the ſurface of any medium on which it falls; though it is ſometimes underſtood of the angle which it makes with the ſurface itſelf.

Angle of Refraction now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the ſurface on which it was incident; but has ſometimes been underſtood of the angle which it makes with the ſurface of the refracting medium itſelf.

ANGLER, a perſon who practiſes the art of angling, whether as a diverſion or otherwiſe. See the article ANGLING.

ANGLER, the Engliſh name of a ſpecies of lophus. See LOPHUS, ICHTHYOLOGY *Index*.

ANGLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, ſettled in that part of Denmark, and duchy of Sleſwick, which to this day is called *Angel*, and of which the city of Flenſburgh is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variouſly accounted for. According to Saxo-Grammaticus, they were called *Angli*, from one Angulus, ſon to Humblus king of Denmark. Widiſchind, a Saxon writer, will have them to be called *Angli*, from an iſland in the corner or angle of the ſea, which they conquered. Goropius derives their name from the Saxon word *Angel* or *Engel*, ſignifying a fiſh-hook; the Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being ſo named by the neighbouring nations; as if, like hooks, they caught all that was in the ſea. To this nation the Britiſh ambaſſadors are ſaid to have applied, when ſoliciting ſuccours againſt the Scots and Picts. The Angles, therefore, came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England. See ENGLAND.

ANGLESEY, ISLE OF, is the moſt weſtern county of North Wales. It is 24 miles in length, 18 in breadth, and ſends one member to parliament. It is ſeparated from Caernarvonſhire by a ſtrait called

Angleſey. *Menai*, and on every other ſide is ſurrounded by the ſea. It is a fertile ſpot, and abounds in corn, cattle, fleſh, fiſh, and fowls.

At Port Aethwy, the moſt general ferry into the iſland, there is a great paſſage of cattle. It is computed that the iſland ſends forth annually from 12,000 to 15,000 head, and multitudes of ſheep and hogs. It is alſo computed that the remaining ſtock of cattle is 30,000. In 1770 upwards of 90,000 buſhels of corn were exported, excluſive of wheat. The improvement in huſbandry has greatly increaſed ſince the ſuppreſſion of ſmuggling from the iſle of Man: before that time every farmer was mounted on ſome high promontory, expecting the veſſel with illicit trade; but ſince that period, he ſets in earneſt to induſtry and cultivation. Not but that the iſland was in the moſt remote times famous for its fertility: Mon, Mam Gymry, the Nurſing mother of Wales, was a title it aſſumed even in the 12th century.

This iſland is divided into 74 pariſhes, of which moſt of the churches are ſituated near the ſhores. By an account given on the 13th of Auguſt 1563, there were 2010 houſeholds, or families, in Angleſey; allowing five to a family, the whole number of inhabitants at that period was 10,050. In 1776, the number of houſes in Angleſey was about 3956: allowing five perſons to a family, the whole number of inhabitants was at that time 19,780; which wants only 340 of doubling the number of inhabitants in the intervening ſpace. The chief town is BEAUMARIS.

In ancient times this iſland was called *Mon*, *Mona* or *Moneg*. It was the great nurſery of the religion of the Druids; being the reſidence of the grand druid, or chief pontiff, and conſequently of all the learned doctors in that religion.

Many ancient monuments of druidiſm ſtill remain in the iſland.—At Tre'r Dryw, or the habitation of the arch druid, are ſeveral mutilated remains, which have been deſcribed by Mr Rowlands. His *Bryn Gwyn*, or *Brein Gwyn*, or royal tribunal, is a circular hollow of 180 feet in diameter, ſurrounded by an immenſe agger of earth and ſtones, evidently brought from ſome other place, there not being any mark of their being taken from the ſpot. It has only a ſingle entrance. This is ſuppoſed to have been the grand conſiſtory of the druidical adminiſtration.—Not far from it was one of the *Gorſeddau*, now in a manner diſperſed, but which once conſiſted of a great copped heap of ſtones, on which ſat aloft a druid, inſtructing the ſurrounding people *multa de Deorum immortalium vi et poteſtate diſputare, et juventuti tradunt;* Cæſ. Lib. 6.—Here were alſo the relicks of a circle of ſtones, with the *cromlech* in the midſt; but all extremely imperfect. Two of the ſtones are very large; one, which ſerves at preſent as part of the end of a houſe, is 12 feet 7 inches high, and 8 feet broad; and another 11 feet high, and 23 feet in girth. Some leſſer ſtones yet remain. This circle, when complete, was one of the temples of the druids, in which their religious rites were performed. It is the conjecture of Mr Rowlands, that the whole of theſe remains were ſurrounded with a circle of oaks, and formed a deep and ſacred grove: *Jam per ſe roborum elegunt lucos, neque ulla ſacra ſine ea fronde conficiunt;* (Plin. Hiſt. Nat. xv. 44.)—Near this is *Caer Leb*, or the moated intrenchment; of a ſquare form, with a double rampart, and broad ditch intervening, and a leſſer on the outſide. Within are foundations of circular and of ſquare buildings. This Mr Rowland ſuppoſes to have been the reſidence of the arch druid, and to have given the name, *Tre'r Dryw*, to the townſhip in which it ſtands. At Trev Wry are ſeveral faint traces of circles of ſtones, and other veſtiges of buildings; but all ſo dilapidated, or hid in weeds, as to become almoſt formleſs. *Bod-druddn*, or the habitation of the druids, *Tre'r-Beirdd*, or that of the bard, and *Bodowyr*, or that of the prieſts, are all of them hamlets, nearly ſurrounding the ſeat of the chief druid, compoſing the eſſential part of his ſuite. At the laſt is a thick cromlech, reſting on three ſtones. Angleſey.

The ſhore near Porthamel, not far from hence, is famed for being the place where Suetonius landed, and put an end in this iſland to the druid reign. His infantry paſſed over in flat-bottomed boats, perhaps at the ſpot ſtill called *Pant yr Yſcraphie*, or the valley of *Skiffs*. His cavalry croſſed partly by fording, partly by ſwimming. Of the conflict on this occaſion we have the following animated deſcription by Tacitus*: * *Annal.* xiv. 30.

"Stat pro littore diverſa acies, denſa armis viriſque, intercurſantibus fœminis in modum furiarum, veſte ferali, crinibus dejectis, faces perferebant; *druidæque* circum, preces diras ſublatis ad cœlum manibus fundentes. Novitate aſpectus percutere militem, ut quaſi hærentibus membris, immobile corpus vulneribus præberent. Dein cohortationibus ducis, et ſe ipſe ſtimulantes, ne muliebre et fanaticum agmen paveſcerent, inferunt ſigna, ſternuntque obvios et igni ſuo involvunt. Præſidium poſthac impoſitum vicis, exciſique luci, ſævi ſuperſtitionibus ſacri. Nam cruore captivo adolere aras, et hominum fibris conſulere deos fas habebant."—Thus Engliſhed: "On the ſhore ſtood a motley army in cloſe array, and well armed; with women running wildly about in black attire with diſhevelled hair, and like the furies brandiſhing their torches; ſurrounded by the druids, lifting up their hands to heaven, and pouring forth the moſt dreadful imprecations. The ſoldier ſtood aſtoniſhed with the novelty of the ſight. His limbs grew torpid, and his body remaining motionleſs reſigned to every wound. At length, animated by their leader, and rouſing one another not to be intimidated with a womanly and fanatic band, they diſplayed their enſigns, overthrew all who oppoſed them, and flung them into their own fires. After the battle, they placed garriſons in the towns, and cut down the groves conſecrated to the moſt horrible ſuperſtitions: for the Britons held it right to ſacrifice on their altars with the blood of their captives, and to conſult the gods by the inſpection of human entrails." There are no traces of any Roman works left in this country. Their ſtay was ſo ſhort, that they had not time to form any thing permanent.

Near the ferry of Moel y Don appear the fine woods of Sir Nicholas Bayley, ſkirting the Menai for a conſiderable way. The wooded part of the iſland is on this ſide. It commences at Llanidan, and recals the ancient Britiſh name of Angleſey, *Ynys Dywyll*, or the *Dark Iſland*, on account of the deep ſhade of its groves: but at preſent it is (except in this part) entirely diveſted of trees; and the climate ſo averſe to their growth, that in moſt parts it is with great difficulty

the

Angleſey. the gentry can raiſe a plantation round their houſes. Plas Newydd, the ſeat of Sir Nicholas Bayley, lies cloſe upon the water, protected on three ſides by venerable oaks and aſhes. The view up and down this magnificent river-like ſtrait is extremely fine. The ſhores are rocky; thoſe on the oppoſite ſide covered with woods; and beyond ſoar a long range of Snowdonian Alps. Here ſtood a houſe built by Gwenllian, a deſcendant of Cadrod Hardd. The manſion has been improved, and altered to a caſtellated form by the preſent owner.

In the woods are ſome very remarkable druidical antiquities. Behind the houſe are to be ſeen two vaſt cromlechs. The upper ſtone of one is 12 feet 7 inches long, 12 broad, and four thick, ſupported by five tall ſtones. The other is but barely ſeparated from the firſt: is almoſt a ſquare, of five feet and a half, and ſupported by four ſtones. The number of ſupporters to cromlechs is merely accidental, and depends on the ſize or form of the incumbent ſtone. Theſe are the moſt magnificent we have, and the higheſt from the ground; for a middle-ſized horſe may eaſily paſs under the largeſt. In the lands of Llugwy, indeed, there is a moſt ſtupendous one of a rhomboidal form. The greateſt diagonal is 17½ feet, the leſſer 15, and the thickneſs three feet nine inches; but its height from the ground is only two feet: it was ſupported by ſeveral ſtones. The Welſh, who aſcribe every thing ſtupendous to our famous Britiſh king, call it *Arthur's Quoit*. In the woods at this place are ſome druidical circles nearly contiguous to each other.

At a ſmall diſtance from Beaumaris, on the ſhore, ſtand the remains of Llanvaes, or the Friars. It was founded by Prince Llewelyn ap Jerwerth, and according to the general tradition of the country, over the grave of his wife Joan, daughter of King John, who died in 1237, and was interred on the ſpot. Here alſo were interred a ſon of a Daniſh king, Lord Clifford, and many barons and knights who fell in the Welſh wars. It was dedicated to St Francis, and conſecrated by Howel biſhop of Bangor, a prelate who died in 1240. The religious were Franciſcans, or minor friars. Their church and houſe were deſtroyed, and their lands waſted, in the inſurrection made ſoon after the death of Llewelyn, laſt Welſh prince, by his relation Madoc. Edward II. in conſideration of their misfortunes, remitted to them the payment of the taxes due to him, which before the war were levied at the rate of 12l 10s. Theſe friars were ſtrong favourers of Owen Glendwr. Henry IV. in his firſt march againſt Owen, plundered the convent, put ſeveral of the friars to the ſword, and carried away the reſt; but afterwards ſet them at liberty, made reſtitution to the place, but peopled it with Engliſh recluſes. It poſſibly was again reduced to ruin: for Henry V. by patent, eſtabliſhes here eight friars, but directs that only two ſhould be Welſh. At the diſſolution, Henry VIII. ſold the convent and its poſſeſſions to one of his courtiers. They became in later days the property of a family of the name of *White* (now extinct), who built here a good manſion. It of late became, by purchaſe, the property of Lord Bulkeley. The church is turned into a barn, and the coffin of the princeſs Joan now ſerves for a watering trough.—A little farther is Caſtell Aber Llienawg, a ſmall ſquare fort, with the remains of a little round tower at each corner. In the middle ſtood a Angleſey. ſquare tower. A foſſé ſurrounds the whole. A hollow way is carried quite to the ſhore, and at its extremity is a large mound of earth, deſigned to cover the landing. This caſtle was founded by Hugh Lupus earl of Cheſter, and Hugh the Red earl of Shrewſbury, in 1098, when they made an invaſion, and committed more ſavage barbarities on the poor natives, eſpecially on one Kenred a prieſt, than ever ſtained the annals of any country. Providence ſent Magnus king of Norway to revenge the crueltics. His coming was to all appearance caſual. He offered to land, but was oppoſed by the earls. Magnus ſtood in the prow of his ſhip, and calling to him a moſt expert bowman, they at once directed their arrows at the earl of Shrewſbury, who ſtood all armed on the ſhore. An arrow pierced his brain through one of his eyes, the only defenceleſs part. The victor, ſeeing him ſpring up in the agonies of death, inſultingly cried out in his own language, *Leite loupe*, "Let him dance." This fort was garriſoned ſo lately as the time of Charles I. when it was kept for the parliament by Sir Thomas Cheadle; but was taken by Colonel Robinſon in 1645.

Above Llanddona is a high hill, called *Bwrdd Arthur*, or Arthur's round table: the true name was probably *Din*, or *Dinas Sulwy*: for a church immediately beneath bears that of *Llanvihangle Din-Sulwy*. On the top of it is a great Britiſh poſt, ſurrounded by a double row of rude ſtones with their ſharp points uppermoſt; and in ſome parts the ramparts are formed of ſmall ſtones. In the area are veſtiges of oval buildings; the largeſt is formed with two rows of flat ſtones ſet on end. Theſe had been the temporary habitations of the poſſeſſors. It had been a place of vaſt ſtrength: for, beſides the artificial defence, the hill ſlopes ſteeply on all ſides, and the brink next to the ramparts is moſtly precipitous. It is worth while to aſcend this hill for the ſake of the vaſt proſpect; and intermixture of ſea, rock, and alps, moſt ſavagely great.

About two miles ſouth of Plas Gwyn, the ſeat of Paul Panton, Eſq. was ſituated Penmynnydd, once the reſidence of the anceſtors of Owen Tudor, ſecond huſband to Catherine of France, queen dowager of Henry V.; "who beyng (as honeſt Halle informs us) young and luſtye, folowyng more her owne appetyte than frendely conſaill, and regardyng more her private affection than her open honour, toke to huſband privily (in 1428) a goodly gentylman, and a beautiful perſon, garniged with manye godly gyftes both of nature and of grace, called *Owen Teuther*, a man brought forth and come of the noble lignage and auncient lyne of Cadwaladar, the laſt kynge of the Britonnes." The match, important in its conſequences, reſtored the Britiſh race of princes to this kingdom: Theſe reigned long, under the title of the Houſe of Tudor; the mixed race having ceaſed on the acceſſion of Henry VII. grandſon to our illuſtrious countryman. The remains of the reſidence of the Tudors are, the door of the gateway: part of the houſe, and the great chimneypiece of the hall, are to be ſeen in the preſent farm-houſe. Some coats of arms, and dates of the building or time of repairs, are to be ſeen, with the initial letters of the names of the owners. The Tudors, for a conſiderable ſpace before the extinction of their race, aſſumed the name of *Owen*. Richard

Angleſey. was the laſt male of the family, and was ſheriff of the county in 1657. Margaret, heireſs of the houſe, married Coningſby Williams, Eſq. of Glan y gors, in this iſland, who poſſeſſed it during his life. It was afterwards ſold to Lord Bulkeley, in whoſe deſcendant it ſtill continues. In the church of Penmynndydd is a moſt magnificent monument of white alabaſter, removed at the diſſolution from the abbey of Llanvaes to this place; probably erected in memory of one of the Houſe of Tudor, who had been interred there. On it is the figure of a man in complete armour, a conic helm, and mail guard down to his breaſt; his lady is in a thick angular hood; their feet reſt on lions, and their heads are ſupported by angels.

On the weſtern point of the bay is a ſmall cape, flat at top, called *Caſtell mawr*, joined to the land by a low iſthmus. It is compoſed of limeſtone, which is carried to diſtant parts in ſmall veſſels, which lie in a ſmall channel near the rock, and by their numbers frequently enliven the view. Roman coins have been found in this neighbourhood; but there are no veſtiges of there having been any ſtation. Beyond Caſtlemawr, on the ſhore, are vaſt blocks of black marble filled with ſhells, corralloids, and fungitæ.

At Tryſclwyn mountain is the moſt conſiderable body of copper ore perhaps ever known. The part of Tryſclwyn which contains it is called *Parys mountain*. Of this mountain, and the works there carried on, we have the following very curious and particular account by Mr Pennant *:—"The external aſpect of the hill is extremely rude, and riſes into enormous rocks of coarſe white quartz. The ore is lodged in a baſon, or hollow, and has on one ſide a ſmall lake, on whoſe waters, diſtaſteful as thoſe of Avernus, no bird is known to alight. The whole aſpect of this tract has, by the mineral operations, aſſumed a moſt ſavage appearance. Suffocating fumes of the burning heaps of copper ariſe in all parts, and extend their baneful influence for miles round. In the adjacent parts vegetation is nearly deſtroyed: even the moſſes and lichens of the rocks have periſhed; and nothing ſeems capable of reſiſting the fumes but the purple melic graſs, which flouriſhes in abundance. It is thought that the ore had been worked in a very diſtant period. Veſtiges of the ancient operations appear in ſeveral parts, carried on by trenching, and by heating the rocks intenſely, then ſuddenly pouring on water, ſo as to cauſe them to crack or ſcale; thus awkwardly ſupplying the uſe of gunpowder. Pieces of charcoal were alſo found, which proves that wood was made uſe of for that purpoſe. As the Britons imported all works in braſs, it is certain that the Romans were the undertakers of theſe mines; and it is very probable that they ſent the ore to Caerhên to be ſmelted, the place where the famous cake of copper was diſcovered. They might likewiſe have had a ſmelting hearth in this iſland; for a round cake of copper was diſcovered at Llanvaethlle, a few miles from this place. Its weight was fifty pounds, and it had on it a mark reſembling an *L*.

* *Tour in Wales*, II. 263.

"In the year 1762, one Alexander Frazer came into Angleſey in ſearch of mines. He viſited Parys mountain; called on Sir Nicholas Bayley, and gave him ſo flattering an account of the proſpect, as induced him to make a trial, and ſink ſhafts. Ore was diſcovered; but before any quantity could be gotten, the mines were overpowered with water. In about two years after, Meſſrs. Roe and Co. of Macclesfield applied to Sir Nicholas for a leaſe of Penrhyn ddu mine in Caernarvonſhire; with which they were, much againſt their wills, compelled to take a leaſe of part of this mountain, and to carry on a level, and make a fair trial. The trial was accordingly made; ore was diſcovered; but the expences overbalanced the profits. They continued working to great loſs; and at length determined to give the affair up. They gave their agent orders for that purpoſe: but he, as a final attempt, divided his men into ten ſeveral companies, of three or four in a partnerſhip, and let them ſink ſhafts in various places, about eight hundred yards eaſtward of a place called the *Golden Venture*, on a preſumption that a ſpring, which iſſued from near the place, muſt come from a body of mineral. His conjecture was right; for in leſs than two days they met with, at the depth of ſeven feet from the ſurface, the ſolid mineral, which proved to be that vaſt body which has ſince been worked to ſuch advantage. The day that this diſcovery was made was March 2. 1768: which has ever ſince been obſerved as a feſtival by the miners. Soon after this diſcovery, another adventure was begun by the reverend Mr Edward Hughes, owner of part of the mountain, in right of his wife Mary Lewis of Llys Dulas; ſo that the whole of the treaſure is the property of Sir Nicholas Bayley and himſelf. The body of copper ore is of unknown extent. The thickneſs has been aſcertained in ſome places by the driving of a level under it, ſeveral years ago, and it was found to be in ſome places twenty-four yards. The ore is moſtly of the kind called by Cronſted, *Pyrites cupri flavo virideſcens*, and contains vaſt quantities of ſulphur. It varies in degrees of goodneſs; ſome of it is rich, but the greater part poor in quality.

Angleſey.

"There are other ſpecies of copper ore found here. Of late a vein of the *Pyrites cupri griſeus* of Cronſted, about ſeven yards wide, has been diſcovered near the weſt end of the mountain: ſome is of an iron gray, ſome quite black; the firſt contains ſixteen lb. of copper per 100lb. the laſt forty. An ore has been lately found, in form of looſe earth, of a dark purpliſh colour; and the beſt of it has produced better than eight in twenty. Some years ago, above thirty pounds of native copper were found in driving a level through a turbery; ſome was in form of moſs, ſome in very thin leaves.

"It is quarried out of the bed in vaſt maſſes; is broken into ſmall pieces: and the moſt pure part is ſold raw, at the rate of about 3l. to 6l. per ton, or ſent to the ſmelting-houſes of the reſpective companies to be melted into metal. Mr Hughes has great furnaces of his own at Ravenhead near Liverpool, and at Swanſey in South Wales. An idea of the wealth of theſe mines may be formed, by conſidering that the Macclesfield Company have had at once fourteen thouſand tons of ore upon bank, and Mr Hughes thirty thouſand.

"The more impure ore is alſo broken to the ſize of about hens eggs; but in order to clear it from the quantity of ſulphur with which it abounds, as well as other adventitious matter, it muſt undergo the operation of burning. For that purpoſe it is placed between two parallel walls of vaſt length: ſome kilns are 20, others

40,

Angleſey. 40, and 50 yards in length; ſome 10, others 20, feet wide, and above four feet in height. The ſpace between is not only filled, but the ore is piled many feet higher, in a convex form, from end to end. The whole is then covered with flat ſtones, cloſely luted with clay; and above is placed a general integument of clay, and ſmall rubbiſh of the work, in order to prevent any of the fumes from evaporating. Of late, ſome kilns have been conſtructed with brick arches over the ore, which is found to be the beſt method of burning. Within theſe few years, attempts are made to preſerve the ſulphur from flying away; and that is done by flues made of brick whoſe tops are in form of a Gothic arch, many ſcores of feet in length. One end of theſe opens into the beds of copper which are to be burnt. Thoſe beds are ſet on fire by a very ſmall quantity of coal, for all the reſt is effected by its own phlogiſton. The volatile part is confined, and directed to the flues; in its courſe the ſulphureous particles ſtrike againſt their roofs, and fall to the bottom in form of the fineſt brimſtone; which is collected and carried to adjacent houſes, where it is melted into what is called in the ſhops *ſtone-brimſtone*.

"The beds of copper, thus piled for burning, are of vaſt extent. Some contain 400 tons of ore, others 2000. The firſt require four months to be completely burnt, the laſt near ten. Thus burnt, it is carried to proper places to be dreſſed, or waſhed, and made merchantable. By this proceſs the ore is reduced to a fourth part in quantity, but conſiderably improved in quality: and by this means the water is ſtrongly or richly impregnated with copper, which is diſſolved by the acid quality of the ſulphur; and is collected or precipitated again by iron in the above-deſcribed pits. The iron is all diſſolved.

"But a far richer produce of copper is diſcovered from the water lodged in the bottom of the bed of ore, which is highly ſaturated with the precious metal. This is drawn up, either by means of whimſies or windmills, to the ſurface, and then diſtributed into numbers of rectangular pits 36 feet long, ſome pits more ſome leſs, 12 to 15 feet broad and 20 inches deep. To ſpeak in the language of the adept, Venus muſt make an aſſignation with Mars, or this ſolution will have no effect. In plain Engliſh, a quantity of iron muſt be immerſed in the water. The kind of iron is of no moment; old pots, hoops, anchors, or any refuſe, will ſuffice; but of late, for the convenience of management, the adventurers procure new plates, four feet long, one and a half broad, and three quarters of an inch thick. Theſe they immerſe into the pits. The particles of copper inſtantly are precipitated by the iron, and the iron is gradually diſſolved into a yellow ochre. Great part of it floats off by the water, and ſinks to the bottom. The plates, or the old iron (as it happens), are frequently taken out, and the copper ſcraped off; and this is repeated till the whole of the iron is conſumed. The copper thus procured differs little from native copper, and is prized accordingly, and ſold for prices from 25l. to 45l. a ton.

"This diſcovery is far from new: it has been practiſed long in the Wicklow mines in Ireland; and above a century in thoſe of Hern-grundt in Hungary, where it is called *ziment copper*. The waters of the Hungarian mines are much more ſtrongly impregnated with copper than thoſe of Parys mountain. The firſt effects its operation in 12 or about 20 days, the laſt requires two months. Horſe ſhoes, iron made in ſhape of hearts, and other forms, are put into the foreign waters; and when perfectly tranſmuted, are given as preſents to curious ſtrangers. Angleſey.

"The ore is not got in the common manner of mining, but is cut out of the bed in the ſame manner as ſtone is out of a quarry. A hollow is now formed in the ſolid ore open to the day, and extends about 100 yards in length, about 40 yards in breadth, and 24 yards in depth. The ends are at preſent undermined, but ſupported by vaſt pillars and magnificent arches, all metallic; and theſe caverns meander far under ground. Theſe will ſoon diſappear, and thouſands of tons of ore be gotten from both the columns and roofs. The ſides of this vaſt hollow are moſtly perpendicular, and acceſs to the bottom is only to be had by ſmall ſteps cut in the ore; and the curious viſitor muſt truſt to them and a rope, till he reaches ſome ladders, which will conduct him the reſt of the deſcent. On the edges of the chaſms are wooden platforms, which project far; on them are windlaſſes, by which the workmen are lowered to tranſact their buſineſs on the face of the precipice. There ſuſpended, they work in mid air, pick a ſmall place for a footing, cut out the ore in vaſt maſſes, and tumble it to the bottom with great noiſe. In ſuch ſituations they form caverns, and there appear ſafely lodged till the rope is lowered to convey them up again. Much of the ore is blaſted with gunpowder, eight tons of which are ſaid to be annually uſed for the purpoſe.

"Nature hath been profuſe in beſtowing her mineral favours on this ſpot: for above the copper ore, and not more than three quarters of a yard beneath the common ſoil, is a bed of yellowiſh greaſy clay, from one to four yards thick, containing lead ore, and yielding from 600 to 1000 pounds weight of lead from one ton; and one ton of the metal yields not leſs than 57 ounces of ſilver. Mixed with the earth, are frequently certain parts of the colour of cinnabar. Whether theſe are ſymptomatic of the ſulphureous arſenical ſilver ores or of quickſilver, I will not pretend to decide. Something interferes with the ſucceſsful ſmelting of this earth in the grate; inſomuch that it has not yet been of that profit to the adventurers which might reaſonably be expected from the crucible aſſays of it, and they have at this time about 8000 tons on bank undiſpoſed of. This place has been worked for lead ore in very diſtant times. In the bottom of the pool was found an ancient ſmelting hearth of grit ſtone, and ſeveral bits of ſmelted lead, of about four inches in length, two in breadth, and half an inch thick.

"Theſe works have added greatly to the population of the iſland; for about 1500 perſons are employed; who, with their families, are ſuppoſed to make near 8000 perſons, getting their bread from theſe mines. The little village of Amlwch, the port of the place, is increaſing faſt, and the market grows conſiderable. At the ſeaſon of the greateſt work, Mr Hughes's men alone receive for many weeks 200l. in one week, and 150l. in another, merely for ſubſiſtence. The port is no more than a great chaſm between two rocks, running far into land, and dry at low water; into

Angling. into which ſloops run, and lie ſecure to receive their lading."

Near Kemlyn bay is a quarry of marble, common to this place, ſome parts of Italy, and to Corſica, and known in the ſhops by the name of *Verde di Corſica*. Its colours are green, black, white, and dull purple, irregularly diſpoſed. In different blocks one or other of the colours is frequently wanting; but among the green parts are oftener found narrow veins of a moſt elegant and ſilky white aſbeſtos. It is a compound ſpecies of marble: part is calcareous, and may be acted on by aquafortis. The green parts partake of the nature of jaſper. It is apt to be interſected by ſmall cracks, or by aſbeſtine veins, therefore incapable of taking a high poliſh. This quarry lies on the lands of Monachty, in the pariſh of Llan-Fair-Ynghornwy; and it is found again in the iſle of Skerries, off this pariſh. Neither the quarry nor the aſbeſtos are at preſent in uſe. In Rhoſcolyn pariſh, a green amianthus, or brittle aſbeſtos, is met with in great plenty in a green marble ſimilar to the above; but by reaſon of the inflexible quality of its fibres not applicable to the ſame uſe.

ANGLING, among ſportſmen, the art of fiſhing with a rod, to which are fitted a line, hook, and bait. See *Fishing-Rod*, *Fishing-Hook*, *Fishing-Fly*.

The angler's firſt buſineſs is to attract the fiſh to the place intended for angling. The method of doing this, in ſtanding waters, by throwing in grains, chopped worms, and the like, is well known: but the chief difficulty is in running rivers and brooks. The method, in this caſe, is to prepare a tin box capable of holding ſome hundreds of worms, bored on all ſides, and full of holes of ſuch a ſize as they may be juſt able to crawl out at; there muſt be a plummet faſtened to this box to ſink it, and a line to draw it back at pleaſure; in this caſe it is to be thrown into the water in a proper place, above which the angler may ſtand under cover. The worms will ſlowly and gradually crawl out of this box, and the fiſh will be gathered about to feed on them; the baited hook is to be thrown in higher up and carried down by the ſtream. If this method do not bring the fiſh about the place in a little time, there is reaſon to ſuſpect that ſome pike lies lurking thereabout, and deters them: in this caſe, it is proper to throw out a baited hook, and he will generally be taken; after this the attempt will ſucceed.

When the angler takes his ſtand, he is to ſhelter himſelf under ſome tree or buſh, or ſtand ſo far from the brink of the water that he can only diſcern his float; as the fiſh are timorous and eaſily frightened away. The angling rod muſt be kept in a moderate ſtate, neither too dry nor too moiſt: in the firſt caſe, it will be brittle: in the other, rotten. When paſtes are uſed, it is proper to mix a little tow with them, and rub them over with honey; finally, a ſmall anointing with butter is of great uſe to keep them from waſhing off the hook. The eyes of any fiſh that is taken are an excellent bait for almoſt any other kind of fiſh. The beſt way of angling with the fly is down the river, and not up; neither need the angler ever make above half a dozen of trials in one place, either with fly or ground bait, when he angles for trout: by that time the fiſh will either offer to take, or refuſe the bait and not ſtir at all.

In a pond, the beſt place for the angler to take his ſtand is uſually that where the cattle go up into water: in rivers, if breams are fiſhed for, it ſhould be in the deepeſt and moſt quiet places; if eels, under the banks of rivers that hang over; perch are to be expected in clean places, where the ſtream is ſwift; and chub in deep ſhaded holes: roach are moſtly found where the perch are, and trout only in ſwift and clear ſtreams. Places where there are many weeds, or old ſtumps of trees, harbour fiſh in great numbers, and they uſually bite freely there; but there is danger of entangling the line, or faſtening the hook to the weeds. In caſe of this accident, recourſe is to be had to a ring of lead, of about ſix inches round, faſtened to a ſmall packthread: this ring is to be thruſt over the rod, and let fall into the water. It will deſcend to the place where the hook is entangled; and then, by pulling the packthread gently, the hook will be ſoon diſengaged, or at the worſt it can only be broke off near the end of the line; whereas, when this is not employed, the rod itſelf is ſometimes broken, or the line nearer its upper end. Angling ‖ Anglus.

Deep waters are beſt for angling in, for the fiſh do not love to be diſturbed by wind and weather.

The openings of ſluices and mill dams always bring fiſh up the current to ſeek for the food which is brought with the ſtream; and angling in theſe places is uſually ſucceſsful.

The beſt ſeaſon is from April to October; for, in very cold ſtormy weather, the fiſh will not bite; the beſt times of the day are from three till nine in the morning, and from three in the afternoon till ſunſet. In an eaſterly wind, there is never much ſport for the angler; the ſoutherly winds are the beſt for his purpoſe, and a warm but lowering day is moſt of all to be choſen; a gentle wind, after a ſudden ſhower, to diſturb the water, makes a very good opportunity for the angler: the cooler the weather in the hotteſt months, the better; but in winter, on the contrary, the warmer the day the better. A cloudy day, after a bright moonlight night, is always a good day for ſport; for the fiſh do not care for going after prey in the bright moonſhine, and are therefore hungry the next morning.

Thoſe who are fond of angling might ſave themſelves ſome fruitleſs trouble by obſerving when ſmall fiſh in a jar take or refuſe food. See Fish.

The ſeveral methods of angling for ſalmon, trout, carp, tench, perch, pike, dace, gudgeons, roach, flounder, &c. may be ſeen under the article Fishing.

ANGLO-Calvinists, a name given by ſome writers to the members of the church of England, as agreeing with the other Calviniſts in moſt points except church government.

Anglo-Saxon, an appellation given to the language ſpoken by the Engliſh Saxons; in contradiſtinction from the true Saxon, as well as from the modern Engliſh.

ANGLUS, Thomas, an Engliſh prieſt, well known for the ſingularity of his opinions, and ſeveral little tracts which he wrote in the 17th century. He went by ſeveral names. Mr Baillet ſays his true name was *White*; but that he uſed to diſguiſe it under that of *Candidus*, *Albus*, *Bianchi*, and *Richworth*; but he was moſt known in France by the name of *Thomas Anglus*.

Des

Angol, Angola.

Des Cartes generally called him Mr *Vitus*. He paſſed ſome time in moſt countries of Europe; but his longeſt ſtay was at Rome and Paris. When he was in England, he lived a conſiderable time in the family of Sir Kenelm Digby; and ſeems to have had a great eſteem for the opinions of this gentleman, as may be ſeen in his writings, particularly in the Preface to his Latin work concerning the Inſtitutions of the Peripatetic Philoſophy, according to the hypotheſis of Sir Kenelm. He was a great advocate for the Peripatetic philoſophy. He attempted even to make the principles of Ariſtotle ſubſervient to the explaining the moſt impenetrable myſteries of religion; and with this view he engaged in the diſcuſſion of predeſtination, free will, and grace. Mr Baillet ſays, "What he wrote upon this ſubject reſembles the ancient oracles for obſcurity." In ſuch abſtruſe points as we have mentioned, he was much embarraſſed; and, by giving too great ſcope to his own thoughts, he pleaſed neither the Moliniſts nor Janſeniſts. He is allowed, however, to have been a man of an extenſive and penetrating genius. On the 10th of June 1658, the congregation of the Index Expurgatorius at Rome condemned ſome treatiſes of Thomas Anglus. The doctors of Douay cenſured alſo 22 propoſitions extracted from his Sacred Inſtitutions. He publiſhed his *Supplicatio poſtulativa juſtitiæ*, in oppoſition to their cenſure; wherein he complains that they had given him a vague undetermined cenſure, without taxing any particular propoſition. He died ſome time after the reſtoration of Charles II. but in what year is uncertain.

ANGOL, a city of Chili in South America, ſituated in W. Long. 72. 5. S. Lat. 37. 36.

ANGOLA, a kingdom on the weſtern coaſt of Africa, lying, according to the moſt probable accounts, between Lat. 8. 30. and 16. 21. S. forming a coaſt of upwards of 480 miles; but how far it extends from weſt to eaſt, has never been exactly determined. Angola Proper is bounded on the north by the river Danda, which ſeparates it from Congo; and on the ſouth by the Coanza, by which it is ſeparated from Benguela. This laſt, however, is now included in the kingdom of Angola, having been conquered by its monarchs, though it ſtill retains the name of kingdom, and is included in the dimenſions we have juſt now given. The air here is very hot and unwholeſome, and the country mountainous; there being but few plains to be met with in it, except on the ſea coaſt, and between the huge ridges of mountains.

1 Originally a province of Congo.

That part of the kingdom which we have diſtinguiſhed by the name of *Angola Proper*, was ſubject to the kings of Congo in the year 1484, when the Portugueſe firſt diſcovered the country: but how long it had been ſo before that time, is not known; the inhabitants being utterly deſtitute of chronology, and having no other way of diſtinguiſhing paſt events, but by ſaying they happened in ſuch a king's reign. Neither, though Angola became a diſtinct kingdom ſince its diſcovery by the Portugueſe, is it known with more certainty at what time that revolution happened; or whether the Portugueſe were not concerned in aſſiſting the viceroy of the king of Congo, who governed the province of Angola, to ſet up for himſelf.

All accounts agree, that this kingdom was founded by one *Ngola* or *Angola*, from whom it took its name. According to the tradition of the country, this Ngola was a ſmith, and the inventor of that trade, in which he had been inſtructed by the demons of the country. In conſequence of this, he became exceeding rich, not in gold, ſilver, or ſhell money, which were not at that time in uſe, but in corn, cattle, and fruits, which were then exchanged in traffic. The country being not long after viſited by a grievous famine, Ngola generouſly relieved his diſtreſſed countrymen, and ſaved the lives of ſome thouſands. In gratitude for this generoſity, he was unanimouſly choſen king; and hence the ſmith's trade is reckoned among the royal arts of Angola.

Angola.

2 Tradition concerning its becoming a diſtinct kingdow.

3 More authentic account.

According to other accounts, which can be more depended upon, Ngola was the king of Congo's viceroy; who, having become powerful by the reduction of ſeveral of the neighbouring ſtates, was induced to ſet up for himſelf. Dreading, nevertheleſs, the power of his old maſter, he choſe to ſend him the uſual tribute and preſents annually, till he reckoned himſelf firmly ſeated on the throne, and had ſecured it to his deſcendants. His meaſures were greatly facilitated by the wars which the king of Congo was then engaged in with the *Giagas*, a barbarous nation in the neighbourhood. Theſe made ſuch a powerful inroad into his dominions that he was glad to aſk aſſiſtance from Ngola; not as a ſubject, but as a friend and ally. This was readily granted; and the two monarchs continued ever after ſending preſents and aſſiſtance to each other, and encouraging a mutual commerce between their ſubjects.

4 Ngola the firſt king.

Ngola lived to a great age, highly reſpected by his ſubjects, and in alliance with the king of Congo and the Portugueſe, whoſe numerous ſettlements on the coaſt had made them become very powerful. According to the cuſtom of the country, he had many wives and concubines. By his chief favourite he had three daughters, *Zunda Riangola*, *Tumba Riangola*, and another whoſe name is unknown. Towards the latter part of his life, the king's chief care was to ſecure the crown to the eldeſt of theſe; for which purpoſe he conſulted his beloved queen, who encouraged him in the deſign with all the eloquence in her power. By her advice, he ſent for his lieutenant-general, a favourite ſlave, whom he had created viceroy over the whole kingdom, to acquaint him with his reſolution. The artful miniſter did not fail to applaud his deſign, though his intention was to defraud the princeſs, and ſeize the throne for himſelf. He accordingly took the opportunity, one day, when that princeſs and the whole court were employed in ſowing their lands, to ſpread a report that the Angolic enemies had entered the kingdom, and were deſtroying every thing with fire and ſword. In this confuſion, the treacherous viceroy conducted the three princeſſes to the royal palace; and acquainting Ngola with the pretended danger, urged him to betake himſelf to a ſpeedy flight. The frighted monarch, unable to ſtir with age, deſired his miniſter to take the moſt proper means for his ſafety: whereupon, being a ſtout young fellow, he takes his majeſty on his back, and carries him into a neighbouring wood; where he no ſooner had him in a convenient place, than he ſtabbed him with a dagger. This ſtratagem was too ſhallow to remain long concealed; the murderer was quickly diſcovered, and many of the nobles roſe in arms againſt him; but finding his party too ſtrong to be oppoſed, they were at laſt obliged to ſubmit, and ſuffer him

5 Murdered by his prime miniſter, who ſeizes the throne.

Angola. him quietly to aſcend the throne, upon his publicly declaring that he had not ſeized it but with a view of ſecuring it to the princeſs Zunda Riangola.

6 Death of the uſurper, who is ſucceeded by Zunda Riangola.

To this princeſs the uſurper palliated his conduct in the beſt manner he could; and ſhe had art enough to diſguiſe her reſentment ſo effectually, that he never diſcovered the ſmalleſt occaſion for jealouſy. At laſt, his ſudden death gave Zunda an opportunity of aſcending the throne peaceably; when ſhe behaved with ſuch moderation and juſtice as to gain the love and affection of all her ſubjects. Her jealous temper prevented her from marrying; and, by giving too much way to it, ſhe came at laſt to dread as rivals the two ſons of her youngeſt ſiſter Tumba, and to form deſigns againſt their life. To accompliſh her purpoſes, ſhe ordered them to be brought to court, pretending to have them educated under her own eye. This was declined for ſome time; but at length the queen prevailed ſo far as to have the eldeſt ſent to her; whom ſhe no ſooner got into her power, than ſhe cauſed him to be maſſacred, with all his attendants; only one eſcaping, all covered with wounds, to carry the dreadful news to the princeſs and her huſband.

7 Murders her nephew.

On hearing of this bloody act, the afflicted parents immediately ſallied forth at the head of all their vaſſals. They were waited for by Queen Zunda at the head of a numerous army; but no ſooner did her ſoldiers perceive the parents of the deceaſed prince, than they immediately abandoned the queen to their reſentment. Tumba immediately ruſhed upon her ſiſter, and ſtabbed her to the heart; after which, ſhe commanded her entrails to be taken out, and thrown into the hole in which her ſon's body had been caſt. Upon this Tumba was crowned queen of Angola, and invited her huſband to participate with her in the management of public affairs. This offer he was too wiſe to accept; and Tumba, upon his refuſal, reſigned the crown into the hands of her ſurviving ſon, named *Angola Chilvagni*. He proved a great and wiſe prince, extending his dominions by conqueſt, and gaining the love of his ſubjects by the moderation and equity of his government.

8 Is herſelf murdered by her ſiſter.

9 Dambi Angola a cruel tyrant.

He was ſucceeded by one of his younger ſons, named *Dambi Angoli*; who no ſooner aſcended the throne, than he put all his brethren to death, leſt they ſhould unite in favour of the eldeſt. The reſt of his reign proved conformable to ſuch a beginning. He was a monſter of cruelty, avarice, lewdneſs, and perfidy. Death, however, in a ſhort time, happily delivered his ſubjects from this tyrant; who, notwithſtanding his infamous life, was buried with the greateſt magnificence; and a mount was erected over his grave, conſiſting, according to the cuſtom of the country, of a prodigious number of human victims which had been ſacrificed to his ghoſt.

10 Ngola Chilivagni, his conqueſts.

Dambi Angola was ſucceeded by Ngola Chilivagni, a warlike and cruel prince. He conquered many nations, and made the moſt dreadful inroads into the kingdom of Congo, along the rivers of Danda, Lucalla, Zanda, and Coanza: whoſe waters were often tinged with the blood of thouſands whom he maſſacred in his excurſions. Notwithſtanding theſe butcheries, Ngola Chilivagni ſhowed ſuch generoſity to thoſe who readily ſubmitted to him, that he was ſure to conquer, not only wherever he came, but wherever he ſeemed to direct his forces. At laſt, as if weary of conqueſt, he planted a tree on the banks of the Coanza, about eight leagues from Loanda San Paulo, as a boundary to his ravages. This tree the Portugueſe called *Iſanda*, or *Iſandaura*; and afterwards erected a fortreſs near it. Angola.

11 Fancies himſelf a god.

The ſame folly and inſolence which took place in the breaſt of Alexander the Great, on account of his rapid conqueſts, ſoon puffed up the mind of this petty African tyrant. Becauſe he had conquered and ravaged ſome of the neighbouring countries, and brought under his ſubjection a few cowardly barbarians; he firſt fancied himſelf invincible, and then that he was a god. He demanded the ſame adoration and reſpect that was paid to their other deities; and with this demand his ſubjects were ſervile enough to comply. This pretended deity, however, was forced to ſubmit to the fate of other mortals, and died without leaving a ſucceſſor behind him.

12 Revolt againſt Bandi Angola.

On the deceaſe of Ngola Chilivagni, the ſtates elected Ngingha-Angola-Chilombo-Kickaſanda, great nephew to Queen Tumba's huſband, as his ſucceſſor. He proved ſuch a rapacious and cruel tyrant, that his ſubjects univerſally wiſhed for his death; which, luckily for them, ſoon happened. He was interred with the uſual pomp and ſolemnities, particularly that of having a whole hecatomb of human victims ſacrificed upon his grave. His ſon Bandi Angola, who ſucceeded him, proved yet a greater tyrant than his father; ſo that he ſoon became intolerable to his ſubjects. A general revolt enſued, in which his ſubjects called in the cannibal Giagas to their aſſiſtance. Theſe immediately poured in like a band of hungry dogs haſtening to feed upon a carcaſs; and having defeated and devoured the forces of the tyrant, beſieged him in an inacceſſible mountain; where, not being able to come at him, they reſolved to reduce him by famine.

13 Quelled by the aſſiſtance of the king of Congo and the Portugueſe.

Bandi Angola applied to the king of Congo for aſſiſtance. As it was the intereſt of that prince to hinder the ravenous Giagas from entering into the Angolic dominions, whence they could ſo eaſily paſs into his own, he did not heſitate at granting his requeſt; and ordered a ſtrong reinforcement of the Portugueſe, of whoſe valour he had a high opinion, and of whom he entertained a great number at his court, to march to the aſſiſtance of the king of Angola. The command of the army was given to one of the moſt experienced Portugueſe officers; who, depending more on the handful of Europeans he had under his command than on the Congoeſe, attacked the rebels, though greatly ſuperior in number; and having utterly defeated them, reſtored the king of Angola to his throne.

14 The king's daughter falls in love with the Portugueſe general;

This eſſential piece of ſervice ſo endeared the Portugueſe to Bandi Angola, that he took them into his ſervice, and even into his council. Their general became a great favourite of the king, but much more ſo of his daughter, who conceived a violent paſſion for him. Unfortunately for them both, the amour was carried on with ſo little precaution on her part, that the king quickly diſcovered it; and immediately formed a reſolution of exterminating the Portugueſe all at once. Such violent meaſures, however, could not be concerted ſo privately but the princeſs got ſome intelligence of it; and having appriſed her lover of his danger, he immediately withdrew into Congo, taking with him as many of his countrymen as he conveniently could. The king of Congo expreſſed ſuch ſtrong reſentment againſt

15 who retires to Congo.

Bandi

Angola. Bandi Angola for his ingratitude, that the Portugueſe general would have probably prevailed upon him to declare war againſt Angola, had he not been obliged to defend his own dominions againſt a neighbouring prince who then made an invaſion. This afforded that general a fair pretence of aſking leave to return home; promiſing to come with ſuch reinforcements as would enable the king of Congo to revenge himſelf for the affront put upon him by the Angolic monarch. His real intention, however, was, to give the king of Portugal an opportunity of ſeizing upon the kingdom of Angola.

16 Lays a plan for the conqueſt of Angola before the king of Portugal. On his return to Liſbon, the Portugueſe general having laid his plan before the king, it was ſo well reliſhed, that an armament was ordered to be fitted out, well furniſhed with every neceſſary for building fortreſſes, &c. and a ſufficient number of men. The wind proving favourable all the way back, the Portugueſe ſoon arrived ſafe at Loanda San Paulo; whence the general deſpatched a meſſenger to acquaint the king of Congo with his arrival, and to make him ſome rich preſents. Theſe were no ſooner gone than the admiral ſailed up the Coanza; and, landing without oppoſition in the kingdom of Angola, ſet about erecting a fortreſs in a convenient ſituation, which was completed in a few days.

The king being informed of the return of the Portugueſe, and of their fortifying themſelves on advantageous ground, gathered together a numerous army:

17 Defeats the Angolans. but his forces, though upwards of 100,000 in number, were utterly defeated by the Portugueſe; vaſt numbers killed, and many more carried into ſlavery. The admiral now ravaged the whole country, putting all to fire and ſword, and making himſelf maſter of every advantageous ſpot of ground. The king, however, had ſtill the good luck to eſcape all the ſtratagems that were laid for him; and once more got ſafe to his inacceſſible fortreſs.

All this time Bandi Angola had himſelf tyrannized, and allowed his favourites to tyrannize, in ſuch a manner, that his ſubjects were become no leſs weary of his government than when they formerly revolted. Being now exaſperated beyond meaſure at the calamitous war of which he had been the occaſion, they formed a deſign of putting an end to his life; and in order to draw him out of his retreat, where he wallowed in all manner of debauchery, they had recourſe to the following ſtratagem: A deputation was ſent, acquainting him with the revolt of one Cuculo Cabazzo; who, at the head of a numerous band, committed the moſt cruel ravages. They beſought his majeſty, either to levy a ſufficient number of troops, and march in perſon againſt him, or to allow them to arm themſelves againſt him. The credulous king complied with this laſt propoſal; and granted them leave to raiſe what forces might be thought neceſſary. Four days after, notice was ſent to the king, that his ſubjects had attacked the rebels, and had been repulſed with loſs; but that, if his majeſty would but condeſcend to animate them with his preſence, the ſight of him would inſpire them with ſuch courage, that they would aſſuredly prove victorious. This had the deſired effect; and the king ſet out a few days after, without any other precaution than his own guards, to head his army which was encamped on the banks of the Lucalla. He no ſooner appeared in view than all the chief officers came out to meet him; and having, under pretence of paying their reſpects, gradually ſeparated him from his guards, they fell upon him and deſpatched him at once.

Angola. 18 Bandi Angola murdered.

Bandi Angola was ſucceeded by his ſon Ngola Bandi, whoſe mother had been a ſlave, and whoſe title to the crown was conſequently diſputable, according to the laws of the country. Of this the new king being well appriſed, thought proper to begin his reign by murdering every perſon who had oppoſed his election. He began with the *Tendula*, or commander of the king's rear guard; who, by his office, is the chief of the electors, and the perſon who governs the kingdom during the interregnum. Him he ordered to be put to death, with all his family. Theſe were followed by the principal officers of his father's court; all his concubines, together with their parents and near relations, whom he cauſed to be butchered; together with his half-brother, his father's ſon by a favourite concubine, and then but an infant. He did not ſpare even the ſon of his ſiſter Zingha Bandi, whom ſhe had by one of her paramours. The intereſt of his ſiſter had contributed greatly to raiſe this tyrant to the throne; and his ingratitude, with the murder of her ſon, ſo exaſperated her, that ſhe ſwore to be revenged on him in the ſame way.

19 Cruelty of the new king.

20 Makes war on the Portugueſe, and is reduced to great diſtreſs.

The Portugueſe were the next objects of his reſentment. Theſe he ſo much dreaded on account of their valour and policy, that he immediately declared war, reſolving not to lay down his arms till he had exterminated them to the laſt man, or driven them totally out of his dominions. His raſhneſs, however, coſt him dear. Myriads of the Angolic poltroons were overthrown by an handful of Portugueſe; and the king himſelf was forced to fly, firſt into the iſland of Chiconda in the river Coanza, and then into the deſerts of Oacco. Here his conquerors, out of great clemency, allowed him to live among the wild beaſts, without any other ſuſtenance than what the deſerts afforded. He had the misfortune alſo to loſe his queen and two ſiſters Cambi and Fungi, who were taken priſoners by the Portugueſe, but honourably treated.

The king being informed of this, ſent an embaſſy to treat of their ranſom and an exchange of priſoners. The propoſal was readily agreed to; and the princeſſes were ſent back, laden with preſents. The king,

21 His treachery. however, refuſed to perform his part of the agreement, and thereby plunged himſelf into ſtill greater difficulties. A new Portugueſe viceroy being arrived about this time, Ngola was quite at a loſs how to excuſe the

22 Sends his ſiſter Zingha on an embaſſy. non-performance of his part of the treaty. At laſt he had recourſe to his exaſperated ſiſter Zingha; and having excuſed, as well as he could, the murder of her ſon, propoſed to ſend her on a ſplendid embaſſy to the viceroy. Having conſented, but without forgetting her reſentment, ſhe ſet out, as plenipotentiary for the king of Angola, with a magnificent retinue; was received with all the honour due to her rank, and lodged in a ſplendid palace prepared for her.

23 Her haughty behaviour. At the firſt audience Zingha had of Don John (the Portugueſe viceroy), ſhe was greatly ſurpriſed to find a ſtately elbow chair prepared for him to ſit upon, and for herſelf only a rich tapeſtry ſpread on the floor, with a velvet cuſhion embroidered with gold, and placed over againſt the chair of ſtate. Diſſembling her diſpleaſure, however,

Angola. however, ſhe beckoned to one of the ladies of her retinue, commanded her to lay herſelf down on her elbows and knees upon the carpet, and ſat herſelf upon her back during the whole time of the audience. She behaved with ſuch addreſs and dignity, as to gain the admiration of the whole council. A propoſal was made of entering into an alliance offenſive and defenſive with the king of Angola, provided he acknowledged himſelf the vaſſal of the king of Portugal, and ſubmitted to pay a yearly tribute. To this Zingha replied, that ſuch conditions were indeed fit to be impoſed upon thoſe who had been conquered by the ſword; but not upon a great and powerful monarch, who only ſought their friendſhip and alliance: upon which the treaty was concluded on both ſides, without any other conditions than the exchange of priſoners. The audience being over, Don John took notice to Zingha, as he conducted her out of the hall, that the lady who had ſerved her as a ſeat, continued ſtill in the ſame poſture; upon which ſhe replied, That it did not become the ambaſſadreſs of a great monarch to make uſe of the ſame chair twice, ſo ſhe looked upon her as a piece of caſt-off goods not worthy of further notice.

Zingha was ſo taken with the honours done her by the Portugueſe, and ſo intent upon obſerving the order, dreſs, arms, &c. of their troops, that ſhe ſtaid at Loanda a conſiderable time; during which ſhe was inſtructed in the Chriſtian religion, and conſented to be baptized. Don John and his ſpouſe were her ſponſors: who diſmiſſed her ſoon after, with all poſſible honours, and highly ſatisfied with her reception and ſucceſs. At her return, ſhe took care to have the articles ratified by her brother; who expreſſed his approbation of them, and the higheſt obligations to her. He even went ſo far as to deſire the viceroy to ſend him ſome proper perſons to inſtruct him in the Chriſtian religion, which he ſaid he was very deſirous of embracing. This requeſt was immediately granted; and Don Denis de Faria, a negro prieſt, a native of Angola, was deſpatched, along with an officer of diſtinction, to ſtand godfather to the king. Theſe met at firſt with a gracious reception: but when they came to talk of baptiſm, Ngola altered his tone, and told them it was too much below his dignity to receive it from the ſon of one of his ſlaves, and ſent them both back. This was cried up by the courtiers as a princely act: but Zingha repreſented, that it could not fail to exaſperate the viceroy; and tried all poſſible means to diſſuade him from it, but in vain. He ſuffered, however, his other two ſiſters, Cambi and Fungi, to be baptized; which was performed in 1625, with a ſplendour ſuited to their dignity.

24 Embraces the Chriſtian religion.

25 War again declared againſt the Portugueſe.

As no experience ſeems to have been a ſufficient antidote againſt the innate folly of Ngola Bandi, he ſoon after took it into his head to make war on the Portugueſe, and invaded ſome of their territories. This laſt action proved his ruin: his troops were all cut off, and himſelf forced to ſwim for his life to a ſmall iſland in the Coanza, about a mile long, and two bow-ſhots in breadth; whither the Portugueſe purſued and ſurrounded him; ſo that he had no other chance, but either to fall into their hands, or be devoured by the wild beaſts with which the place ſwarmed. From both theſe dangers he was relieved by a doſe of poiſon, given him, as was ſuppoſed, by his ſiſter Zingha. Before this time, however, he had taken care to ſend his eldeſt ſon to the country of the Giagas, and put him under the care of one of their chiefs, called *Giaga Caza*, whom he beſought to take care of him, and protect him from his aunt Zingha, as he rightly imagined ſhe would not fail of attempting his life, in order to ſecure herſelf on the throne. Angola.

26 The king poiſoned.

27 Zingha Bandi crowned queen.

Zingha Bandi was crowned queen of Angola, without oppoſition, in 1627.—She was a very artful woman, endowed with great preſence of mind, firm in her reſolutions, of an intrepid courage, and a great miſtreſs in the art of diſſimulation. She inherited a large ſhare of her brother's jealous and cruel temper, to which ſhe would not heſitate to ſacrifice her neareſt relations, if they gave her the leaſt umbrage.—To this jealouſy, therefore, ſhe reſolved to ſacrifice her nephew, as well knowing he had a better title to the crown than herſelf. She made uſe of the moſt ſolemn oaths to draw him out of the hands of his guardian, proteſting that ſhe had accepted of the throne with no other view than to preſerve it for him. But Giaga, being well acquainted with her temper, was proof againſt all her oaths and fair ſpeeches.—Zingha, finding this method ineffectual, pretended a deſire of reſigning the crown to her nephew, to which ſhe ſaid ſhe had no other objection, than that ſhe was afraid he was yet incapable of aſſuming the reins of government. She therefore deſired an interview with him, though ever ſo ſhort, that ſhe might ſatisfy herſelf in this particular, and promiſed to detain him no longer than Giaga ſhould think neceſſary. Giaga thought there could be no danger in conſenting to a ſhort interview; and therefore ſent the unfortunate prince to her, attended by a magnificent retinue. The cruel queen no ſooner got him in her power, than ſhe murdered him with her own hand, and cauſed his body to be thrown into the Coanza, ridding herſelf, by that inhuman act, of a dangerous rival, as well as revenging herſelf on her brother, as ſhe had ſworn to do, for the murder of her ſon.

28 She murders her nephew.

Zingha's next ſcheme was to rid herſelf of the Portugueſe, who had eſtabliſhed themſelves in ſuch a manner as to be almoſt entire maſters of the country. They had built fortreſſes on every convenient ſpot that ſuited them, eſpecially near her principal towns, which they could level with the ground with the greateſt eaſe. They had engroſſed all her commerce, were become very wealthy, and their numbers increaſed daily; ſo that they were dreaded not only by her ſubjects, but by all the neighbouring nations. As Zingha was of a martial temper, ſhe did not long heſitate. She quickly made all neceſſary proviſions, ſtrengthened herſelf by alliances with the Giagas, and other idolatrous nations, and even with the Dutch and the king of Congo. With this combined force ſhe attacked the Portugueſe ſo ſuddenly and unexpectedly, that ſhe gained ſome advantages over them: and the Dutch made themſelves maſters of San Paulo de Loando, and ſoon after of ſome of the beſt provinces in the kingdom. This happened in the year 1641; and the Portugueſe did not recover theſe places till the year 1648, when the Dutch were entirely driven out of Angola.

29 Declares war againſt the Portugueſe.

Zingha's ſucceſſes proved ſtill more ſhort lived. Her allies the Congoeſe were ſo completely overthrown, that they were forced to ſue for peace; which the Portugueſe did not grant till they had obtained a ſufficient

30 Her bad ſucceſs.

Angola.

ficient number of hoſtages, and obliged the Congoeſe to deliver up to them ſome conſiderable poſts, upon which they immediately erected fortreſſes. Zingha's troops were now defeated in every battle; and theſe defeats followed on another ſo cloſe, that ſhe was ſoon abandoned, not only by her allies, but by her own troops. She was now conſtrained to abandon her dominions, and retire to ſome of the eaſtern deſerts, whither the Portugueſe did not think it worth while to follow her.

Zingha being reduced to ſuch diſtreſs, the Portugueſe, after giving her ſome time to ruminate on her ſituation, ſent her propoſals of peace, upon condition that ſhe ſhould become tributary to the crown of Portugal. This propoſal ſhe rejected with ſcorn; and let them know, that, however her daſtardly ſubjects might ſubmiſſively and ſhamefully behave towards them, their queen diſdained ſubjection to any foreign power. On this haughty anſwer the Portugueſe, to mortify her ſtill more, ſet up a king in her place. The perſon they piched upon was named *Angola Oarij*, or *Aaru*, who was of the royal family. Before he was crowned, the Portugueſe obliged him to turn Chriſtian; and he was accordingly baptized by the name of John. The new king, however, ſoon died of grief, at ſeeing himſelf ſo hardly treated by his maſters the Portugueſe. They quickly ſet up another, named *Philip*; who bore the yoke with more patience, and lived to the year 1660.

31 Refuſes to become tributary to them.

32 They ſet up a king.

33 Zingha's apoſtaſy and horrid barbarity.

In the mean time Zingha, exaſperated at ſeeing herſelf deprived of eleven of the beſt provinces in her dominions, and her authority in the remaining ſix greatly weakened, renounced the Chriſtian religion, and embraced all the horrid and bloody cuſtoms of the Giagas, whom ſhe outdid even in their own barbarity.—We have already hinted the barbarity of this nation in eating human fleſh. In this Zingha not only joined them, but took pleaſure in devouring the raw fleſh of human victims, and drinking their blood while warm both at her ſacrifices and at her public meals.—She affected a martial and heroic ſpirit, together with an utter averſion to the male ſex; but, according to the Portugueſe, maintained a number of the ſtrongeſt and luſtieſt youths, in whoſe embraces ſhe gave a full ſcope to her inclinations, and managed matters with ſuch ſecrecy that her intrigues could never be diſcovered. At the ſame time ſhe ordered many of her own ſex to be ripped up, when their incontinency was manifeſted by their pregnancy; and their bodies with thoſe of the infants to be caſt to wild beaſts.

But what made her moſt admired, as well as dreaded, by her ſubjects, was a notion that ſhe had by various ſtratagems inculcated upon them, of her being able to penetrate into the moſt ſecret thoughts. To keep up this apprehenſion ſhe ordered the bones of her deceaſed brother to be brought from the iſland where he was poiſoned, locked up in a cheſt covered with coarſe plates of ſilver, and laid on a fine carpet upon a pedeſtal. A number of ſinghillos or prieſts were ordered to offer ſacrifices to theſe bones, and to keep lamps continually burning before them. To this place ſhe herſelf frequently repaired, to aſſiſt at thoſe rites, which, as ſhe gave out, and every body believed, engaged the ſpirit of the deceaſed to inform her of every thing that was done, ſaid, or even deſigned, either in the kingdom or out of it.—To procure, however, as much real intelligence as poſſible, ſhe kept vaſt numbers of ſpies all over the kingdom, who conſtantly gave her notice of what happened in their reſpective circles; and this ſhe ſo cunningly improved to her own ends, that her ſubjects looked upon her as a kind of deity from whom nothing could be concealed.

Angola.

By ſuch means as theſe, Zingha gained ſuch authority over the Giagas, that they were ready, at the very firſt indication of her will, to follow her through the moſt dreadful dangers, and to engage in the moſt deſperate enterpriſes. She now made many ſtrenuous and daring efforts to drive out the Portugueſe; but though ſhe had, in all probability, more valour and ſkill than her enemies, their fire arms gave them ſuch an advantage, that ſhe was always defeated with great loſs. Perceiving therefore the folly of attempts of this kind, ſhe contented herſelf with making continual inroads into their country, carrying off or deſtroying every thing that fell in her way. Though ſhe ſpared neither Europeans, nor blacks, who were ſubjects of the mock monarchs ſet up by the Portugueſe, yet the caſe of the former was peculiarly dreadful when they happened to be taken priſoners. They were either roaſted by a ſlow fire, or had their fleſh cut off in pieces, and devoured before their faces, in the manner related by Mr Bruce of the Abyſſinian oxen*. In this manner ſhe infeſted the Portugueſe territories for 28 years, ſcarce ever allowing them a moment's ceſſation of arms. Their mock-kings were often obliged to ſhelter themſelves from her fury in an inacceſſible rock called *Maopongo*; and they themſelves could never hope to enjoy their dominions with any kind of peace ſo long as this furious queen continued alive. They in vain exhauſted all their politics either to reduce her by force, or to mollify her by preſents and fair offers. The one ſhe rejected with diſdain, and always found means to baffle the other. Nor would ſhe hearken to any terms, unleſs they conſented to reſign all their conqueſts. The refuſal of this demand was ſo commonly followed by ſome marks of her reſentment, that it was with the utmoſt difficulty the Portugueſe could prevail on any body to carry their propoſals to her; and as for Zingha, ſhe diſdained to make any to them, except thoſe of the hoſtile kind. The terror of her arms procured her a free paſſage wherever ſhe directed her courſe; all the inhabitants of a province making no leſs haſte to abandon, than ſhe to invade it. Thus ſhe continued to advance, till at length ſhe was got ſo far as the ſmall iſland of Dangii in the river Coanza. The Portugueſe now found themſelves under the neceſſity of raiſing an army of negroes, in order to drive her out of it. Accordingly they ſurrounded the iſland, and intrenched themſelves along the banks on both ſides of the river; but while they were buſy at their work, Zingha attacked them with ſuch advantage, that ſhe killed and wounded ſeveral hundreds of the blacks, and ſome of the white men. Elated with this advantage, ſhe was preparing for another attack; when ſhe perceived, to her ſurpriſe, that the Portugueſe had drawn their lines ſo cloſe, and raiſed them to ſuch a height, that they overlooked her whole camp, and could fire upon her naked ſoldiers as if they ſhot at a mark.—Thus great numbers of her men were cut off, particularly her chief officers. The queen, now perceiving the

34 Her influence over the Giagas.

35 Her terrible ravages.

* See *Abyſſinia*.

Angola.

danger of her ſituation, amuſed the Portugueſe with propoſals of an accommodation; and having obtained a truce for three days, croſſed the river in the dead of the night, and led her forces to the province of Oacco. The next morning, the Portugueſe, ſeeing no human creature upon the iſland, began to apprehend ſome new ſtratagem; but, upon landing ſome of their troops, they perceived themſelves over-reached, and deprived of the faireſt opportunity they ever had of forcing her to ſurrender at diſcretion.

36 Outwits the Portugueſe.

Zingha ſtaid no longer in the province whither ſhe had retired, than till ſhe was aſſured that the Portugueſe were retired from the Coanza; and then, croſſing that river once more, marched directly towards the kingdom of Metamba, which had been invaded by ſome of the neighbouring princes. The ſpeed with which ſhe led her forces thither, and recruited her army with multitudes of Giagas, who were all emulous of fighting under her banner, quickly enabled her to recover ſome of her territories in that kingdom. Beginning now to think herſelf ſucceſsful, ſhe again attacked the Portugueſe; but was defeated with great loſs, ſo as to be obliged to ſend for freſh troops. To complete her misfortune, ſhe received news that the Giaga Caſſangi had taken the advantage of her abſence, to enter the kingdom of Metamba with a numerous army, had carried off the greateſt part of the inhabitants, deſtroyed all the fruits of the earth, plundered the towns of all that was valuable, and ſet fire to the reſt, leaving that kingdom in a manner deſolate. To add to all this, her troops, exaſperated at the loſs of their wives, children, and goods, which were carried to the fartheſt corner of Benguela, were all on the point of revolting.

37 Her complicated misfortunes.

38 The Portugueſe ſend an embaſſy to her.

Notwithſtanding theſe diſaſters, Zingha behaved with ſuch reſolution and addreſs, that the Portugueſe, who, according to character, had probably inſtigated the Giaga againſt her, were ſo much afraid of her joining with him in alliance againſt them, that they deſpatched one Anthony Coglio, a learned prieſt and an excellent negotiator, with Don Gaſpar Borgia an eminent officer, under pretence of negotiating a peace between them, firſt to the Giaga, and afterwards to the queen. They met with a very civil reception from the firſt, who told them that he was very willing to live at peace with that princeſs, and even to let her enjoy the kingdom of Metamba, though he was the rightful heir to it, provided ſhe would lay down her arms. This anſwer encouraged the prieſt to try whether he could prevail on him to embrace the Chriſtian religion; but that was declined by the Giaga in ſuch ſtrong terms, that the prieſt thought proper to deſiſt, and ſet out for Zingha's camp.

39 Their propoſals reſected.

The ambaſſadors, at their firſt arrival, met with ſuch a polite reception, as made them hope for ſucceſs; but after ſhe had heard their propoſals, ſhe aſſumed a haughty threatening tone, and told them in the concluſion of her ſpeech, "That it did not become her dignity to lay down her arms, till ſhe had brought the war ſhe had begun to an honourable concluſion: that as to the Giagas, whoſe ſect ſhe had embraced ſome years before, and who had furniſhed her with ſuch a prodigious number of forces to fight in her defence, her honour and intereſt required that ſhe ſhould ſtill keep them in her ſervice, and under her protection: and laſtly, that as to herſelf, ſhe remembered, indeed, that ſhe had formerly embraced Chriſtianity; but that it was not now a proper ſeaſon to propoſe her returning to it, and they ought to remember that they themſelves were the cauſe of her abandoning it."

Angola.

Borgia, perceiving that ſhe was not to be wrought upon by religious motives, ſhifted the topic; and told her, that ſhe had gained honour enough in war, and that it was now high time to think of granting peace and tranquillity to the ſubjects of two ſuch powerful kingdoms, and accept of the favour and friendſhip of the king of Portugal, which was offered her by his viceroy. To this the queen made anſwer, that ſhe was perfectly well acquainted with the valour and ſtrength of the Portugueſe, and ſhould eſteem it an honour to be allied to that monarch; but that ſhe thought it juſt that their reſpective claims to the dominions which ſhe juſtly inherited from her anceſtors, and of which he had unjuſtly deprived her, ſhould firſt of all be decided, either by the ſword or by ſome equitable judges.

Borgia, vainly imagining that he had now obtained enough, ſet off immediately for Loanda San Paulo; but left the prieſt, on ſome pretence or other, to ſee whether, in the time of ſickneſs, he could make any impreſſion on the inflexible mind of Zingha, who now laboured under a lingering diſeaſe. Coglio, however, found all his arts to no purpoſe; and, upon the queen's recovery, ſhe recommenced the war with more fury than ever.

40 Zingha's narrow eſcape.

For ſome time hoſtilities were carried on with various ſucceſs; Zingha being ſometimes victorious and ſometimes defeated. In one attempt of the latter kind, before the fortreſs of Maſſangana, ſhe not only loſt a great number of men, but had her two ſiſters Cambi and Fungi taken priſoners, ſhe herſelf eſcaping with the utmoſt difficulty. Exaſperated by this loſs, ſhe led her troops into ſome of the beſt provinces of the Portugueſe, and reduced them to a mere wilderneſs. Still, however, ſhe had the mortification to find her loſſes vaſtly greater than what ſhe gained; and had now the additional misfortune of loſing her ſiſter Fungi, who was put to death by the Portugueſe for treachery, and ſeeing her allies the Dutch totally expelled out of Angola.

41 Begins to relent;

Zingha being thus oppreſſed with a complication of misfortunes, and conſcious of the crimes ſhe had committed, began ſeriouſly to conſider whether ſuch a continued ſeries of diſaſters was not owing to the diſpleaſure of the God of the Chriſtians. To this opinion ſhe ſeemed to have inclined; and therefore began to treat with more lenity ſuch Chriſtians as fell into her hands, eſpecially if they happened to be prieſts or monks. To theſe ſhe now began to liſten with ſome attention; and ordered them, under ſevere penalties, to be treated with all poſſible reſpect; yet without loſing in the leaſt that invincible hatred ſhe had conceived againſt thoſe who had ſtripped her of her dominions, or dropping her reſolution never to make peace till ſhe had recovered them.

42 but ſtill reſiſts the artifices of the Portugueſe.

The viceroy, Don Salvador Correa, who had driven out the Dutch, being appriſed of the regard ſhown to the clergy by Queen Zingha, thought proper to ſend ſome Capuchins to her, in hopes that they might now find her more tractable. But Zingha was ſtill proof againſt

Angola. against their utmoſt art; obſerving, however, that if they would conſent to reſtore what they had unjuſtly taken from her, ſhe would not only return to the Chriſtian religion, but encourage it to the utmoſt of her power.

The viceroy, being now afraid that Zingha might make an alliance againſt him with the king of Congo, firſt raiſed a powerful army, and then acquainted that monarch, that, if he deſigned to prevent the total ruin of his dominions, he muſt immediately make reparation for all the damage he had cauſed to the Portugueſe by his alliance with the Dutch. The fame of the Portugueſe valour ſo intimidated the king, that he ſubmitted to a treaty almoſt on the viceroy's own terms; and as ſoon as this treaty was concluded, Don Ruy Pegado, an old experienced officer, was deſpatched to Zingha, offering a firm and laſting alliance with her, provided ſhe renounced the Giaghan ſect, and returned to the boſom of the church. To this embaſſy ſhe returned the old anſwer, namely, that the Portugueſe themſelves had been the occaſion of all that had happened; as they had not only ſtripped her of her hereditary dominions, but dared to proclaim one of her vaſſals king of Angola; but, provided theſe dominions were reſtored, ſhe would immediately embrace Chriſtianity.

43 Their infamous conduct.

All this time the furious Queen Zingha went on with her ravages, notwithſtanding the viceroy kept plying her with letters for near three years. At laſt he had recourſe to the artifice of taking advantage of the remorſe for her crimes with which Zingha was ſometimes affected, in order to procure the peaceable enjoyment of his own ill-gotten conqueſts.

It is eaſy to ſee, that had this viceroy, or the prieſts he employed, really intended to convert Zingha to Chriſtianity, they ought to have ſo far ſet her an example, as at leaſt to abandon part of the countries of which they had robbed her: but, inſtead of this, they impiouſly made uſe of the ſacred name of our Saviour, in order to deter a poor ſavage African from recovering what juſtly belonged to her.

44 She returns to Chriſtianity.

Queen Zingha, at laſt, came to incline ſo much to return to the Chriſtian religion, that a general murmur ran through her army. But having, by various artifices, reconciled the minds of her ſubjects to this event, ſhe explained her deſign in a ſet ſpeech; offering at the ſame time liberty to thoſe who choſe to abandon her on this account to go where they would; and ſuch was their attachment to her, that even on ſuch a ſudden and important change in her reſolutions they expreſſed no uneaſineſs, but on the contrary applauded her to the higheſt degree.

The Portugueſe, after having been haraſſed in a terrible manner for 28 years, and at laſt obliged to profane the name of their Saviour to procure a peace, began now freely to enjoy the fruits of their villany. A

45 Treaty with the Portugueſe propoſed.

treaty was ſet on foot between the viceroy and Zingha; which, however, was not eaſily concluded. She demanded the releaſe of her ſiſter Cambi, whoſe Chriſtian name was Donna Barbara; and the Portugueſe demanded a ranſom of 200 ſlaves or an equivalent in money. This Zingha did not well reliſh; and, being preſſed to a compliance, threatened them with a more furious war than any they had yet experienced. Upon this the viceroy was obliged to have recourſe to the uſual method of ſending prieſts to perſuade her to comply through motives of religion. Theſe hypocrites effected their purpoſe; and the ſlaves were ſent, as if Chriſtianity required the delivering up innocent people to thoſe who had no lawful authority over them: but not being able to conclude a laſting peace about the ceſſion of the Angolic provinces, they were forced to conclude a ſhort truce, and ſent back her ſiſter. Angola.

This princeſs was received by Zingha in a very affectionate manner: and, ſome time after, the queen, her mind being probably weakened through the infirmities of old age, not only was thoroughly reconciled to the Portugueſe, but looked upon them as her beſt friends. She encouraged the Chriſtian religion; had a church built in her capital; made ſeveral laws againſt Paganiſm; and, *to encourage marriage*, ſhe herſelf wedded a handſome young fellow in the 75th year of her age.

The Portugueſe now imagining they would at laſt gain their point, propoſed to her the following terms, as the baſis of a laſting treaty between the two nations. 46 The Portugueſe terms.

1. "That they ſhould yield to her, *as a preſent*, ſome of the countries of which they had already robbed her. 2. That, in conſideration of the ſaid preſent, which ſhould in noways be interpreted as an inveſtiture, the queen ſhould pay yearly a certain acknowledgement to the king of Portugal, who ſhould be at liberty to withdraw the ſaid preſent whenever ſhe failed of making the ſaid acknowledgement. 3. That a free commerce ſhould be opened between thoſe two ſtates, as well for ſlaves as for other merchandiſes. 4. That the queen ſhould moleſt none of the lords that were feudatory to the Portugueſe, whatever damages or ravages they might have committed during the late wars between them. 5. That ſhe ſhould reſtore all the Portugueſe ſlaves that had taken refuge in her dominions. 6. That ſhe ſhould deliver up the Giaga Colanda, who had revolted from the Portugueſe, upon condition that his crime ſhould go unpuniſhed."

The queen, having now a thorough view of the deep-rooted villany of thoſe with whom ſhe had to do, conceived ſuch diſpleaſure againſt the Portugueſe, that ſhe fell ſick. During this ſickneſs, Father Anthony, her chief confidant, and a creature of the viceroy, never left off ſoliciting her to make her peace with God, and to accept of the terms offered her by the Portugueſe: but Zingha, though worn out with age and ſickneſs, had ſtill the good ſenſe to perceive, that there was no connexion between making her peace with God and complying with ſuch infamous terms; and therefore gave the following anſwer, which, under ſuch circumſtances, ſhows a magnanimity ſcarce equalled in any age or in any country. 47 The queen's noble anſwer.

1. "That as to her converſion, as it was neither owing to any deſire of obtaining a peace, or other worldly motives, but the Divine grace by which ſhe was recalled, ſhe was reſolved to perſevere in it to her laſt breath. 2. That as to her going over to the Giagan ſect, ſhe had in a great meaſure been forced to it by the Portugueſe viceroy. 3. That the king of Portugal would do a generous act in reſtoring ſome of her Angolic dominions; but it would be more ſo, were he to reſtore them all. 4. That as to her paying homage to him, neither her mind nor heart were baſe enough to conſent to it; and that as ſhe had refuſed the propoſal while ſhe lived among the Giagas, much more did ſhe think herſelf

above

Angola. above it now she was a Christian queen, and owed neither tribute nor homage to any but to the Supreme Power, from whom she had received both her being and her kingdom: That, nevertheless, if she could be convinced that there was any thing in her dominions that would be acceptable to his Portuguese majesty, she would voluntarily make him a present of it; and as to the rest of the articles, such was her desire of making a firm and lasting peace with them, that she should make no difficulty of consenting to them."

This answer was not altogether satisfactory to the viceroy; but the priest, finding it impossible to make
48 any impression upon her mind, easily prevailed upon
Articles of the treaty. him to consent to the following terms. 1. "That the river Lucalla should be the boundary between the dominions of the Portuguese and of Queen Zingha. 2. That neither side should thenceforth give any reception to the fugitive slaves of the other, but send them back without any delay, together with the prisoners which had been taken during the last year. 3. That the queen should remain wholly free and exempt from all tribute and homage whatever, provided she agreed to the other articles."

49 The peace signed. These terms were at last signed by the queen and viceroy in the month of April 1657, and ratified by the king of Portugal in the month of November the same year.—The only difficulty the queen had concerning this treaty was with regard to the Giaga Colanda: and the manner in which she extricated herself from it, with her subsequent behaviour, cannot fail to give us an high idea of the mental abilities of this African heroine.

50 Zingha's honourable behaviour. This Giagan chief, weary of the Portuguese yoke, had retired from them, at the head of 1000 stout soldiers, and a much greater number of slaves, some leagues beyond the river Lucalla, and put himself under the queen's protection. This she readily granted, as he was very able to be serviceable to her in case the perfidious conduct of the Portuguese should oblige her to renew the war. She could not therefore but look upon it as unjust and dishonourable, to deliver up a brave chief who had devoted himself to her service, and whom she had taken under her special protection, to a nation with whose perfidy she was so well acquainted. To save her honour, therefore, some time before the ratification of the treaty, she sent privately for the Giaga, and acquainted him with the demand of the Portuguese; telling him, at the same time, that though she doubted not of the viceroy's keeping his word, and forgiving his offence, yet she advised him to go out of her dominions, and settle himself and his men in some country distant from the Portuguese frontiers; but forbade him, on pain of her highest displeasure, to commit the least outrage or hostility within their dominions.

The Giaga thanked her majesty, and seemed to acquiesce with her advice, but did not follow it. On the contrary, he had no sooner reached his fortress, than he set himself about fortifying it in such a manner as looked rather like defiance than defence: and, having gathered a considerable army, soon spread a general terror around him. Of this the Portuguese failed not to complain to the queen: who immediately marched against him, surprised and defeated his army; and he himself being killed in the action, his head was cut off and sent to the Portuguese. Angola.

This was among the last memorable actions performed by this famous queen; who, now finding herself unfit for the fatigues of war, contented herself (in 1658) with despatching an old experienced general against a neighbouring prince who had invaded her territories. He proved no less successful than herself, and quickly forced the aggressor to submit to her terms. She now gave herself up to study the best method of propagating Christianity among her subjects; and for this purpose sent a solemn embassy to Rome, to pay homage to the Pope in her name, and to request a fresh supply of missionaries. To this letter she received an answer from his Holiness in 1662; and it was read in the church, that same year, in the most public and solemn manner. The day appointed was the 15th of July; on which she repaired to the church at the head of a numerous retinue, and having the letter hanging about her neck in a purse made of cloth of gold. The concourse was so great, that the church could not contain one half of the people, so that none were admitted but persons of rank. The father having finished the mass, read the latter at the altar in the Portuguese language; and the secretary interpreted it in that of the country. The queen, who had stood all the while it was reading, went towards the altar, and on her knees received it from the father; and having kissed it, and sworn afresh upon the gospel to continue in obedience to the church of Rome, kissed the letter again, put it into the purse, and returned to the palace amidst the shouts and acclamations of many thousands of her subjects. On that day she gave a magnificent treat to the Portuguese resident, and to all her court, in two great porticos, and she herself vouchsafed to eat after the European manner; that is, sitting on a stately elbow chair, with a high table before her, covered with the finest linen, and with dishes, plates, knives, and forks, all of silver gilt. She bestowed some largesses upon her chief officers, released a good number of slaves, and at night appeared at the head of her ladies of honour, both she and they dressed in the Amazonian manner. They performed a kind of combat, in which the queen, though upwards of eighty years of age, behaved with all the vigour and activity of a women of thirty.

51 Defeats and kills the Giaga Colanda.

52 Encourages Christianity.

53 Ceremonies at receiving a letter from the pope.

Her life, however, was not lengthened in proportion to her vigour and activity: for in the month of September she was seized with an inflammation in her throat; which, in December, having seized her breast and lungs, she expired on the 17th of that month, and was succeeded by her sister Barbara. 54 Zingha dies.

The deceased queen was buried with extraordinary pomp; and, out of regard to her, Barbara was inaugurated a second and third time, with the greatest pomp, and the most joyful acclamations. She was a very zealous Christian, but wanted her sister's abilities, and had the misfortune of being in the decline of life, lame, and almost blind. Besides this, she had been married to a proud ill-natured husband, named Mona Zingha; who, though to her he owed all his fortune and advancement, being himself no more than the son of a slave, used her with such cruelty, even in the late queen's life, that she was obliged to take refuge in the palace, from whence he had the insolence immediately to 55 Succeeded by her sister Barbara.

56 Cruelty of her husband Mona Zingha to her.

Angola.

to fetch her. This ſo exaſperated Queen Zingha, that ſhe had well nigh ordered him to be cut in pieces before her face; but pardoned him at the requeſt of Father Anthony, who probably knew he was privy to ſome religious ſecrets which he might, in caſe of ſuch emergency, have diſcloſed. On Barbara's acceſſion to the throne, however, he not only redoubled his cruelty to her, in hopes of getting the management of affairs entirely into his own hands, but invented accuſations againſt Anthony himſelf, with a deſign to extirpate both him and his religion. He gave out that the late queen had been poiſoned by ſome favourite European diſhes, with which Brother Ignatio uſed to regale her during her laſt illneſs; and attributed his wife's lameneſs and blindneſs to ſome ſorceries or charms uſed by the convent againſt her. He had even perſuaded, or rather forced, his queen to conſent that ſome of the ſinghillos or prieſts ſhould be brought to counter-charm her diſtemper.

57 He accuſes Father Anthony:

58 who reprimands the queen.

Father Anthony, far from being intimidated at the accuſations brought againſt him, repaired immediately to the palace; where he boldly reprimanded the queen for giving ear to theſe jugglers, threatening at the ſame time to leave her dominions, and carry off with him all the croſſes, and other religious utenſils, from which alone they could have any benefit. The queen returned a very ſubmiſſive anſwer; and promiſed to deliver up the counter-charms which ſhe at that time had upon her, before ſunſet; which ſhe accordingly did, and ſent them to the convent by the hands of her ſecretary. This ſo exaſperated her huſband, and all the Giagan ſect, that they reſolved upon the deſtruction of all the prieſts and Europeans, and even the queen herſelf. This, however, was found improper to be attempted; and Mona Zingha was ſo much chagrined at his diſappointment, that he retired to his own eſtate; giving out, that he deſigned to meddle no more with ſtate affairs; but, in reality, to concert meaſures for engroſſing the ſovereignty to himſelf, and to deprive his wife of her life and crown.

To accompliſh his purpoſe, he ſent a meſſenger to her, deſiring her to repair to his houſe, where he had ſomething of importance to communicate; but ſhe declining the invitation by the advice of Father Anthony, he found himſelf diſappointed, and begged leave to retire to a neighbouring province, which was under his government. He was again diſappointed, and forbid to ſtir out of the province of Metamba. The queen was, however, guilty of an error not long after, in ſending Mona Zingha, at the head of an army, to quell a revolt on the fronties. On his returning victorious, he thought himſelf ſtrong enough to revive the ancient Giagan rites, and therefore ordered 100 ſlaves to be ſacrificed to the manes of the deceaſed queen. Though the queen was immediately appriſed of his intention, and deſpatched a meſſenger expreſsly commanding him to deſiſt; yet Mona, by diſtributing ſome preſents, particularly ſome European wines, among the counſellors, effected his purpoſe with impunity. He did not forget to ſend ſome of this wine to Father Anthony: but to prevent ſuſpicion, preſented him only with a ſmall quantity, to be uſed, as he ſaid, at the maſs; adding, that if it proved agreeable, he would ſupply him with a larger quantity. The unſuſpecting prieſt drank about two glaſſes of it; and in about a quarter of an hour was ſeized with violent convulſions in his bowels, and other ſymptoms of being poiſoned. By proper aſſiſtance, however, he recovered: yet ſo far was he diſabled by this doſe, that he was obliged to abandon his miſſion.

59 Mona Zingha revives the Giagan rites;

60 and poiſons Father Anthony.

Angola.

The queen's infirmities in the mean time daily increaſing, Mona Zingha was ſoon delivered from all further oppoſition on her part, by her death, which happened on the 24th of March 1666. Upon this, Mona Zingha made all poſſible haſte to get himſelf elected king; and immediately renounced the Chriſtian religion, raiſing a perſecution at the ſame time againſt its profeſſors. He even wrote to the Portugueſe viceroy, acquainting him with his having renounced Chriſtianity, which he had only embraced out of complaiſance to his queen, and with his deſign to revive the Giagan rites. To ſhow that he meant to be as good as his word, he ordered all the children under ſix years of age, that could be found, to be ſacrificed in honour of their infernal deities. He alſo recalled the ſinghillos, and heaped many favours upon them; ſo that they became entirely devoted to his purpoſes. He likewiſe cauſed many of his ſubjects to be privately poiſoned; and then gave out, that their unaccountable deaths were owing to their having abandoned the religion of their anceſtors, and embraced Chriſtianity; which he ſtyled the religion of a parcel of famiſhed ſtrangers, who through their extreme miſery, had been forced to leave their native country, and ſeek for a livelihood in the richeſt provinces of Africa.

61 The queen dies.

62 Cruelties of Mona Zingha.

By theſe and ſuch like ſtratagems he almoſt entirely extirpated Chriſtianity, and any appearances of civilization which had been introduced among his ſubjects. His career, however, was ſtopped by Don John the princeſs Barbara's firſt huſband, from whom ſhe had been divorced on account of his having another wife. He ſoon compelled the uſurper to fly into an iſland in the Coanza; but not having the precaution to reduce him entirely, Mona Zingha found means to retrieve his affairs, and at laſt defeated and killed Don John himſelf, by which he became maſter of the throne without any further oppoſition. He was no ſooner re-eſtabliſhed, than he began to purſue his butcheries with more fury than ever; when on a ſudden, Don Franciſco, the ſon of Don John, appeared at the head of an army in oppoſition to the uſurper; and in the firſt engagement Mona Zingha being defeated and killed, Don Franciſco became ſole maſter of the empire.

63 He is defeated and killed.

It is not known whether this prince kept to the terms of the alliance made by Queen Zingha with the Portugueſe or not. Theſe, however, have preſerved their conqueſts, and for ſome time they allowed the natives to chooſe a king for themſelves, or rather they choſe him for them, as we have already noticed. Theſe kings enjoyed only a mere ſhadow of royalty; their whole grandeur conſiſting in being allowed to breed peacocks, and adorn themſelves with their feathers, which was forbidden to their ſubjects under pain of perpetual ſlavery. The laſt of theſe kings was named Ngola Sedeſio, who, diſliking an empty name of royalty, revolted from the Portugueſe, and carried on a long war with them; but being at laſt defeated and killed, his head was cut off, ſalted, and ſent to Liſbon in pickle. After this the Portugueſe ſeem not to have thought it ſafe to truſt their Angolic ſubjects even with the

64 Low ſtate of the kings ſet up by the Portugueſe.

Angola, Angon.

the name of a king of their own, but have veſted the power entirely in their viceroy; but as to the extent of his dominions, and how matters ſtand between him and that race of Angolic princes who have preſerved their liberty, we are entirely in the dark.

65 Diviſion into provinces.

When in its greateſt ſplendour, the kingdom of Angola contained the 17 following provinces: Cheſſama, Sumbi, Benguela, Rimba, Sietta, High and Low Bembea, Temba, Oacco, Cabezzo, Lubolo, Loanda, Bengo, Danda, Moſiche, Higher and Lower Ilamba, Oraij, and Embacca. The provinces conquered by the Portugueſe during the wars above mentioned were, Danda, Moſiche, Bengo, the Higher and Lower Ilamba, Oraij, Embacca, Benguela, Sietta, Cabezzo, Lubolo, and Oacco.

66 Rivers.

The principal rivers are thoſe already mentioned, viz. the Danda and Coanza. The Coanza is large, deep, and rapid. It empties itſelf into the Atlantic ocean about latitude 9° 20′ ſouth, twelve leagues ſouth of Loando the capital of the kingdom. It is navigable for 150 miles, and abounds with variety of fiſh. It forms ſeveral iſlands, has ſome cataracts, and one in particular which bears its name. As for its ſource, and the length of ground it croſſes from eaſt to weſt before it comes to the Portugueſe ſettlement, it is abſolutely unknown, as well as the countries through which it runs. Its mouth, which runs between the capes Palmerino and Lego, is above a league wide; the northern ſhore is the deepeſt, and along which the veſſels ſail. The fall of this river into the ocean is ſo rapid, that the ſea appears quite muddy for two or three leagues below it. Its mouth is not eaſily perceived from the open ſea, by reaſon of an iſland quite covered with high trees which lies juſt before it. The two principal iſlands formed by this river are called *Maſſander* and *Motchiamia*. The one is ſix leagues long, and about two miles broad: it is very fertile in maize, millet, and ſome other grains, which are reaped at three different ſeaſons of the year. It produces likewiſe vaſt quantities of manhioc, a root, of which they make a coarſe kind of meal, which ſerves inſtead of bread. Here alſo grow great numbers of palm and other fruit trees of various kinds. The iſland of Motchiamia is four or five miles long, and one in breadth, moſtly plain, and producing variety of roots and herbs. It likewiſe abounds in cattle; and there were formerly five or ſix Portugueſe families ſettled upon it, who drove a conſiderable trade in theſe commodities, and likewiſe in ſlaves.

Concerning the river Danda we know little or nothing: only, that though its mouth is not above 70 or 80 miles diſtant from that of the Coanza, yet their diſtance grows ſo conſiderably wider as you penetrate further into the inlands, as to be much above twice if not thrice that ſpace; though how much, is not exactly known.

The manners, religion, and dreſs, &c. of the inhabitants, are much the ſame with the Congoeſe. See Congo.

Angola *Pea*, or *Pigeon pea*. See Cytisus, Botany *Index*.

ANGON, in the *Ancient Military Art*, a kind of javelin uſed by the French. They darted it at a conſiderable diſtance. The iron head of this weapon reſembled a fleur-de-luce. It is the opinion of ſome writers, that the arms of France are not fleurs-de-luce, but the iron point of the angon or javelin of the ancient French.

Angot ‖ Angoy.

ANGOR, among *Ancient Phyſicians*, a concentration of the natural heat: the conſequence of which is a pain of the head, palpitation, and ſadneſs.

ANGOT, a province or kingdom of Abyſſinia, formerly rich and fertile, but almoſt ruined by the Gallas, a wandering nation in the internal parts of Africa, who diſpoſſeſſed the Abyſſinian monarchs of all that was worth poſſeſſing.

ANGOULESME, a city of France, the capital of the former duchy of Angoumois, now the department of Charente, and the ſee of a biſhop. It is ſeated on the top of a hill, ſurrounded with rocks, at the foot of which runs the river Charente. The inhabitants are ſaid to be about 8000, and have a conſiderable trade in paper, which they manufacture. E. Long. 0. 10. Lat. 45. 39.

ANGOUMOIS, formerly a province of France, now a diſtrict, bounded on the north by Poitou, on the eaſt by Limoſin and Marche, on the ſouth by Perigord, and on the weſt by Saintonge. Through this province run the rivers Touvre and Charente. This laſt is full of excellent fiſh; and though it often overflows its banks, it is ſo far from doing any damage, that it greatly enriches the ſoil. The Touvre is full of trouts. The air is generally warmer than at Paris, though the country is hilly. The ſoil produces plenty of wheat, rye, oats, Spaniſh corn, ſaffron, grapes, and all ſorts of fruits. Here are ſeveral iron mines, which yield a very good ſort of iron.

ANGOURA, Angora, or Angori, a city of Aſia, in Anatolia, formerly called *Ancyra*, and ſtill full of remarkable antiquities, which are ſo many marks of its ancient magnificence. It is at preſent one of the beſt cities in Anatolia; its ſtreets are full of pillars and old marbles, among which are ſome of porphyry and jaſper. The greateſt part of the pillars are ſmooth and cylindrical; ſome are channelled ſpirally; but the moſt ſingular are oval, with plate bands before and behind from the top to the bottom of the pedeſtal. The houſes are now made of clay, which is ſometimes intermixed with fine pieces of marble. The walls of the city are low, with very mean battlements. The maſonry of the walls is intermixed with pillars, architraves, capitals, and other ancient fragments, eſpecially that of the towers and gates. The caſtle of Angora has a triple encloſure; and the walls are of large pieces of white marble, and a ſtone much like porphyry.

The baſha of Angora has about 30 purſes income; and there are here about 300 janizaries, under the command of a ſardar. The Turks are ſaid to be 40,000, the Armenians 4000 or 5000, and the Greeks 600. The Armenians have ſeven churches, beſides a monaſtery, and the Greeks two. They breed the fineſt goats in the world; and their hair, which is of a dazzling white, is almoſt as fine as ſilk, and nine inches in length: it is worked into very fine ſtuffs, particularly camblet. All the inhabitants are employed in this manufacture. Several large caravans paſs through this city to different places. E. Long. 32. 5. N. Lat. 39. 30. See Ancyra.

ANGOY, a kingdom of Loango in Africa, bounded

Angoy. ed on the north by Cacongo, and on the ſouth by Congo; from the former of which it is ſeparated by the river Cabinda, and from the latter by the river Zaire. It is but of ſmall extent; being only a vaſſal province of Cacongo, till the mani or prince, who had married a Portugueſe's daughter, was perſuaded by his father-in-law to make himſelf independent. This he effected at a favourable juncture, the king of Loango having but juſt before revolted from the king of Congo, and the king of Cacongo from the new king of Loango. The country is full of woods and thickets; and has no towns of any note, except one called Bomangoy, ſituated on the north banks of the Zaire, and not far from its mouth. Its chief port is Cabinda, called alſo Kabenda, or Cubenda, ſituated on the mouth of a river of the ſame name about five leagues north of Cape Palmerino, on the north ſide of the Zaire's mouth. The bay is very commodious for trade, or wooding and watering along the ſhore. It is flat and marſhy in ſome places; but aſcends gradually about three miles inland, and then forms itſelf into a ridge of hills. On the aſcent of theſe is ſituated a town belonging to the father-in-law of the king above mentioned, where he conſtantly kept a ſtock of wood ready cut, to ſell to foreign ſhips at an eaſy rate. From theſe wood piles, ſouth-weſt along the bay, lie ſcattered a number of fiſhermen's huts, on each ſide a ſmall freſh water river which falls into the bay; and thence all the water for ſhips is brought in caſks to the mouth of the river, which is ſo ſhallow, that even at full flood it can only be entered by a yawl carrying a caſk or two. The town ſtands on the round point of the bay looking to the weſtward; and the Engliſh have a factory on the ſouth-weſt of the road.

The country round the bay is moſtly barren; owing chiefly to the lazineſs of the inhabitants, which often occaſions a ſcarcity of proviſions. The wild beaſts ſwarm ſo in the woods, that they deſtroy all the tame kinds; ſo there are no cattle bred here but hogs. From the woods in this country ſome monkeys have been brought away, which in ſhape and ſtature reſembled the human ſpecies. Civet cats abound here in great plenty, and parrots may be bought for three or four ordinary knives. The coaſts abound ſo with oyſters, that the ſailors quickly load their boats with them; they being found lying in great heaps like ſmall rocks. The natives follow the occupation of fiſhing more than any other. They fiſh both on the ſea and in the rivers, making uſe of drag nets, which have long canes fixed at equal diſtances, inſtead of corks, to ſhow when any fiſh is caught. Theſe nets are made of a peculiar kind of root, which, after being beaten, may be ſpun like hemp.

The dreſs of the inhabitants is the ſame with that of the Congoeſe. They allow polygamy, and the beſt beloved wife hath the command of the reſt; but is no leſs liable to be turned out, if ſhe proves unfaithful. The ladies of the blood-royal have the privilege of chooſing their huſbands out of any, even the meaneſt rank; and have even the power of life and death over them; as likewiſe over their paramours, if any of them are caught tripping: but the huſbands are by no means entitled to expect the ſame fidelity from their royal ladies. Women of the lower rank are obliged, when they receive a ſtranger, to admit him for a night or two into their embraces. This obliged the miſſionaries, who travelled through this country, to give notice of their approach to any of their houſes, that none of the female ſex might enter within their doors.—Their religion conſiſts chiefly in a variety of ſuperſtitious cuſtoms; ſuch as powdering their public and domeſtic idols with the duſt of a kind of red wood, on the firſt day of the moon, and paying a kind of worſhip to that planet. If, on that night, it happens to ſhine clear and bright, they cry out, "Thus may I renew my life as thou doſt;" but if the air is cloudy, they imagine the moon hath loſt her virtue, and pay her no reſpect. We do not hear of their offering any ſacrifices to their idols; though they commonly conſult them about the ſucceſs of their enterpriſes, thefts, or ſuch like. The king of Congo ſtill ſtyles himſelf ſovereign of Angoy; but the king of this little ſtate pays neither tribute nor homage to any foreign power. Angra.

ANGRA, a city of Tercera one of the Azores; the capital, not only of that iſland, but of all the reſt, and the reſidence of the governor. It is ſeated on the ſouth ſide, near the middle of the longeſt diameter of the iſland, on the edge of the ſea. The harbour is the only tolerable one in the whole iſland, being equally ſecured againſt ſtorms and the efforts of an enemy. It is of the form of a creſcent; the extremities of which are defended by two high rocks, that run ſo far into the ſea as to render the entrance narrow, and eaſily covered by the batteries on each ſide. From this harbour the town is ſaid to derive its name, the word *Angra* ſignifying a creek, bay, or ſtation for ſhipping; and this is the only convenient one among all the Azores. The opening of the port is from the eaſt to the ſouth-weſt; and, according to Frezier, it is not above four cables length in breadth, and not two of good bottom. Here ſhips may ride in great ſafety during the ſummer; but as ſoon as the winter begins, the ſtorms are ſo furious, that the only ſafety for ſhipping is the putting to ſea with all poſſible expedition. Happily, however, theſe ſtorms are preceded by infallible ſigns, with which experience has made the inhabitants perfectly well acquainted. On theſe occaſions the Pico, a high mountain in another of the Azores, is overcaſt with thick clouds, and grows exceedingly dark; but what they look upon as the moſt certain ſign is the fluttering and chirping of flocks of birds round the city for ſome days before the ſtorm begins.

The town is well built and populous, is the ſee of a biſhop, under the juriſdiction of the archbiſhop of Liſbon. It hath five pariſhes, a cathedral, four monaſteries, as many nunneries, beſides an inquiſition and biſhop's court, which extends its juriſdiction over all the Azores, Flores, and Corvo. It is ſurrounded by a good wall, a dry ditch of great depth and breadth, and defended by a ſtrong caſtle rendered famous by the impriſonment of King Alphonſo by his brother Peter in 1668. Though moſt of the public and private buildings have a good appearance externally, they are but indifferently furniſhed within; but for this poverty the Portugueſe excuſe themſelves, by ſaying, that too much furniture would prove inconvenient in ſo warm a climate.

At Angra are kept the royal magazines for anchors, cables, ſails, and other ſtores for the royal navy, or occaſionally for merchantmen in great diſtreſs. All ma-

Angrivarii ‖ Anguinum.

ritime affairs are under the inſpection of an officer called *Deſembergrador*, who hath ſubordinate officers and pilots for conducting ſhips into the harbour, or to proper watering places. The Engliſh, French, and Dutch, have each a conſul reſiding here, though the commerce of any of theſe nations with the Azores is very inconſiderable.

ANGRIVARII, (Tacitus); a people of Germany, ſituated between the Weſer and the Ems, and eaſtward reaching beyond the Weſer, as far as the Cheruſci, on which ſide they raiſed a rampart (Tacitus); to the ſouth, having the Tubantes on the Ems, and on the Weſer where it bends to the foreſt Bacemis; to the weſt, the Ems and the confines of the Bructeri; and to the north, the territory of the Angrivarii lay between the Chamavi and Anſibarii. Ptolemy places them between the Cauchi and Suevi or Catti. Suppoſed now to contain a part of the county of Schaumburg, the half of the biſhopric or principality of Minden to the ſouth, the greateſt part of the biſhopric of Oſnaburg, the north part of the country of Teclenburg, and a part of the county of Ravenſberg. A trace of the name of the people ſtill remains in the appellation *Energn*, a ſmall town in the county of Ravenſberg.

ANGUILLA, one of the Weſt India or Carribbee iſlands, lying in about 15° N. Lat. It has its name from its ſnake-like form; and is about ten leagues in length and three in breadth. It was firſt diſcovered by the Engliſh in 1650, when it was filled with alligators and other noxious animals; but they, finding the ſoil fruitful, and proper for raiſing tobacco and corn, ſettled a colony on it, and imported live cattle, which have ſince multiplied exceedingly. But the colony not being ſettled under any public encouragement, each planter laboured for himſelf, and the iſland became a prey to every rapacious invader, which diſheartened the inhabitants ſo much, that all induſtry was loſt among them. Their chief ſufferings were from a party of wild Iriſh, who landed here after the Revolution, and treated them worſe than any of the French pirates who had attacked them before. The people of Barbadoes, and other Engliſh Caribbees, knowing the value of the ſoil, ſeveral of them removed to Anguilla, where they remained for many years, and even carried on a profitable trade, though without any government either civil or eccleſiaſtical. In 1745, their militia, though not exceeding 100 men, defended a breaſtwork againſt 1000 French who came to attack them; and at laſt obliged them to retire with the loſs of 150 men, beſides carrying off ſome of their arms and colours as trophies of their victory. Since that time the inhabitants have ſubſiſted moſtly by farming; though they ſtill plant ſugar, and the iſland is ſaid to be capable of great improvements.

ANGUILLIFORM, an appellation given by zoologiſts, not only to the different ſpecies of eels, but to other animals reſembling them in ſhape.

ANGUINA. See TRICOSANTHES.

ANGUINUM-OVUM, a fabulous kind of egg, ſaid to be produced by the ſaliva of a cluſter of ſerpents, and poſſeſſed of certain magical virtues. The ſuperſtition in reſpect to theſe was very prevalent among the ancient Britons, and there ſtill remains a ſtrong tradition of it in Wales. The account Pliny * gives of it is as follows: "Præterea eſt ovorum genus in magna "Galliarum fama, omiſſum Græcis. Angues innume-

*Lib. xix. 3.

"ri æſtate convoluti, ſalivis faucium corporumque ſpu- Anguinum
"mis artifici complexu glomerantur; anguinum appel- ‖
"latur. Druidæ ſibilis id dicunt in ſublime jactari, Anhalt.
"ſagoque oportere intercipi, ne tellurem attingat?
"profugere raptorem equo: ſerpentes enim inſequi,
"donec arceantur amnis alicujus interventu."—Of which the following may ſerve as a tranſlation: (from *Maſon's Caractacus*; the perſon ſpeaking, a Druid.)

But tell me yet
From the grot of charms and ſpells,
Where our matron ſiſter dwells,
Brennus, has thy holy hand
Safely brought the Druid wand,
And the potent *Adder-ſtone*,
Gender'd 'fore th' autumnal moon?
When, in undulating twine,
The foaming ſnakes prolific join;
When they hiſs, and when they bear
Their wond'rous egg aloof in air:
Thence before to earth it fall,
The *Druid* in his hallow'd pall
Receives the prize,
And inſtant flies,
Follow'd by th' envenom'd brood,
'Till he croſs the cryſtal flood.

This wondrous egg ſeems to be nothing more than a bead of glaſs, uſed by the Druids as a charm to impoſe on the vulgar, whom they taught to believe, that the poſſeſſor would be fortunate in all his attempts, and that it would gain him the favour of the great.

Our modern Druideſſes (ſays Mr Pennant, from whom we extract) give much the ſame account of the *ovum anguinum*, *glain naidr*, as the Welſh call it, or the *adder gem*, as the Roman philoſopher does; but ſeem not to have ſo exalted an opinion of its powers, uſing it only to aſſiſt children in cutting their teeth, or to cure the chincough, or to drive away an ague.

Theſe beads are of a very rich blue colour; ſome plain, others ſtreaked. For their figure, ſee Plate XXXVI. fig. 22. N° 1, 2, 3.

ANGUIS, or SNAKE, in *Zoology*, a genus belonging to the order of amphibia ſerpentes. See OPHIOLOGY *Index*.

ANGURIA, the WATER MELON. See BOTANY *Index*.

ANGUS, a diſtrict of the county of Forfar in Scotland. It was an earldom belonging to the Douglaſſes, now extinct.

ANGUSTICLAVIA, in *Roman Antiquity*, a tunica embroidered with little purple ſtuds. It was worn by the Roman knights, as the laticlavia was by the ſenators.

ANHALT, a principality of Germany, in the circle of Upper Saxony, is a long narrow tract, ſituated for the moſt part betwixt the rivers Elbe and Saal, about 90 miles in length from eaſt to weſt, but of unequal breadth, the greateſt being on the eaſt ſide, which is but 35 miles. The houſe of Anhalt, from whence the electors of Saxony and Brandenburg are ſaid to derive their original, is a very ancient and honourable family. The beſt genealogiſts deduce their origin from Berenthobaldus, who made war upon the Thuringians in the ſixth century: it has produced many princes who make a great figure in the German hiſtory.

Anhelatio ‖ Anjengo.

ſtory. Joachim Erneſt, who died in 1586, left five ſons, who divided the principality among them. All of them having children, and being of equal authority, they unanimouſly agreed to ſubmit to the eldeſt of the family, who has the ſupreme government, which is *Anhalt Deſſau*. The others are, *Anhalt Bernburg*, *Anhalt Schaumburg*, *Anhalt Coethen*, and *Anhalt Zerbſt*. The Saxons acknowledge that the inhabitants of theſe little independent ſovereignties live in the land of milk and honey. Theſe petty princes poſſeſs lands ſufficient for their expences, the revenues being reckoned about half a million of dollars. The tax on lands is four per cent. which, rating them at 20 years purchaſe, is not quite one ſhilling in the pound. Upon an emergency the ſubjects are able to raiſe half a million extraordinary. The towns in theſe little ſtates are not ſo numerous in proportion to the extent of country as in Saxony, but better peopled. It is bounded on the ſouth by the county of Mansfeld, on the weſt by the duchy of Halberſtadt, on the eaſt by the duchy of Saxony, and on the north by the duchy of Magdeburg. It abounds in corn, and is watered by the Sadle and Mulda; its principal trade is in beer.

ANHELATIO, or ANHELITUS, among *Phyſicians*, a ſhortneſs of breath.

ANHINGA. See ORNITHOLOGY *Index*.

ANHOLT, an iſland of Denmark, in North Jutland, lying in the Categat, eight miles from the coaſt of Jutland, ten from Seeland, and ſeven from Halland. It is dangerous for ſeamen, for which reaſon there is a lighthouſe.

ANIAN, the name of a ſtrait formerly ſuppoſed to lie between the north-eaſt of Aſia and the north-weſt of America; but now found to exiſt only in imagination.

ANIAN is alſo the name of a barren ſandy deſert lying on the eaſt coaſt of Africa. It is ſo exceſſively hot and otherwiſe inhoſpitable, that it contains but very few inhabitants, except ſome wandering Arabs who live in camps.

ANIELLO, or MASSANIELLO. See Hiſtory of NAPLES.

ANJENGO, a ſmall town and factory, with a fort, on the coaſt of Malabar, in the peninſula on this ſide the Ganges, belonging to the Eaſt India Company. The fort is ſmall, but neat and ſtrong; it is a ſquare with four baſtions, having eight guns mounted on each, carrying a ball of 18 pounds. Two of theſe baſtions face the ſea, the other two the country. Beſides theſe, there is a line of 18 or 20 guns pointing towards the ſea, of 18 and 24 pounders. About a piſtol ſhot from the back of the fort runs a river, which, beſides being a ſecurity to the factory, adds much to the agreeable ſituation of the place. This river has its ſource in ſome diſtant mountains; and, deſcending in a courſe from the north and eaſt, it afterwards turns in ſeveral pleaſing meanders ſo far to the weſt as to waſh the bottom of our factory's garden, and at laſt winding to the ſouth, it empties itſelf into the ſea. Several beautiful ſmall iſlands too, which are waſhed by its current, diverſify the ſcenery, and greatly heighten the beauty of the proſpect. This ſettlement ſupplies our Eaſt India Company with pepper; and its ſituation is alſo very convenient for giving proper intelligence to our ſhips touching here from Europe, or from any part of India. E. Long. 76. 1. N. Lat. 7. 0.

ANIL, in *Botany*, a ſynonyme of a ſpecies of indigofera. See INDIGOFERA, BOTANY *Index*.

Anil ‖ Animal.

ANIMA, among *Chemiſts*, denotes the volatile or ſpirituous parts of bodies.

ANIMA, among *Divines* and *Naturaliſts*, denotes the ſoul, or principle of life, in animals. See SOUL.

ANIMA Hepatis, is a name by which ſome call *ſal martis*, or *ſalt of iron*, on account of its ſuppoſed efficacy in diſeaſes of the liver.

ANIMA Mundi, a certain pure ethereal ſubſtance or ſpirit, diffuſed, according to many of the ancient philoſophers, through the maſs of the world, informing, actuating, and uniting the divers parts thereof into one great, perfect, organical, and vital body or animal. Plato treats at large of the ψυχη τε κοσμε, in his *Timæus*; and is even ſuppoſed to be the author of the *dogma*; yet are interpreters much at a loſs about his meaning. Ariſtotle, however, taking it in the common and obvious ſenſe, ſtrenuouſly oppoſes it. The modern Platoniſts explain their maſter's *anima mundi* by a certain univerſal ethereal ſpirit, which in the heavens exiſts perfectly pure, as retaining its proper nature; but on earth pervading elementary bodies, and intimately mixing with all the minute atoms thereof, it aſſumes ſomewhat of their nature, and becomes of a peculiar kind.—So the poet:

Spiritus intus alit, totoſque infuſa per artus
Mens agitat molem, et magno ſe corpore miſcet.

They add, that this *anima mundi*, which more immediately reſides in the celeſtial regions as its proper ſeat, moves and governs the heavens in ſuch a manner, as that the heavens themſelves firſt received their exiſtence from the fecundity of the ſame ſpirit: for that this *anima*, being the primary ſource of life, everywhere breathed a ſpirit like itſelf, by virtue whereof various kinds of things were framed conformable to the divine ideas.

ANIMA Saturni, a white powder obtained by pouring diſtilled vinegar on litharge, of conſiderable uſe in enamelling. See ENAMEL.

ANIMADVERSION, in matters of literature, is uſed to ſignify, ſometimes correction, ſometimes remarks upon a book, &c. and ſometimes a ſerious conſideration upon any point.

ANIMAL, in *Natural Hiſtory*, an organized and living body, which is alſo endowed with ſenſation: thus, minerals are ſaid to grow or increaſe, plants to grow and live, but animals alone to have ſenſation.

It is this property of ſenſation alone that can be deemed the eſſential characteriſtic of an animal; and by which the animal and vegetable kingdoms ſeem to be ſo eſſentially ſeparated, that we cannot even imagine the leaſt approximation of the one to the other. Thoſe naturaliſts, indeed, who have ſuppoſed the diſtinction between animals and vegetables to conſiſt in any thing elſe than what we have already mentioned, have found themſelves greatly embarraſſed; and have generally agreed, that it was extremely difficult, if not impoſſible, to ſettle the boundaries between the animal and vegetable kingdoms. But this difficulty will be eaſily ſeen to ariſe from their taking the characteriſtic marks of the animal kingdom, from ſomething that was evidently common to both. Thus Boerhaave at-

Animal. tempted to diſtinguiſh an animal from a vegetable, by the former having a mouth, which the latter has not: but here, as the mouth of an animal is only the inſtrument by which nouriſhment is conveyed to its body, it is evident that this can be no eſſential diſtinction, becauſe vegetables alſo require nouriſhment, and have inſtruments proper for conveying it into their bodies; and where the end is the ſame, a difference in the means can never be eſſential. The fixing the difference in an animal's having a gula, ſtomach, and inteſtines, as is done by Dr Tyſon, is as little to the purpoſe.

The power of moving from one place to another, hath by many been thought to conſtitute their difference; and indeed, in moſt caſes, it is the obvious mark by which we diſtinguiſh an animal from a vegetable: but Lord Kames hath given ſeveral very curious inſtances of the locomotive power of plants; ſome of which, as he ſays, would do honour to an animal.—"Upon the ſlighteſt touch, the ſenſitive plant ſhrinks back and folds up its leaves, ſimilar to a ſnail; which on the ſlighteſt touch retires within its ſhell. A new ſpecies of the ſenſitive plant hath been lately diſcovered. See DIONÆA. If a fly perch upon one of its flower leaves, it cloſes inſtantly, and cruſhes the inſect to death. There is not an article in botany more admirable than a contrivance, viſible in many plants, to take advantage of good weather, and to protect themſelves againſt bad. They open and cloſe their flowers and leaves in different circumſtances; ſome cloſe before ſunſet, ſome after: ſome open to receive rain, ſome cloſe to avoid it. The petals of many flowers expand in the ſun; but contract at night, or on the approach of rain. After the ſeeds are fecundated, the petals no longer contract. All the trefoils may ſerve as a barometer to the huſbandman; they always contract their leaves on an impending ſtorm. Some plants follow the ſun, others turn from it. Many plants, on the ſun's receſs, vary the poſition of their leaves, which is ſtyled the *ſleep of plants*. A ſingular plant * was lately diſcovered in Bengal. Its leaves are in continual motion all day long; but when night approaches, they fall down from an erect poſture to reſt.

* A ſpecies of the *Hedyſarum.*

"A plant has a power of directing its roots for procuring food. The red whortleberry, a low evergreen plant, grows naturally on the tops of our higheſt hills, among ſtones and gravel. This ſhrub was planted in an edging to a rich border, under a fruit wall. In two or three years, it overran the adjoining deep laid gravel walk: and ſeemed to fly from the border, in which not a ſingle runner appeared. An effort to come at food in a bad ſituation, is extremely remarkable in the following inſtance: Among the ruins of Newabbey, formerly a monaſtery in Galloway, there grows on the top of a wall a plane tree about 20 feet high. Straitened for nouriſhment in that barren ſituation, it ſeveral years ago directed roots down the ſide of the wall, till they reached the ground ten feet below; and now the nouriſhment it afforded to thoſe roots during the time of their deſcending is amply repaid, having every year ſince that time made vigorous ſhoots. From the top of the wall to the ſurface of the earth, theſe roots have not thrown out a ſingle fibre; but are now united in a ſingle root.

"Plants, when forced from their natural poſition, are endowed with a power to reſtore themſelves. A hop plant, twiſting round a ſtick, directs its courſe from ſouth to weſt, as the ſun does. Untwiſt it, and tie it in the oppoſite direction: it dies. Leave it looſe in the wrong direction: it recovers its natural direction in a ſingle night. Twiſt a branch of a tree ſo as to invert its leaves, and fix it in that poſition: if left in any degree looſe, it untwiſts itſelf gradually, till the leaves be reſtored to their natural poſition. What better can an animal do for its welfare? A root of a tree meeting with a ditch in its progreſs, is laid open to the air. What follows? It alters its courſe like a rational being, dips into the ground, ſurrounds the ditch, riſes on the oppoſite ſide to its wonted diſtance from the ſurface, and then proceeds in its original direction. Lay a wet ſponge near a root laid open to the air; the root will direct its courſe to the ſponge. Change the place of the ſponge; the root varies its direction. Thruſt a pole into the ground at a moderate diſtance from a ſcandent plant: the plant directs its courſe to the pole, lays hold of it, and riſes on it to its natural height. A honeyſuckle proceeds in its courſe, till it be too long for ſupporting its weight; and then ſtrengthens itſelf by ſhooting into a ſpiral. If it meet with another plant of the ſame kind, they coaleſce for mutual ſupport; the one ſcrewing to the right, the other to the left. If a honeyſuckle twig meets with a dead branch, it ſcrews from the right to the left. The claſpers of briony ſhoot into a ſpiral, and lay hold of whatever comes in their way for ſupport. If, after completing a ſpiral of three rounds, they meet with nothing, they try again by altering their courſe."—— Animal.

By comparing theſe and other inſtances of ſeeming voluntary motion in plants, with that ſhare of life wherewith ſome of the inferior kinds of animals are endowed, we can ſcarce heſitate at aſcribing the ſuperiority to the former; that is, putting ſenſation out of the queſtion. Muſcles, for inſtance, are fixed to one place as much as plants are; nor have they any power of motion, beſides that of opening and ſhutting their ſhells: and in this reſpect they have no ſuperiority over the motion of the ſenſitive plant; nor doth their action diſcover more ſagacity, or even ſo much, as the roots of the plane tree mentioned by Lord Kames.

Mr Buffon, who ſeems to be deſirous of confounding the animal and vegetable kingdoms, denies ſenſation to be any eſſential diſtinction. "Senſation (ſays he) more eſſentially diſtinguiſhes animals from vegetables: but ſenſation is a complex idea, and requires ſome explication. For if ſenſation implied no more than motion conſequent upon a ſtroke or an impulſe, the ſenſitive plant enjoys this power. But if, by ſenſation, we mean the faculty of perceiving and comparing ideas, it is uncertain whether brute animals are endowed with it. If it ſhould be allowed to dogs, elephants, &c. whoſe actions ſeem to proceed from motives ſimilar to thoſe by which men are actuated, it muſt be denied to many ſpecies of animals, particularly to thoſe which appear not to poſſeſs the faculty of progreſſive motion. If the ſenſation of an oyſter, for example, differed only in degree from that of a dog; why do we not aſcribe the ſame ſenſation to vegetables, though in a degree ſtill inferior? This diſtinction, therefore, between the animal and vegetable, is neither ſufficiently general nor determined.

"From

Animal. "From this inveſtigation we are led to conclude, that there is no abſolute and eſſential diſtinction between the animal and vegetable kingdoms; but that nature proceeds, by imperceptible degrees, from the moſt perfect to the moſt imperfect animal, and from that to the vegetables; and the freſh water polypus may be regarded as the laſt of animals and the firſt of plants."

It were to be wiſhed, that philoſophers would on ſome occaſions conſider, that a ſubject may be dark as well on account of their inability to ſee, as when it really affords no light. Our author boldly concludes, that there is no eſſential difference between a plant and an animal, becauſe we aſcribe ſenſation to an oyſter, and none to the ſenſitive plant; but we ought to remember, that though we cannot perceive a diſtinction, it may nevertheleſs exiſt. Before Mr Buffon, therefore, had concluded in this manner, he ought to have proved that ſome vegetables were endowed with ſenſation.

It is no doubt, however, as much incumbent on thoſe who take the contrary ſide of the queſtion, to prove that vegetables are not endowed with ſenſation, as it was incumbent on Mr Buffon to have proved that they are. But a little attention will ſhow us, that the difficulty here proceeds entirely from our inability to ſee the principle of ſenſation. We perceive this principle in ourſelves, but no man can perceive it in another. Why then does every individual of mankind conclude that his neighbour has the ſame ſenſations with himſelf? It can only be from analogy. Every man perceives his neighbour formed in a manner ſimilar to himſelf; he acts in a ſimilar manner on ſimilar occaſions, &c. Juſt ſo it is with brute animals. It is no more doubtful that they have ſenſations, than that we have them ourſelves. If a man is wounded with a knife, for inſtance, he expreſſes a ſenſe of pain, and endeavours to avoid a repetition of the injury. Wound a dog in the ſame manner, he will alſo expreſs a ſenſe of pain; and, if you offer to ſtrike him again, will endeavour to eſcape, before he feels the ſtroke. To conclude here, that the action of the dog proceeded from a principle different from that of the man, would be abſurd and unphiloſophical to the laſt degree.

We muſt further take notice, that there are ſenſations eſſentially diſtinct from one another; and in proportion as an animal is endowed with more or fewer of theſe different ſenſes, it is more or leſs perfect as an animal: but, as long as one of them remains, it makes not the leaſt approach to the vegetable kingdom; and, when they are all taken away, is ſo far from becoming a vegetable, that it is only a maſs of dead matter. The ſenſes of a perfect animal, for inſtance, are five in number. Take away one of them, ſuppoſe ſight; he becomes then a leſs perfect animal, but is as unlike a vegetable as before. Suppoſe him next deprived of hearing: his reſemblance to a vegetable would be as little as before; becauſe a vegetable can neither feel, taſte, nor ſmell, and we ſuppoſe him ſtill to enjoy theſe three ſenſes. Let us, laſtly, ſuppoſe him endowed only with the ſenſe of feeling, which, however, ſeems to include that of taſte, and he is no more a vegetable than formerly, but only an imperfect animal. If this ſenſe is then taken away, we connect him not with the vegetable kingdom, but with what Mr Buffon calls *brute matter*. It is to this kingdom, and not to the vegetable, that animals plainly approximate as they deſcend. Indeed, to ſuppoſe an approximation between the vegetable and animal kingdoms, is very abſurd: for, at that rate, the moſt imperfect animal ought to be the moſt perfect plant; but we obſerve no ſuch thing. All animals, from the higheſt to the loweſt, are poſſeſſed of vegetable life; and that, as far as we can perceive, in an equal degree, whether the animal life is perfect or imperfect: nor doth there ſeem to be the ſmalleſt connexion between the higheſt degree of vegetation and the loweſt degree of ſenſation. Though all animals, therefore, are poſſeſſed of vegetable life, theſe two ſeem to be as perfectly diſtinct and incommenſurate to one another as any two things we can poſſibly imagine. Animal.

The power of vegetation, for inſtance, is as perfect in an onion or leek, as in a dog, an elephant, or a man: and yet, though you threaten a leek or an onion ever ſo much, it pays no regard to your words, as a dog would do; nor, though you wound it, does it avoid a ſecond ſtroke. It is this principle of ſelf-preſervation in all animals, which, being the moſt powerful one in their nature, is generally taken, and with very good reaſon, as the true characteriſtic of animal life. This principle is undoubtedly a conſequence of ſenſation; and as it is never obſerved to take place in vegetables, we have a right to ſay that the foundation of it, namely ſenſation, belongs not to them. There is no animal, which makes any motion in conſequence of external impulſe where danger is threatened, but what puts itſelf in a poſture of defence; but no vegetable whatever does ſo. A muſcle, when it is touched, immediately ſhuts its ſhell; and as this action puts it in a ſtate of defence, we conclude that it proceeded from the principle of ſelf-preſervation. When the ſenſitive plant contracts from a touch, it is no more in a ſtate of defence than before; for whatever would have deſtroyed it in its expanded ſtate, will alſo do it in its contracted ſtate. We conclude, therefore, that the motion of the ſenſitive plant proceeds only from a certain property called by phyſicians *irritability*; and which, though our bodies poſſeſs it in an eminent degree, is a characteriſtic neither of animal nor vegetable life, but belongs to us in common with brute matter. It is certain, that an electrified ſilk thread ſhows a much greater variety of motions than any ſenſitive plant. If a bit of ſilk thread is dropt on an electrified metal plate, it immediately erects itſelf; ſpreads out the ſmall fibres like arms; and, if not detained, will fly off. If a finger is brought near it, the thread ſeems greedily to catch at it. If a candle approaches, it claſps cloſe to the plate, as if afraid of it.—Why do we not conclude that the thread in this caſe is really afraid of the candle? For this plain reaſon, That its ſeeming flight is not to get away from the candle, but to get towards the electrified metal; and, if allowed to remain there, will ſuffer itſelf to be burnt without offering to ſtir.—The ſenſitive plant, in like manner, after it has contracted, will ſuffer itſelf to be cut in pieces, without making the leaſt effort to eſcape. The caſe is not ſo with the meaneſt animal. A hedgehog, when alarmed, draws its body together, and expands its prickles, thereby putting itſelf in a poſture of defence. Throw it into water; and the ſame principle of ſelf-

preſervation

Animal. preſervation prompts it to expand its body and ſwim. A ſnail, when touched, withdraws itſelf into its ſhell; but if a little quicklime is ſprinkled upon it, ſo that its ſhell is no longer a place of ſafety, it is thrown into agonies, and endeavours to avail itſelf of its locomotive power in order to eſcape the danger. In muſcles and oyſters, indeed, we cannot obſerve this principle of ſelf-preſervation ſo ſtrongly, as nature has deprived them of the power of progreſſive motion: but, as we obſerve them conſtantly to uſe the means which nature has given them for ſelf-preſervation, we can have no reaſon to think that they are deſtitute of that principle upon which it is founded.

But there is no need of arguments drawn from the inferior creation. We ourſelves are poſſeſſed both of the animal and vegetable life, and certainly muſt know whether there is any connexion between vegetation and ſenſation, or not.—We are conſcious that we exiſt; that we hear, ſee, &c.: but of our vegetation we are abſolutely unconſcious. We feel a pleaſure, for inſtance, in gratifying the calls of hunger and thirſt; but of the proceſs by which our aliment is formed into chyle, the chyle mixed with the blood, the circulation of that fluid, and the ſeparation of all the humours from it, we are altogether ignorant. If we then, who are more perfect than other vegetables, are utterly inſenſible of our own vegetable life, why ſhould we imagine that the leſs perfect vegetables are ſenſible of it?

To illuſtrate our reaſoning here by an example.—The direction of the roots of the plane tree mentioned by Lord Kames, ſhows as much ſagacity, if we are to look only to the outward action, as can be obſerved in any motion of the moſt perfect animal whatever; nevertheleſs, we have not the leaſt ſuſpicion, either that the tree ſaw the ground at a diſtance, or that it was informed of its being there by the reſt of its roots. If a wound is made in the body of a man, and a loſs of ſubſtance is to be repaired, the ſame ſagacity will be obſerved in the arrangement of the fibres, not only as if they were animated, but they will diſpoſe of themſelves ſeemingly with a degree of wiſdom far ſuperior to what we have any idea of; yet this is done without our having the leaſt knowledge either how it is done, or of its being done at all. We have therefore in ourſelves a demonſtration, that vegetable life acts without knowing what it does: and if vegetables are ignorant of their moſt ſagacious actions, why ſhould we ſuſpect that they have a ſenſation, let it be ever ſo obſcure, of any of their inferior ones, ſuch as contracting from a touch, turning towards the ſun, or advancing to meet a pole?

Thus we may eaſily give Mr Buffon a reaſon why we aſcribe ſenſation to an oyſter, and none to a vegetable; namely, becauſe we perceive the vegetable do nothing but what is alſo performed in our own bodies, without our having the leaſt ſenſation of it; whereas an oyſter puts itſelf in a defenſive poſture on the approach of danger; and this being an action ſimilar to our own upon a like occaſion, we conclude that it proceeds from the ſame principle of ſenſation. Here it may alſo be obſerved, that though the inferior animals are deficient in the number, they are by no means ſo in the acuteneſs of their ſenſations; on the contrary, though a muſcle or an oyſter is probably endowed with no other ſenſe than that of feeling, yet this ſenſe Animal. is ſo exquiſite, that it will contract upon the ſlighteſt touch, ſuch as we would be altogether inſenſible of.

As to that power of contractility, or irritability, which is obſerved in ſome plants; our ſolids have it, when deprived both of vegetable and animal life: for a muſcle, cut out of a living body, will continue to contract, if it is irritated by pricking it, after it has neither ſenſation nor vegetation.

A very good moral reaſon may alſo be adduced why we do not believe vegetables to be endowed with ſenſation.—Had they been ſo, we muſt ſuppoſe them to ſuffer pain when they are cut or deſtroyed; and, if ſo, what an unhappy ſtate muſt they be in, who have not the leaſt power to avoid the injuries daily offered them? In fact, the goodneſs of the Deity is very conſpicuous in not giving to vegetables the ſame ſenſations as to animals; and, as he hath given them no means of defence, though we had not been told it by himſelf, we might have known that he gave them for food to animals; and, in this caſe, to have endowed them with ſenſation would have been a piece of cruelty. Though animals without number prey upon one another, yet all of them have ſome means of defence; from whence we may juſtly conclude, that their mutual deſtruction was not an original appointment of the Creator, but what he foreſaw would happen in a courſe of time, and which he therefore gave every one of them ſome means of guarding againſt. It may no doubt be here objected, that the giving ſome means of ſelf-defence to every animal cannot be reckoned a ſufficient proof that it was not the original deſign of the Creator that they ſhould be deſtroyed, ſeeing theſe means are not always effectual for their preſervation.—This objection, however, cannot be completely obviated without a ſolution of the queſtion concerning the origin of evil among the works of a perfectly good Being. But whatever difficulty there may be in ſolving this queſtion, it is certain, that, as ſome means of ſelf-defence is given to every animal, it has been the original deſign of the Creator, that in all caſes one ſpecies of animals ſhould not be deſtroyed at the pleaſure of any other ſpecies; and as no means of ſelf-defence is given to any vegetable, it is plain that they have been deſtined for a prey to every ſpecies of animals that had acceſs to them. Philoſophers have inſiſted much on the neceſſity of one animal's devouring another, that there might be room ſufficient for all; but this, ſo far from being a ſyſtem worthy of the divine wiſdom, ſeems to us to be a reflection upon it, as if the Author of nature could not have found means to preſerve the life of one part of his creatures, without the deſtruction and miſery of the reſt. The ſacred writings leave us at no loſs to ſee how this carnivorous diſpoſition came in; and, in the next world, this piece of perfection (as the ſanguinary philoſophers above mentioned would have it to be) ſeems to be left out; for there, it is ſaid, "They ſhall not hurt nor deſtroy; the lion ſhall eat ſtraw like the ox, and there ſhall be no more pain."

When ſpeaking of the food of plants, we took occaſion to mention a certain power, totally different from that of attraction or repulſion, by which the food of a plant, after it was attracted, or otherwiſe brought to it, was aſſimilated to its ſubſtance. This power which we there diſtinguiſh by the name of *tranſmutation*, belongs

Animal, Animal-Flower.

longs in a more eminent degree to animals. The alimentary ſubſtance is changed into two kinds of matter. (1.) An excrementitious one, which paſſes off through the inteſtines; and (2.) A fluid, which is the direct pabulum of the animal. Different ſubſtances, however, are not equally changeable by this proceſs. The human ſtomach is not capable of acting upon any animal ſubſtance till it has loſt its vital principle: the ſtomachs of ſome animals cannot act upon creatures of their own ſpecies: ſome have an apparatus for grinding their food after it is ſwallowed, &c. and there are no animals but what are ſubject to death by taking certain ſubſtances into their ſtomach. Some ſubſtances alſo, though they reſiſt the action of the ſtomach, and paſs unchanged into the ſyſtem, produce no bad effects. Thus, madder will turn the bones of animals red; rhubarb will communicate its purgative nature to the milk, and its deep yellow colour to the urine.—All theſe changes, however, ſeem to belong to the vegetative part of our ſyſtem: for as every one of them are performed without our knowledge of the manner how; and not only ſo, but while we are abſolutely unconſcious of their being done; we can have no reaſon to ſuppoſe, that the *animal* life, properly ſo called, is at all connected with them, any farther than as they are at preſent the means of preſerving the creature alive, and making the connexion betwixt the principle of life and this viſible creation.

The deſcription and claſſing of animals make a conſiderable part of Natural Hiſtory, known by the name of *Zoology*.

Animal, uſed adjectively, denotes any thing belonging to, or partaking of, the nature of animals. Thus, animal actions, thoſe that are peculiar to animals; ſuch are ſenſation and muſcular motion.

Animal-Flower, in *Zoology*, a name given to ſeveral ſpecies of animals belonging to the genus of Actinia of Linnæus. They have likewiſe been diſtinguiſhed by the names of *Urtica Marina*, or *Sea-nettle*, from their ſuppoſed property of ſtinging; and *Sea-anemone*, from their claws or tentacles being diſpoſed in regular circles, and tinged with a variety of bright lively colours, reſembling the petals of ſome of our moſt beautiful flowers. As to one ſpecies particularly, mentioned by Abbé Dicquemarre, (Phil. Tranſ. for 1773, art. 37.) the pureſt white, carmine, and ultramarine, are ſaid to be ſcarce ſufficient to expreſs their brilliancy. The bodies of ſome of them are hemiſpherical, of others cylindrical, and of others ſhaped like a fig. Their ſubſtance likewiſe differs; ſome are ſtiff and gelatinous, others fleſhy and muſcular; but all of them are capable of altering their figure when they extend their bodies and claws in ſearch of food. They are found in many of the rocky coaſts of the Weſt India iſlands, and likewiſe on ſome parts of the coaſt of England.

They have only one opening, which is in the centre of the uppermoſt part of the animal; round this are placed rows of fleſhy claws; this opening is the mouth of the animal, and is capable of great extenſion. The animals themſelves, though exceedingly voracious, will bear long faſting. They may be preſerved alive a whole year, or perhaps longer, in a veſſel of ſea-water, without any viſible food; but, when food is preſented, one of them will ſucceſſively devour two muſcles in their ſhells, or even ſwallow a whole crab as large as a hen's egg. In a day or two the crab-ſhell is voided at the mouth, perfectly cleared of all the meat. The muſcle ſhells are likewiſe diſcharged whole, with the two ſhells joined together, but entirely empty, ſo that not the leaſt particle of fiſh is to be perceived on opening them. An anemone of one ſpecies will even ſwallow an individual of another ſpecies; but after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening alſo it produces its young ones alive, already furniſhed with little claws, which, as ſoon as they fix themſelves, they begin to extend in ſearch of food.

Animal-Flower.

One of the extremities of the ſea-anemone reſembles, as we have ſaid, the outward leaves of that flower; while its limbs are not unlike the ſhag or inner part of it. By the other extremity it fixes itſelf, as by a ſucker, to the rocks or ſtones lying in the ſand; but it is not totally deprived of the power of progreſſive motion, as it can ſhift its ſituation, though very ſlowly.

A particular ſpecies of animal-flowers has been found in ſome of the iſlands ceded to Britain at the laſt treaty of peace with France; and the following account of them was publiſhed in the Philoſophical Tranſactions, vol. 57. by Mr Ellis, in a letter to Lord Hillſborough.

"This compound animal, which is of a tender fleſhy ſubſtance, conſiſts of many tubular bodies ſwelling gently towards the upper part, and ending like a bulb or very ſmall onion: on the top of each is its mouth, ſurrounded by one or two rows of tentacles, or claws, which when contracted look like circles of beads.

"The lower part of all theſe bodies has a communication with a firm fleſhy wrinkled tube, which ſticks faſt to the rocks, and ſends forth other fleſhy tubes, which creep along them in various directions. Theſe are full of different ſizes of theſe remarkable animals, which riſe up irregularly in groups near to one another.

"This adhering tube, that ſecures them faſt to the rock, or ſhelly bottom, is worthy of our notice. The knobs that we obſerve, are formed in ſeveral parts of it by its inſinuating itſelf into the inequalities of the coral rock, or by graſping pieces of ſhells, part of which ſtill remain in it, with the fleſhy ſubſtance grown over them.

"This ſhows us the inſtinct of nature, that directs theſe animals to preſerve themſelves from the violence of the waves, not unlike the anchoring of muſcles, by their fine ſilken filaments that end in ſuckers; or rather like the ſhelly baſis of the ſerpula, or worm ſhell, the tree oyſter, and the ſlipper barnacle, &c. whoſe baſes conform to the ſhape of whatever ſubſtance they fix themſelves to, graſping it faſt with their teſtaceous claws, to withſtand the fury of a ſtorm.

"When we view the inſide of this animal diſſected lengthwiſe, we find like a little tube leading from the mouth to the ſtomach, from whence there riſe eight wrinkled ſmall guts, in a circular order, with a yellowiſh ſoft ſubſtance in them; theſe bend over in the form of arches towards the lower part of the bulb, from whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleſhy adhering tube, where ſome of them may be perceived entering into a papilla, or the beginning of an animal of the like kind, moſt probably to convey it nouriſhment

Animal-Flower.

nouriſhment till it is provided with claws; the remaining part of theſe ſlender guts is continued on in the fleſhy tube, without doubt, for the ſame purpoſe of producing and ſupporting more young ones from the ſame common parent.

"The many longitudinal fibres that we diſcover lying parallel to each other, on the inſide of the ſemitranſparent ſkin are all inſerted in the ſeveral claws round the animal's mouth, and are plainly the tendons of the muſcles for moving and directing the claws at the will of the animal; theſe may be likewiſe traced down to the adhering tube.

"As this ſpecimen has been preſerved in ſpirits, the colour of the animal, when living, cannot be certainly known; it is at preſent of a pale yellowiſh brown.

"With regard to its name, it may be call *Actinia ſociata*, or the *Cluſter Animal-flower*."

The Abbé Dicquemarre, by many curious, though cruel, experiments related in the Phil. Tranſ. for 1773, has ſhown that theſe animals poſſeſs, in a moſt extraordinary degree, the power of reproduction; ſo that ſcarce any thing more is neceſſary to produce as many ſea anemonies as we pleaſe, than to cut a ſingle one into as many pieces. A ſea anemone being cut in two by a ſection through the body, that part, where the limbs and mouth are placed, ate a piece of a muſcle offered to it ſoon after the operation, and continued to feed and grow daily for three months after. The food ſometimes paſſed through the animal; but was generally thrown up again, conſiderably changed, as in the perfect ſea anemone. In about two months, two rows of limbs were perceived growing out of the part where the inciſion was made. On offering food to this new mouth, it was laid hold of and eaten; and the limbs continually increaſing, the animal gradually became as perfect as thoſe which had never been cut. In ſome inſtances, however, he found, that, when one of theſe creatures was cut through, new limbs would be produced from the cut place, thoſe at the mouth remaining as before; ſo that a monſtrous animal was the conſequence, having two mouths, and feeding at both ends. Having put ſome of them into a pan of water, ſet over a ſlow fire, he found that they loſt their life at 50 degrees of Reaumur's thermometer. To avoid the imputation of cruelty in theſe experiments, the author argues the favourable conſequences that have attended his operations on the ſea anemonies which have been ſo fortunate as to fall into his hands; as he hath not only multiplied their exiſtence, but alſo renewed their youth; which laſt, he adds, "is ſurely no ſmall advantage."

In Hughes's Natural Hiſtory of Barbadoes, an account is alſo given of ſeveral ſpecies of animal flowers. They are there deſcribed as only found in a baſon in one particular cave; and of the moſt remarkable ſpecies mentioned by him we have the following deſcription.

"In the middle of the baſon, there is a fixed ſtone, or rock, which is always under water. Round its ſides, at different depths, ſeldom exceeding 18 inches, are ſeen, at all times of the year, iſſuing out of little holes, certain ſubſtances that have the appearance of fine radiated flowers, of a pale yellow, or a bright ſtraw colour, ſlightly tinged with green, having a circular border of thickſet petals, about the ſize of, and much reſembling, thoſe of a ſingle garden marigold, except that the whole of this ſeeming flower is narrower at the diſcus, or ſetting on of the leaves, than any flower of that kind.

Animal-Flower ‖ Animal Syſtem.

"I have attempted to pluck one of theſe from the rock, to which they are always fixed; but never could effect it: for as ſoon as my fingers came within two or three inches of it, it would immediately contract cloſe together its yellow border, and ſhrink back into the hole of the rock; but if left undiſturbed for about four minutes, it would come gradually in ſight, expanding, though at firſt very cautiouſly, its ſeeming leaves, till at laſt it appeared in its former bloom. However, it would again recoil, with a ſurpriſing quickneſs when my hand came within ſmall diſtance of it. Having tried the ſame experiment by attempting to touch it with my cane, and a ſmall ſlender rod, the effect was the ſame.

"Though I could not by any means contrive to take or pluck from the rock one of theſe animals entire; yet I once cut off (with a knife which I had held for a long time out of ſight, near the mouth of a hole out of which one of theſe animals appeared) two of theſe ſeeming leaves. Theſe, when out of the water, retained their ſhape and colour; but, being compoſed of a membrane-like ſubſtance, ſurpriſingly thin, it ſoon ſhrivelled up, and decayed."

The reproductive power of the Barbadoes animal-flower is prodigious. Many people coming to ſee theſe ſtrange creatures, and occaſioning ſome inconvenience to a perſon through whoſe grounds they were obliged to paſs, he reſolved to deſtroy the objects of their curioſity; and, that he might do ſo effectually, cauſed all the holes out of which they appeared, to be carefully bored and drilled with an iron inſtrument, ſo that we cannot ſuppoſe but their bodies muſt have been entirely cruſhed to a pulp: nevertheleſs, they again appeared in a few weeks from the very ſame places.

Plate XXXIV. fig. 1. repreſents the actinia ſociata, or cluſtered animal-flower, deſcribed by Mr Ellis, with its radical tube adhering to a rock: (a) One of the animals ſtretching out its claws. Fig. 2. A perpendicular diſſection of one of the bodies, to ſhow the gullet, inteſtines, ſtomach, and fibres or tendons that move the claws: (a) A young one ariſing out of the adhering tube. Fig. 3. The actinia aſter, or animal flower of the newly ceded iſlands. Fig. 4. The actinia anemone, or ſea anemone from the ſame place. Fig. 5. The under part of the ſame by which it adheres to the rocks. Fig. 6. The actinia helianthus, or the ſea ſun-flower from ditto. Fig. 7. the under part of the ſame. Fig. 8. The actinia dianthus, or ſea carnation, from the rocks at Haſtings in Suſſex. This animal adheres by its tail, or ſucker, to the under part of the projecting rocks oppoſite to the town; and, when the tide is out, has the appearance of a long white fig; this is the form of it when put into a glaſs of ſea water. It is introduced here as a new variety of this animal not yet deſcribed.

Animal Food. See Food.

Animal Oeconomy. This ſubject is explained under Anatomy.

Animal Magnetiſm. See Magnetism.

Animal Spirit. See *Nervous Fluid.*

Animal Syſtem denotes the whole claſs of beings endowed with animal life, otherwiſe called *Animal Kingdom*,

Animals,

Fig. 1.

Fig. 2.

Fig. 6.

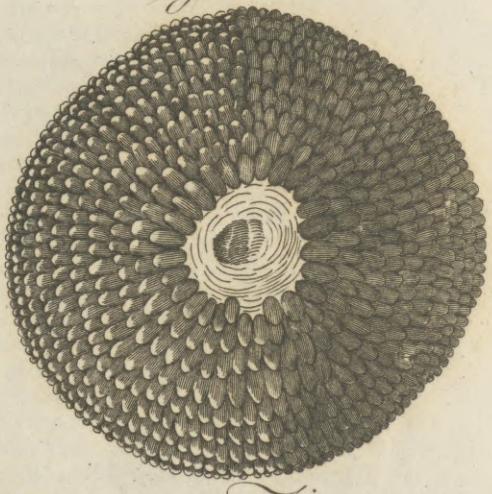

Fig. 4.

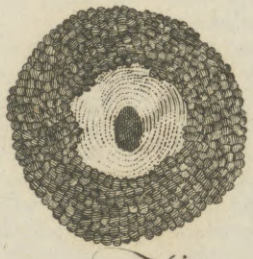

Fig. 3.

Fig. 7.

Fig. 8.

Fig. 5.

A. Bell Prin. Wal. Sculptor fecit.

Animals || Animalcule.

Animals, the preparation of, for collections or muſeums. See Quadrupeds, Birds, Reptiles.

Pairing of Animals. See Pairing.

ANIMALCULE, in general, ſignifies a little animal; and thus the term might be applied to every animal which is conſiderably inferior in ſize to ourſelves. It hath been cuſtomary, however, to diſtinguiſh by the name of *animalcules* only ſuch animals as are of a ſize ſo diminutive, that their true figure cannot be diſcerned without the aſſiſtance of glaſſes; and more eſpecially it is applied to ſuch as are altogether inviſible to the naked eye, and cannot even be perceived to exiſt but by the aſſiſtance of microſcopes.

1 Common acceptation of the word.

By the help of magnifying glaſſes, we are brought into a kind of new world; and numberleſs animals are diſcovered, which from their minuteneſs muſt otherwiſe for ever have eſcaped our obſervation; and how many kinds of theſe inviſibles there may be, is ſtill unknown; as they are diſcerned of all ſizes, from thoſe which are barely inviſible to the naked eye, to ſuch as reſiſt the action of the microſcope, as the fixed ſtars do that of the teleſcope, and with the beſt magnifiers hitherto invented appear only as ſo many moving points.

2 Different ſizes of animalcules.

The ſmalleſt living creatures our inſtruments can ſhow are thoſe that inhabit the waters: for though poſſibly animalcules equally minute, or perhaps more ſo, may fly in the air, or creep upon the earth, it is ſcarce poſſible to bring ſuch under our examination; but water being tranſparent, and confining the creatures in it, we are able, by applying a drop of it to our glaſſes, to diſcover, to a certain degree of ſmallneſs, all that it contains.—Some of the moſt curious of theſe animalcules, which have been deſcribed by microſcopical obſervers, we ſhall here give an account of.

3 Hair-like inſect.

1. *The Hair-like Inſect.* This ſo called by Mr Baker on account of its ſhape; being extremely ſlender, and frequently an hundred and fifty times as long as broad. The body or middle part, which is nearly ſtraight, appears, in ſome, compoſed of ſuch rings as the windpipe of land animals is made up of; but in others ſeems rather ſcaled, or made up of rings that obliquely croſs one another. Its two ends are hooked or bent, pretty nearly in the ſame degree, but in a direction oppoſite to one another; and as no eyes can be diſcerned, it is difficult to judge which is the head or tail. Its progreſſive* motion is very ſingular, being performed by turning upon one end as a centre, and deſcribing almoſt a quarter of a circle with the other, as repreſented in the figure. Its motions are very ſlow, and require much patience and attention in the obſerver. Theſe creatures are ſo ſmall, that millions of millions of them might be contained in an inch ſquare. When viewed ſingly, they are exceedingly tranſparent, and of a beautiful green colour; but when numbers of them are brought together, they become opaque, loſe their green colour, and grow entirely black.

* Plate XXXV. fig. 1.

4 Its extreme ſmalneſs, &c.

5 Delights in ſociety.

Notwithſtanding the extreme minuteneſs of theſe animalcules, they ſeem to be fond of ſociety; for, after viewing for ſome time a parcel of them taken up at random, they will be ſeen diſpoſing themſelves in a kind of regular order †. If a multitude of them are put into a jar of water, they will form themſelves into a regular body, and aſcend ſlowly to the top, where after they have remained for ſome time expoſed to the air, their green colour changes to a beautiful ſky blue. When they are weary of this ſituation, they form themſelves into a kind of rope, which ſlowly deſcends as low as they intend; but if they happen to be cloſe to the ſide of the jar, they will deſcend upon it. They are ſo nearly of the ſpecific gravity of water itſelf, that they will either remain at the bottom, float on the ſurface, or be ſuſpended in the middle, according as they are originally placed, or as they themſelves have a mind.

† Fig. 2.

Animalcule.

A ſmall quantity of the matter containing theſe animalcules ‡ having been put into a jar of water, it ſo happened, that one part went down immediately to the bottom, whilſt the other continued floating on the top. When things had remained for ſome time in this condition, each of theſe ſwarms of animalcules began to grow weary of its ſituation, and had a mind to change its quarters. Both armies, therefore, ſet out at the ſame time, the one proceeding upwards, and the other downwards; ſo that, after ſome hours journey, they met in the middle. A deſire of knowing how they would behave on this occaſion, engaged the obſerver to watch them carefully; and to his ſurpriſe he ſaw the army that was marching upwards, open to the right and left, to make room for thoſe that were deſcending. Thus, without confuſion or intermixture, each held on its way: the army that was going up, marching in two columns to the top, and the other proceeding in one column to the bottom, as if each had been under the direction of wiſe leaders.

‡ Fig. 3.

6 Seems poſſeſſed of a conſiderable degree of ſagacity.

The hair-like inſect was firſt diſcovered in a ditch at Norwich, one end of which communicates with the river there, and the other end with a ſecond ditch, into which ſeveral kennels empty themſelves. The length of this ditch, when Mr Baker wrote his account of this animalcule, was at leaſt 100 yards, and its breadth nine. The bottom, for more than a foot thick, was covered with a blackiſh green ſubſtance, in appearance like mud, made up for the moſt part of theſe inſects; but, ſuppoſing only a half or a quarter part of it to be compoſed of them, according to the dimenſions we have given, their numbers muſt exceed all imagination.

7 Found in prodigious quantity.

2. *Eels in paſte*, &c. When paſte is allowed to ſtand till it become ſour, it is then found to be the habitation of numberleſs animalcules, which may be diſcerned by the naked eye; and though their form cannot be perfectly diſtinguiſhed, their motion is very perceptible, and the whole paſte will ſeem to be animated. Fig. 4. repreſents one of theſe anguillæ magnified. The moſt remarkable property of theſe inſects is, that they are viviparous. If one of them is cut through near the middle, ſeveral oval bodies of different ſizes will be ſeen to iſſue forth. Theſe are young anguillæ, each of them coiled up and encloſed in its proper membrane, which is ſo exquiſitely fine, as ſcarce to be diſcernible by the greateſt magnifier, while it encloſes the embryo animal. The largeſt and moſt forward immediately break through this covering, unfold themſelves, and wriggle about in the water nimbly; others get out, uncoil, and move themſelves about more ſlowly; and the leaſt mature continue entirely without motion. The *uterus*, or veſſel that contains all theſe oval bodies, is compoſed of many ringlets, not unlike the aſpera arteria of land animals, and ſeems to be conſiderably elaſtic; for as ſoon as the animalcule is cut in two, the oval bodies are thruſt out with ſome degree of violence, from the ſpringing back or action of this bowel. An

8 Eels in paſte viviparous.

Animalcule.

hundred and upwards of the young ones have been ſeen to iſſue from the body of one ſingle eel, whereby the prodigious increaſe of them may be accounted for; as probably ſeveral ſuch numerous generations are produced in a ſhort time. They ſeem to be all prolific; and unleſs trial happens to be made upon one that has brought forth all its young, or when the paſte has been kept for a very long time, the experiment will always ſucceed.—This property of theſe eels being viviparous renders it highly improbable that they ever become flies.

Animalcules of a ſimilar kind are likewiſe found in vinegar; and, like thoſe already deſcribed, are found to be viviparous. But it is not only in acid matters that ſuch appearances are obſerved. In ſome fields of wheat, many grains may be obſerved, that appear blackiſh outwardly, as if ſcorched; but when opened are found to contain a ſoft white ſubſtance, which, attentively conſidered, appears to be nothing elſe than a congeries of threads or fibres lying cloſe to each other in a parallel direction, much reſembling the unripe down of ſome thiſtles on cutting open the flower heads before they begin to blow. This fibrous matter diſcovers not the leaſt ſign of life or motion, unleſs water is applied; but immediately on wetting, provided the grains of wheat have been newly gathered, the ſuppoſed fibres ſeparate, and appear to be living creatures. Their motions at firſt are very languid; but gradually become more vigorous, twiſting and wriggling themſelves ſomewhat in the manner of the eels in paſte, but always ſlower than they, and with a great deal leſs regularity.

9 Similar creatures found in blighted wheat.

If the grains of wheat are grown dry by keeping, and in that condition are cut open, the fibrous matter is very diſtinguiſhable; and, on putting water to it, will ſeparate with great readineſs, and ſeem like fine tubes or threads tapering at both ends: but not the leaſt motion will be perceived till they have been in water for ſeveral hours, and ſometimes they will never move at all. But if the ſame grains are ſteeped in water for three or four hours, or buried for ſome days in the earth, till they are fully ſaturated with moiſture, and then opened with a penknife; on taking out a ſmall portion of the white matter carefully, and ſpreading it thin upon a ſlip of glaſs, the animalcules will be ſeen bundled together, and extended longitudinally, but without motion: and though, upon the application of water, they will not revive ſo ſoon as thoſe taken from freſh grains, whoſe moiſture has never been exhaled; yet, after remaining an hour or two in water, they are conſtantly found alive and vigorous, even though the grains have been kept in a dry condition for ſeveral years. It is neceſſary, however, to adapt, in ſome meaſure, the time of continuing the grains in water or earth to the age and dryneſs of them: for if they are not opened before they are too much ſoftened, the animalcules will be dead; and unleſs the huſks are opened to let thoſe creatures out after they have been ſteeped, they inevitably periſh in them: otherwiſe, they will continue alive in water for many months; and, ſhould the water dry away, may be revived again by giving them a freſh ſupply.

10 How diſcoverable.

11 Precautions neceſſary in making the experiment.

12 Proteus, why ſo called.

3. *The Proteus.* This animalcule has been dignified by Mr Baker with the name of *Proteus*, on account of its aſſuming a great number of different ſhapes, ſo as ſcarce to be known as the ſame animal in its various transformations; and indeed, unleſs it be carefully watched while paſſing from one ſhape to another, it will often become ſuddenly inviſible, as happened more than once to Mr Baker. Animalcule.

When water, wherein any ſort of vegetable has been infuſed, or animals preſerved, has ſtood quietly for ſome days, or weeks, in any glaſs or other veſſel, a ſlimy ſubſtance will be collected about the ſides: ſome of which being taken up with the point of a penknife, placed on a ſlip of glaſs in a drop of water, and looked at through the microſcope, will be found to harbour ſeveral kinds of little animals that are ſeldom found ſwimming about at large; among which the proteus is one. Its ſhape is better underſtood from the figure, than from any deſcription that could be given. Its ſubſtance and colour ſeems to reſemble that of a ſnail; and its whole ſhape ſeems to bear a conſiderable reſemblance to that of a ſwan. It ſwims to and fro with great vivacity: but will now and then ſtop for a minute or two; during which time its long neck is uſually employed as far as it can reach, forwards, and on every ſide, with a ſomewhat ſlow, but equable motion, like that of a ſnake, frequently extending thrice the length of its body, and ſeemingly in ſearch of food. 13 Where found. 14 Its ſhape, colour, &c.

There are no eyes, nor any opening in the head like a mouth, to be diſcerned: but its actions plainly prove it to be an animal that can ſee; for though multitudes of different animalcules ſwim about in the ſame water, and its own progreſſive motion is very ſwift, it never ſtrikes againſt any of them, but directs its courſe between them with a dexterity wholly unaccountable, ſhould we ſuppoſe it deſtitute of ſight.

When the proteus is alarmed, it ſuddenly draws in its long neck, repreſented in fig. 5. and 6. transforming itſelf into the ſhape repreſented in fig. 7. when it becomes more opaque, and moves about very ſlowly with the large end foremoſt. When it has continued ſome time in this poſture, it will often, inſtead of the head and neck it had formerly, put forth a new one, with a kind of wheel machinery, repreſented fig. 8. the motions of which draw a current of water to it from a conſiderable diſtance. Having often pulled in and thruſt out this ſhort head, ſometimes with and ſometimes without the wheel work, the creature, as if weary, will remain motionleſs for a while; then its head and long neck will be very ſlowly protruded, as in fig. 9. and it ſoon reſumes its former agility. Sometimes it diſpoſes of its neck and head, as repreſented in fig. 10. 15 Its transformations.

4. *The Wheel Animal*, or *Vorticella*. This wonderful animalcule is found in rain water that has ſtood ſome days in leaden gutters, or in hollows of lead on the tops of houſes; or in the ſlime or ſediment left by ſuch water; and perhaps may alſo be found in other places: but if the water ſtanding in gutters of lead, or the ſediment left behind it, has any thing of a red colour in it, one may be almoſt certain of finding them therein. Though it diſcovers no ſigns of life except when in the water, yet it is capable of continuing alive for many months after it is taken out of the water, and kept in a ſtate as dry as duſt. In this ſtate it is of a globular ſhape, exceeds not the bigneſs of a grain of ſand, and no ſigns of life appear: but being put into water, in the ſpace of half an hour a languid motion begins, the globule turns itſelf about, lengthens itſelf by ſlow degrees, 16 Vorticella, where found.

Animalcule.

degrees, assumes the form of a lively maggot, and most commonly in a few minutes afterwards puts out its wheels; swimming vigorously through the water, as if in search of food; or else, fixing itself by the tail, works the wheels in such a manner as to bring its food to it.

Fig. 23. and 24. show the wheel animal in its globular form; fig. 11. and 12. in its maggot state; and fig. 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22. show the different appearances of its wheels, and also its various intermediate changes between the globular and maggot state.

17 Its wheel work described.

The most remarkable part of this animalcule is its wheel work. This consists of a couple of semicircular instruments, round the edges of which many little fibrillæ move themselves very briskly, sometimes with a kind of rotation, and sometimes in a trembling or vibrating manner. When in this state, it sometimes unfastens its tail, and swims along with a great deal of swiftness, seemingly in pursuit of its prey. Sometimes the wheels seem to be entire circles, armed with small teeth, like those of the balance wheel of a watch, appearing projected forwards beyond the head, and extending sidewise somewhat wider than its diameter. The teeth or cogs of these wheels seem to stand very regularly at equal distances: but the figure of them varies according to their position, the degree of their protrusion, and perhaps the will of the animal itself. They appear sometimes like minute oblong squares, rising at right angles from the periphery of a circle, like ancient battlements on a round tower; at other times they terminate in sharp points, and altogether resemble a kind of Gothic crown. They are often seen in a kind of curvular direction, all bending the same way, and seeming like so many hooks; and now and then the ends of them will be perceived to be clubbed like mallets. This figure, however, as well as the first, they assume but rarely.

As these wheels are everywhere excessively transparent, except about their circular rim or edge, where the cogs are set, it is very difficult to determine by what contrivance they are turned about, or what their real figure is, though they seem exactly to resemble wheels moving round upon an axis. It is also hardly possible to be certain whether those circular bodies in which the teeth are set, are of a flat form, or hollow and conical; but they seem rather to be of a conical figure. The difficulty of conceiving how an articulation could be contrived so as to cause a real rotation, hath caused many people imagine that there was a deception in this case: But Mr Baker assures us, that when the wheels are fully protruded, they never fail to show all the visible marks of a regular rotation; and, in some positions, the same cogs or teeth may be traced by the eye during a complete revolution.

18 Shows all the marks of a real rotation.

19 Shows great quickness of sensation.

All the actions of this creature seem to imply sagacity and quickness of sensation. At the least touch or motion in the water, they instantly draw in their wheels; and Mr Baker conjectures, that their eyes are lodged somewhere about the wheels; because, while in the maggot state, its motions are slow and blundering; but after the wheels are protruded, they are performed with great regularity, swiftness, and steadiness.

Notwithstanding the minuteness of this animalcule, the microscope generally discovers others in the same drop of water, compared with which the wheel animal may be said to be a whale. The transparency of its body, therefore, allows its internal parts to be seen, which cannot be perceived in the minutest animalcules, on account of the smallness of their size. *a*, Is the appearance of the head; and though it is everywhere transparent, a ring or circle, more particularly remarkable for its clearness, is commonly perceived about the middle of the forehead, a little above the mouth. This, Mr Baker thinks, might justly be called the seat of the brain. Many vessels which seem to take their origin from thence are discernible in the head, wherein some transparent fluid appears continually agitated by a kind of fluctuating motion.

Animalcule.

Fig. 15. 20 Description of its internal parts.

The thorax, *b*, is joined to the head by a very short neck, *c*, and appears to be about the sixth part of the whole length of the animal. In the middle of the thorax is placed the heart, *d*, where its systole and diastole are plainly visible. It is seen through the back of the insect, shutting and opening alternately with great regularity and exactness. Its size is proportionable to the creature's bigness; and its shape, during the systole, is nearly circular, being composed seemingly of two semilunar parts, which then approach each other laterally, and form between them a roundish or horse shoe-like figure, whose upper side is flat, and the under one convex. The diastole is performed by a seeming separation, or opening, of these two semilunar parts, whereby the transverse diameter of the heart is very much enlarged. This separation begins exactly in the middle of the lower part next the tail; and opens to such a considerable width upwards, that the two parts, when at their utmost distention, seem only joined by an arched vessel at their anterior end. The alternate motions of contraction and dilatation are performed with great strength and vigour, in pretty much the same time as the pulsation of the arteries of a man in health. The motions of the heart are communicated to all the internal parts of the thorax, and seem to extend a great deal further; for a strict examination discovers, at the same time, throughout the whole animal, contractions and dilatations going on, that are apparently correspondent thereto. These motions of the heart, however, are sometimes suspended or imperceptible for two or three minutes: after which they are renewed, and go on again with the same regularity as before. From the under part of the thorax proceeds a small transparent horn represented at *a*, fig. 11. and 12. It is never visible but when the animal turns on its back or side.

The blood or circulating fluid of the wheel animal is so absolutely colourless, that the current of it through the vessel is indistinguishable by glasses. A sort of irregular agitation of some fluid is indeed perceived, which is perhaps a compound motion of currents running different ways, and forming such an appearance, though no single current is anywhere distinctly visible.

Immediately below the thorax is another annular division, *e*, joining upwards to the thorax and downwards to the abdomen, the entrance whereof it serves occasionally to enlarge or diminish. The abdomen *f*, is by much the largest part of the animal, and contains the stomach and intestines. When the insect is full of food, these bowels appear opaque and of a blood-red colour, extending quite through the belly and great

Animalcule. part of the tail, and exhibiting a variety of contractions and dilatations. The belly is capable of ſtretching out greatly in length, or being ſhortened very much, and widening its diameter. It aſſumes many ſhapes, and becomes occaſionally a caſe for all the other parts of the body.

21 Other kinds of wheel animals. Beſides the above mentioned one, there are found in the waters ſeveral other ſpecies of animals furniſhed with wheels, ſome of which appear to have a rotatory, and others a vibratory, motion. Fig. 25. repreſents a kind found in the ditch at Norwich, where the hair-like inſect is produced. They differ from the foregoing only in having very long tails. Fig. 26, 27, and 28. repreſent a ſpecies of wheel animals, which are alſo covered with ſhells. The body of this ſpecies conſiſts of three parts, in like manner as the other; only the thorax and abdomen, in this, are not ſeparated by any gut, or intermediate veſſel, but are joined immediately together. The heart is plainly perceived, having a regular ſyſtole and diaſtole, at *a*, as in the former ſpecies. Theſe creatures occaſionally draw themſelves entirely within their ſhells; and the ſhell then appears terminated by ſix ſhort ſpikes on one ſide and two on the other.

22 Manner of producing their young ones. The young ones of this ſpecies are carried in oval ſacculi, or integuments, faſtened externally on the lower part of their ſhells ſomewhere about the tail; theſe ſacculi are ſometimes opaque only at one end, and ſeemingly empty at the other; ſometimes they appear opaque in the middle, with a tranſparency all round, as in fig. 26. When the young one is about to burſt its integuments, the parent aſſiſts it greatly, by wagging its tail, and ſtriking the oval bag, ſo that the young one's head becomes as it were forced into the water, though Fig. 28. *b.* the tail cannot be ſo ſoon diſengaged. In this condition the young one ſets its wheel a-going, and exerts all its endeavours to free itſelf from its confinement. When it has got clear, it ſwims away, wagging its tail as the old one does, and leaving the integument adhering to the ſhell of the parent. The old one then uſes a number of efforts to get rid of this incumbrance, ſtriking againſt it with her tail, fixing the end of her tail upon it, and then darting her body forward; with ſeveral very odd motions not eaſy to be deſcribed. This

23 Infeſt the Pulex Aquaticus. kind of wheel animals are great tormentors of the water flea, *Pulex aquaticus arboreſcens* of Swammerdam; of which a figure is given from that author (Plate XXXVI.); fig. 2. ſhows the natural ſize of the flea; and fig. 1. ſhows it magnified, with ſome of the wheel animals adhering to it. Theſe inſects are often found in great numbers in the ſame water: and when that is the caſe, it is not uncommon to diſcover five or ſix of theſe cruſtaceous wheel animals faſtened by their tail to the ſhell or horns of the flea; cauſing it, ſeemingly, a vaſt deal of uneaſineſs: nor can they be driven away, or ſhaken off, by all the efforts the flea can uſe for that purpoſe.

24 Bell-flower animal. 5. *The Bell-flower Animal*, or *Plumed Polype*. Theſe animalcules dwell in colonies together, from ten to fifteen (ſeldom falling ſhort of the former number, or exceeding the latter), in a ſlimy kind of mucilaginous or gelatinous caſe; which, out of the water, has no determined form, appearing like a little lump of ſlime; but, when expanded therein, has ſome reſemblance to the figure of a bell with its mouth upwards; and is uſually about half an inch long, and a quarter of an inch in diameter. Theſe bells, or colonies, are to be found adhering to the large leaves of duckweed, and other aquatic plants. They may be moſt eaſily diſcovered by letting a quantity of water, with duckweed in it, ſtand quietly for three or four hours in glaſs veſſels in a window, or other place whence a ſtrong light comes: for then, if any are about the duckweed, they will be found, on careful inſpection, extending themſelves out of their caſes, and making an elegant appearance. Animalcule. 25 Where diſcovered.

The bell, or caſe, which theſe animals inhabit, being very tranſparent, all the motions of its inhabitants may be diſcerned through it diſtinctly. It ſeems divided internally into ſeveral apartments, or rather to contain ſeveral ſmaller ſacculi, each of which encloſes one of theſe animals. The openings at the tops of theſe ſacculi, are but juſt ſufficient to admit the creature's head and a ſmall part of its body to be thruſt out beyond them, the reſt remaining always in the caſe. It can, however, occaſionally retire into its caſe altogether; and never fails to do ſo when alarmed by any ſudden motion of the water, or of the veſſel which contains it.

Beſide the particular and ſeparate motion which each of theſe creatures is able to exert within its own caſe and independent of the reſt; the whole colony together has a power of altering the poſition of the bell, or even of removing it from one place to another; and hence this bell is ſometimes found ſtanding perfectly upright, as in fig. 29. and 33. and ſometimes bending the upper part downwards, as in fig. 30. As theſe animalcules ſeem not to chooſe to ſtay together in ſocieties whoſe number exceeds 15, when the colony happens to increaſe in number, the bell may be obſerved to ſplit gradually, beginning from about the middle of the upper or anterior extremity, and proceeding downwards towards the bottom, as in fig. 32. till they at laſt ſeparate entirely, and become two complete colonies independent of each other, one of which ſometimes removes to another part of the veſſel. 26 Motions of the whole colony.

The arms of each individual of this colony are ſet round the head, to the number of 40, having each the figure of an Italic *f*, one of whoſe hooked ends is faſtened to the head; and all together, when expanded, compoſe a figure ſhaped ſomewhat like a horſe's ſhoe, convex on one ſide next the body, but gradually opening and turning outwards, ſo as to leave a conſiderable area within the outer extremities of the arms. When the arms are thus extended, the creature, by giving them a vibrating motion, can produce a current in the water, which brings the animalcules, or whatever other minute bodies are within the ſphere of its action, with great velocity to its mouth, ſituated between the arms; where they are taken in if liked, or driven away by a contrary motion. The food is conveyed immediately from the mouth or opening between the arms, through a narrow neck, into a paſſage ſeemingly correſpondent to the œſophagus in land animals; down which it paſſes into the ſtomach, where it remains for ſome time, and then is voided upwards, in ſmall round pellets, through a gut whoſe exit is near the neck. The body conſiſts of three diviſions; in the uppermoſt of which are contained all the above-mentioned inteſtines, which are only to be diſcerned when the creature is full, at which time they become opaque. The other two diviſions, 27 Deſcription of an individual.

Animalcule.

visions, which are probably fixed to the bell, seem to be of no other use than to give the creature a power of contraction and extension. The arms are not able to contract like those of the common polype; but when the animal retires into its case, they are brought together in a close and curious order, so as to be easily drawn in. Though their general appearance, when expanded, is that of a cup whose base and top are of an horse-shoe form, they sometimes separate into four parts, and range themselves as in fig. 36. so as to resemble four separate plumes of feathers. Though their eyes cannot be discovered, yet Mr Baker thinks they have some perception of the light: for when kept in the dark, they always remain contracted; but on being exposed to the light of the sun or of a candle, they constantly extend their arms, and show evident signs of being pleased.

28 Seem to have a perception of light.

Fig. 29. represents one complete colony or bell standing erect, with all the animals out of their kingdom, and their arms extended, exhibiting all together a very pretty appearance. *a*, represents two oval bodies, supposed by Mr Baker to be eggs.

Fig. 30. shows all the creatures withdrawn into their cells, and the end of the bell hanging downwards.

Fig. 33. shows the bell erect, with only one of the animals coming out, in order to show its connexion with the bell.

Fig. 34. shows the head and arms of a single polype closing together, and disposing themselves in order to be drawn into the bell.

Fig. 35. shows one complete animal greatly magnified, to show its several parts more distinctly; viz. *a*. the head, resembling a horse shoe; *b b*, the arms seen from one side; *c*, the narrow neck; *d*, the œsophagus; *e*, the stomach; *f*, the gut or last intestine through which the food passes after being digested in the stomach; *g*, the anus, where the fæces are discharged in little pellets; *h i*, that part of the bell which surrounds the body of the animal, and closes upon it when it retires down.

Fig. 37. The head and arms seen in front.

29 Globe animal.

6. *The Globe animal.* This animalcule, represented fig. 38. seems exactly globular, having no appearance of either head, tail, or fins. It moves in all directions, forwards or backwards, up or down, either rolling over and over like a bowl, spinning horizontally like a top, or gliding along smoothly without turning itself at all. Sometimes its motions are slow, at other times very swift; and, when it pleases, it can turn round, as it were upon an axis, very nimbly, without removing out of its place. The whole body is transparent, except where the circular black spots are shown in the figure. Some of the animals have no spots, and others from one to seven. The surface of the whole body appears, in some, as if all over dotted with points; in others, as if granulated like shagreen: but their more general appearance is, as if beset thinly round with short moveable hairs or bristles, which probably are the instruments by which their motions are performed. These animalcules may be seen by the naked eye, but appear only like moving points.

30 Pipe animal.

7. *The Pipe animal.* These creatures are found on the coast of Norfolk, living in small tubes or cases of sandy matter, in such multitudes as to compose a mass sometimes of three feet in length. Fig. 39. shows a piece of such a congeries broke off, where *aaaa* represent the mouths or openings of the pipes wherein the little animals make their abode. Fig. 40. shows one single pipe, with its inhabitant, separated from the rest, and magnified nine or ten times in diameter. The pipe or case *b* is made of sand, intermixed here and there with minute shells, and all cemented together by a glutinous slime, probably issuing from the animal's own body *c*, which is composed of muscular ringlets like those of a worm, capable of great extension or contraction. The anterior end or head, *d*, is exceedingly beautiful, having round it a double row of little arms disposed in a very regular order, and probably capable of extension, in order to catch its food, and bring it to its mouth. Some of these tubes are found petrified, and constitute one species of syringoides.

Animalcule.

31 Sometimes found petrified.

8. *An Insect with net-like arms.* The properties and shape of this little animal are very extraordinary. It is found only in cascades, where the water runs very swift. There these insects are found in clusters, standing erect on their tails; and resembling, when all together, the combs of bees at the time they are filled with their aureliæ. On being taken out of the water, they spin threads, by which they hang exactly in the same manner as the garden spider. Fig. 42. shows one of these insects magnified. Its body appears curiously turned as on a lathe; and at the tail are three sharp spines, on which it raises itself, and stands upright in the water; but the most curious apparatus is about its head, where it is furnished with two instruments like fans or nets, which serve to provide its food. These it frequently spreads out and draws in again; and when drawn up, they are folded together with the utmost nicety and exactness, so as to be indiscernible when brought close to the body. At the bottom of these fans a couple of claws are fastened to the lower part of the head, which, every time the nets are drawn in, conduct to the mouth of the animal whatever is taken in them. When the creature does not employ its nets, it thrusts out a pair of sharp horns, as in fig. 41. where the insect is shown magnified about 400 times.

32 Insects with net-like arms.

Some of these creatures being kept with water in a vial, most of them died in two days; and the rest, having spun themselves transparent cases (which were fastened either to the sides of the glass, or to pieces of grass put into it), seemed to be changed into a kind of chrysalis: but, before taking this form, they appeared as in fig. 43. which shape they likewise assumed when weary with catching their food, or when lying in wait for it. None of them lived above three days; and though fresh water was given them two or three times a-day, yet, in a few hours, it would stink to a degree scarce conceivable, and that too at several yards distance, though, in proportion to the water, all the included insects were not more than as 1 to 150,000. This makes it probable, that it is necessary for them to live in a rapid stream, lest they should be poisoned by the effluvia issuing from their own bodies, as no doubt they were in the vial.

33 Surprising property of spoiling water.

9. *A curious aquatic worm.* This animalcule is shown, magnified, at fig. 31. It is found in ditch water; and is of various sizes, from $\frac{1}{40}$ to $\frac{1}{2}$ of an inch in length. About the head it is somewhat of a yellowish colour; but all the rest of the body is perfectly colourless and transparent, except the intestines, which are considerably

34 An aquatic worm.

Animalcule.

conſiderably opaque, and diſpoſed as in the figure. Along its ſides are ſeveral papillæ, with long hairs growing from them: it has two black eyes, and is very nimble. But the moſt remarkable thing in this creature is a long horn or proboſcis; which, in the large ones, may be ſeen with the naked eye, if the water is clear, and is ſometimes $\frac{1}{10}$ of an inch in length: this it waves to and fro as it moves in the water, or creeps up the ſide of the glaſs; but it is not known whether it is hollow, or of what uſe it is to the creature itſelf.

35 Its horn or proboſcis.

36 Spermatic animals, when diſcovered.

10. *Spermatic Animals*, and *Animacula Infuſoria*. The diſcovery of living animalcules in the ſemen of moſt animals is claimed by Mr Leeuwenhoek and Mr Nicholas Hartſoeker, who both ſay they publiſhed it about the end of the year 1677 or beginning of 1678: but Mr Leeuwenhoek having given the moſt particular deſcription of, and made by far the greateſt number of experiments concerning them, the diſcovery is commonly attributed to him.

37 General appearance the ſame in every animal.

According to this naturaliſt, theſe animalcules are found in the ſemen maſculinum of every kind of animal: but their general appearance is very much the ſame, nor doth their ſize differ in proportion to the bulk of the animal to which they belong. The bodies of all of them ſeem to be of an oblong oval form, with long tapering ſlender tails iſſuing from them; and as by this ſhape they reſemble *tadpoles*, they have been frequently called by that name; though the tails of them, in proportion to their bodies, are much longer than the tails of tadpoles are: and it is obſervable, that the animalcules in the ſemen of fiſhes have tails much longer and more ſlender than the tails of thoſe in other animals; inſomuch, that the extremity of them is not to be diſcerned without the beſt glaſſes, and the utmoſt attention. Fig. 21. N° 1, 2, 3, 4, repreſent the ſpermatic animalcula of the rabbit; and N° 5, 6, 7, 8, thoſe of a dog; according to Mr Leeuwenhoek.

Pl. XXXII.

38 Inconceivable number and minuteneſs.

The numbers of theſe animalcula are inconceivable. On viewing with a microſcope the milt or ſemen maſculinum of a living cod fiſh, innumerable multitudes of animalcules were found therein of ſuch a diminutive ſize, that he ſuppoſed at leaſt 10,000 of them capable of being contained in the bulk of a grain of ſand; whence he concludes, that the milt of this ſingle fiſh contained more living animalcules than there are to be found people living in the whole world. To find the comparative ſize of theſe animalcules, Mr Leeuwenhoek placed a hair of his head near them; which hair, through his microſcope, appeared an inch in breadth; and he was ſatisfied, that at leaſt 60 ſuch animalcules could eaſily lie within that diameter; whence, their bodies being ſpherical, it follows, that 216,000 of them are but equal to a globe whoſe diameter is the breadth of a hair. He obſerved, that when the water wherewith he had diluted the ſemen of a cod fiſh was exhaled, the little bodies of the animalcules burſt in pieces; which did not happen to thoſe in the ſemen of a ram: and this he imputes to the greater firmneſs and conſiſtency of the latter, as the fleſh of a land animal is more compact than fiſh.

39 Are continually in motion.

Theſe animalcules appear to be very vigorous, and tenacious of life; for they may be obſerved to move long after the animal from which they are taken is dead. They have this peculiarity alſo that they are continually in motion, without the leaſt reſt or intermiſſion, provided there is fluid ſufficient for them to ſwim about in. Theſe animalcula are peculiar to the ſemen; nothing that has the leaſt token of life being diſcovered, by the beſt glaſſes, either in the blood, ſpittle, urine, gall, or chyle. Great numbers, however, are to be found in the whitiſh matter that ſticks between the teeth; ſome of which are of an oval figure, and others reſemble eels.

Animalcule.

40 Animalcula infuſoria.

The *Animalcula Infuſoria* take their name from their being found in all kinds either of vegetable or animal infuſions. Indeed, there is ſcarce any kind of water, unleſs impregnated with ſome mineral ſubſtance, but what will diſcover living creatures.—Mr Leeuwenhoek ſays, that at firſt he could diſcern no living creatures in rain water; but after ſtanding ſome days, he diſcovered innumerable animalcules, many thouſands of times leſs than a grain of ſand, and in proportion to a mite as a bee is to a horſe.—In other rain water, which had likewiſe ſtood ſome time, he found the ſmalleſt ſort he had ever ſeen; and, in a few days more, met with others eight times as big as theſe, and almoſt round. In another quantity of rain water that had been expoſed like the former, he diſcovered a kind of animalcules with two little horns in continual motion. The ſpace between the horns was flat, though the body was roundiſh, but tapering a little towards the end; where a tail appeared, four times as long as the body, and the thickneſs of a ſpider's web. He obſerved ſeveral hundreds of theſe within the ſpace a grain of ſand would occupy. If they happened on the leaſt filament or ſtring, they were entangled in it; and then would extend their bodies into an oblong round, and ſtruggle hard to diſengage their tails. He obſerved a ſecond ſort of an oval figure, and imagined the head to ſtand at the ſharpeſt end. The body was flat, with ſeveral ſmall feet moving exceeding quick, but not diſcernible without a great deal of attention. Sometimes they changed their ſhape into a perfect round, eſpecially when the water began to dry away. He met alſo with a third ſort, twice as long as broad, and eight times ſmaller than the firſt: yet in theſe he diſcerned little feet, whereby they moved very nimbly. He perceived likewiſe a fourth ſort, a thouſand times ſmaller than a louſe's eye, and which exceeded all the reſt in briſkneſs: he found theſe turning themſelves round, as it were upon a point, with the celerity of a top. And he ſays, there were ſeveral other ſorts.

41 Mr Leeuwenhoek's account of animalcules in rain water.

42 Surpriſing production of theſe animalcules.

The production of *animalcula infuſoria* is very ſurpriſing. In four hours time, an infuſion of cantharides has produced animalcula leſs than even the tails of the ſpermatic animals we have already deſcribed. Neither do they ſeem to be ſubject to the fate of other animals; but, ſeveral kinds of them at leaſt, by dividing themſelves in two, to enjoy a ſort of immortality. Nor do the common methods by which other animals are deſtroyed, ſeem to be effectual for deſtroying their vital principle. Hot mutton gravy, ſecured in a phial with a cork, and afterwards ſet among hot aſhes to deſtroy as effectually as poſſible every living creature that could be ſuppoſed to exiſt in it, has nevertheleſs been found ſwarming with animalcules after ſtanding a few days.

43 Mr Ellis's account of animalcules from infuſion of potatoes.

In the Philoſophical Tranſactions, Vol. LIX. we have the following curious account, given us by Mr Ellis, of animalcules produced from an infuſion of potatoes and of hempſeed.

"On

Animal-cule.

"On the 25th of May 1768, Fahrenheit's thermometer 70°, I boiled a potato in the New River water till it was reduced to a mealy conſiſtence. I put part of it, with an equal proportion of the boiling liquor, into a cylindrical glaſs veſſel that held ſomething leſs than half a wine pint, and covered it cloſe immediately with a glaſs cover. At the ſame time, I ſliced an unboiled potato; and, as near as I could judge, put the ſame quantity into a glaſs veſſel of the ſame kind; with the ſame proportion of New River water not boiled; and covered it with a glaſs cover; and placed both veſſels cloſe to each other.

"On the 26th of May, 24 hours afterwards, I examined a ſmall drop of each, by the firſt magnifier of Wilſon's microſcope, whoſe focal diſtance is reckoned at $\frac{1}{70}$ part of an inch; and, to my amazement, they were both full of animalcula of a linear ſhape, very diſtinguiſhable, moving to and fro with great celerity; ſo that there appeared to be more particles of animal than vegetable life in each drop.

"This experiment I have repeatedly tried, and always found it to ſucceed in proportion to the heat of the circumambient air; ſo that even in winter, if the liquors are kept properly warm, at leaſt in two or three days the experiment will ſucceed.

"What I have obſerved are infinitely ſmaller than ſpermatic animals, and of a very different ſhape: the truth of which every accurate obſerver will ſoon be convinced of, whoſe curioſity may lead him to compare them; and I am perſuaded he will find they are no way akin.

"At preſent I ſhall paſs over many other curious obſervations, which I have made on two years experiments, in order to proceed to the explaining a hint which I received laſt January from M. de Sauſſure of Geneva, when he was here; which is, that he found one kind of theſe animalcula infuſoria that increaſe by dividing acroſs into nearly two equal parts.

"I had often ſeen this appearance in various ſpecies a year or two ago, as I found upon looking over the minutes I had taken when I made any new obſervation; but always ſuppoſed the animal, when in this ſtate, to be in coition.

"Not hearing, till after M. de Sauſſure left this kingdom, from what infuſion he had made his obſervation; his friend Dr de la Roche of Geneva informed me, the latter end of February laſt, that it was from hempſeed.

44 From an infuſion of hempſeed.

"I immediately procured hempſeed from different ſeedſmen in different parts of the town. Some of it I put into New River water, ſome into diſtilled water, and ſome I put into very hard pump water. The reſult was, that in proportion to the heat of the weather, or the warmth in which they were kept, there was an appearance of millions of minute animalcula in all the infuſions; and, ſome time after, ſome oval ones made their appearance, as at fig. 3. *b*, *c*. Theſe were much larger than the firſt, which ſtill continued: theſe wriggled to and fro in an undulatory motion, turning themſelves round very quick all the time that they moved forwards. I was very attentive to ſee theſe animals divide themſelves; and at laſt I perceived a few of the appearance of fig. 3. *a*, as it is repreſented by the firſt magnifier of Wilſon's microſcope; but I am ſo well convinced by experience that they would ſeparate, that I did not wait to ſee the operation: however, as the following ſketches, which I have drawn from five other ſpecies, will very fully explain this extraordinary phenomenon, there will be no difficulty in conceiving the manner of the firſt. See fig. 4, 5, 6, 7, 8.

45 Divide themſelves in two.

Animal-cule.

"The proportion of the number of theſe animals which I have obſerved to divide in this manner, to the reſt, is ſcarce 1 to 50; ſo that it appears rather to ariſe from hurts received by ſome few animalcula among the many, than to be the natural manner in which theſe kinds of animals multiply; eſpecially if we conſider the infinite quantity of young ones which are viſible to us through the tranſparent ſkins of their bodies, and even the young ones that are viſible in thoſe young ones while in the body of the old ones.

"But nothing more plainly ſhows them to be zoophytes than this circumſtance, That when, by accident, the extremity of their bodies has been ſhrivelled for want of a ſupply of freſh water, the applying more freſh water has given motion to the part of the animal that was ſtill alive; by which means, this ſhapeleſs figure has continued to live and ſwim to and fro all the time it was ſupplied with freſh water.

"I cannot finiſh this part of my remarks on theſe animals, without obſerving, that the excellent Linnæus has joined the *beroë* with the *volvox*, one of the animalculia infuſoria. The beroë is a marine animal, found on our coaſt; of a gelatinous tranſparent nature, and of an oval or ſpherical form, from half an inch to an inch diameter; divided like a melon into longitudinal ribs, each of which is furniſhed with rows of minute fins; by means of which, this animal, like the animalcula infuſoria, can ſwim in all directions with great ſwiftneſs. In the ſame manner I have ſeen moſt of thoſe minute animals move ſo ſwift that we could not account for it, without ſuppoſing ſuch a proviſion in nature, which is really true, but cannot be ſeen till the animals grow faint for want of water; then, if we attend, we may with good glaſſes plainly diſcover them.

46 Beroë deſcribed.

"I have lately found out, by mere accident, a method to make their fins appear very diſtinctly, eſpecially in the larger kind of animalcula, which are common to moſt vegetable infuſions; ſuch as the terebella. This has a longiſh body, with a cavity or groove at one end, like a gimlet: by applying, then, a ſmall ſtalk of the horſe-ſhoe geranium (or geranium zonale of Linnæus), freſh broken, to a drop of water in which theſe animalcula are ſwimming we ſhall find that they will become torpid inſtantly; contracting themſelves into an oblong oval ſhape, with their fins extended like ſo many briſtles all round their bodies. The fins are in length about half the diameter of the middle of their bodies. Before I diſcovered this expedient, I tried to kill them by different kinds of ſalts and ſpirits; but though they were deſtroyed by this means, their fins were ſo contracted, that I could not diſtinguiſh them in the leaſt. After lying in this ſtate of torpidity for two or three minutes, if a drop of clean water is applied to them, they will recover their ſhape, and ſwim about immediately, rendering their fins again inviſible."

47 Method of diſcovering the fins of animalcules.

Fig. 3, 4, 5, 6, 7, 8, repreſent different ſpecies of animalcula infuſoria, mentioned by Mr Ellis as belonging to the genus of volvox of Linnæus.

Fig. 3. repreſents the volvox ovalis, or egg-ſhaped volvox;

Animalcule.

volvox; at (b) and (c) it is expreſſed in its natural ſhape; at (a) the manner in which it becomes two animals, by ſeparating acroſs the middle. This was found in the infuſion of hempſeed; but is found in other vegetable infuſions, particularly that of tea-ſeed.

Fig. 4. is the volvox torquilla, or wryneck. At (a) is repreſented its divided ſtate; at (b) and (c) its natural ſtate: this is common to moſt vegetable infuſions, as is the following.

Fig. 5. is the volvox volutans, or the roller. At (a) the animal is ſeparated, and becomes two diſtinct beings, each ſwimming about and providing for itſelf: this is often the prey of another ſpecies of this genus, eſpecially while it is weak by this ſeparation, not being ſo active for ſome time till it can recover itſelf. At (c) the animal appears to be hurt on one ſide; this impreſſion in a little time is ſucceeded by another in the oppoſite ſide, as at (b), which ſoon occaſions a diviſion. At (d) is the ſide view, and at (e) the front view, of the natural ſhape of the animal.

Fig. 6. is the volvox oniſcus, or wood-louſe. At (a) is the natural ſhape of it, as it appears full of little hairs both at the head and tail; with thoſe at the head, it whirls the water about to draw its prey to it; the feet, which are many, are very viſible, but remarkably ſo in a ſide-view at (d). At (b) it is repreſented beginning to divide; and at (c) the animals are ready to part: in this ſtate, as if in exquiſite pain, they ſwim round and round, and to and fro, with uncommon velocity, violently agitated till they get aſunder. This was found in an infuſion of different kinds of pine branches.

Fig. 7. is the volvox terrebella, or the gimlet. This is one of the largeſt of the kind, and is very viſible to the naked eye. It moves along ſwiftly, turning itſelf round as it ſwims, juſt as if boring its way. (a) and (b) are two views of its natural ſhape, (c) ſhows the manner of its dividing. When they are ſeparated, the lower animal rolls very awkwardly along, till it gets a groove in the upper part. (d) repreſents one of them lying torpid, by means of the juice of the horſe-ſhoe geranium, with its fins extended. This animal is found in many infuſions, particularly of graſs or corn.

Fig. 8. is the volvox vorax, or glutton. This animal was found in an infuſion of the Tartarian pine; it varies its ſhape very much, contracting and extending its proboſcis, turning it to and fro, in various directions, as at a, b, c, d, e. It opens its proboſcis underneath the extremity, when it ſeizes its prey. The leſs active animals, that have lately been divided, ſuch as thoſe at fig. 3. (a), and at fig. 4. (a), ſerve it as food, when they come in its way: theſe it ſwallows down inſtantly, as it is repreſented at fig. 8. h and i. At (f) it is ready to divide, and at (g) it is divided; where the hinder part of the divided animal has got a proboſcis or beak, to procure nouriſhment for itſelf, and ſoon becomes a diſtinct being from the fore part.

Thus we have given as full an account as our limits would admit, of the moſt curious kinds of animalcules that have hitherto been obſerved. We cannot, however, diſmiſs this ſubject, without taking notice of ſome of the moſt remarkable hypotheſes which have been formed concerning their nature and origin.

Before the invention of microſcopes, the doctrine of equivocal generation, both with regard to animals and plants of ſome kinds, was univerſally received: but this inſtrument ſoon convinced every intelligent perſon, that thoſe plants which formerly were ſuppoſed to be produced by equivocal generation aroſe from ſeeds, and the animals, in like manner, from a male and female. But as the microſcope threw light upon one part of nature, it left another involved in darkneſs: for the origin of the animalcula infuſoria, or of the ſpermatic animals already mentioned, remains as yet as much unknown as that of many other kinds was when the doctrine of equivocal generation reigned in full force.

Animalcule.

48 Doctrine of equivocal generation exploded.

49 Supposed diſcovery concerning generation.

The diſcovery of ſpermatic animalcules was thought to throw ſome light on the myſterious affair of generation itſelf, and theſe minute creatures were imagined to be each of them individuals of the ſame ſpecies with the parent. Here the infinite number of theſe animalcules was an objection, and the difficulty remained as great as before: for, as every one of theſe animalcules behoved to be produced from a male and female to explain their origin by animalcular generation in the ſame manner, was only explaining generation by itſelf.

This hypotheſis, therefore, having proved unſatisfactory, others have been invented. M. Buffon, particularly, hath invented one, by which he at once annihilates the whole animalcular world; and in this he hath been followed by ſeveral very ingenious philoſophers. For a particular account of this, ſo far as it concerns generation, we muſt refer to that article; but as he gives ſuch a particular account of his having examined the human ſemen, that we cannot doubt of his accuracy, we ſhall here contraſt his account with that of Mr Leeuwenhoek already mentioned.

50 M. Buffon's experiments on the human ſemen.

Having procured the ſeminal veſſels of a man who died a violent death, he extracted all the liquor from them while they were ſtill warm; and having examined a drop of it with a double microſcope, it had the appearance, fig. 9. Large filaments appeared, which in ſome places ſpread out into branches, and in others intermingled with one another. Theſe filaments clearly appeared to be agitated by an internal undulatory motion, like hollow tubes, which contained ſome moving ſubſtance. He ſaw diſtinctly this appearance changed for that fig. 10. Two of theſe filaments, which were joined longitudinally, gradually ſeparated from each other in the middle, alternately approaching and receding, like two tenſe cords fixed by the ends, and drawn aſunder in the middle. Theſe filaments were compoſed of globules that touched one another, and reſembled a chaplet of beads. After this, he obſerved the filament ſwelled in ſeveral places, and perceived ſmall globular bodies iſſue from the ſwelled parts, which had a vibratory motion like a pendulum. Theſe ſmall bodies were attached to the filaments by ſmall threads, which gradually lengthened as the bodies moved. At laſt, the ſmall bodies detached themſelves entirely from the filaments, drawing after them the ſmall thread, which looked like a tail. When a drop of the ſeminal liquor was diluted, theſe ſmall bodies moved in all directions very briſkly; and had he not ſeen them ſeparate themſelves from the filaments, he would, he ſays, have thought them to be animals. The ſeminal matter was at firſt too thick, but gradually became more fluid; and, in proportion as its fluidity increaſed, the filaments diſappeared,

Animalcule. diſappeared, but the ſmall bodies became exceedingly numerous. Each of them had a long thread or tail attached to it, from which it evidently endeavoured to get free. Their progreſſive motion was extremely ſlow, during which they vibrated to the right and left, and at each vibration they had a rolling unſteady motion in a vertical direction.

At the end of two or three hours, the ſeminal matter becoming ſtill more fluid, a greater number of theſe moving bodies appeared. They were then more free of encumbrances; their tails were ſhorter; their progreſſive motion was more direct, and their horizontal motion greatly diminiſhed. In five or ſix hours, the liquor had acquired almoſt all the fluidity it could acquire, without being decompoſed. Moſt of the ſmall bodies were now diſengaged from their threads; their figure was oval. They moved forward with conſiderable quickneſs, and, by their irregular motions backward and forward, they had now more than ever the appearance of animals. Thoſe that had tails adhering to them, ſeemed to have leſs vivacity than the others: and of thoſe that had no tails, ſome altered both their figure and their ſize. In twelve hours, the liquor had depoſited at the bottom of the vial a kind of aſh-coloured gelatinous ſubſtance, and the fluid at top was almoſt as tranſparent as water. The little bodies being now entirely freed from their threads, moved with great agility, and ſome of them turned round their centres. They alſo often changed their figures, from oval becoming round, and often breaking into ſmaller ones. Their activity always increaſed as their ſize diminiſhed. In 24 hours, the liquor had depoſited a greater quantity of gelatinous matter, which, being with ſome difficulty diluted in water, exhibited an appearance ſomewhat reſembling lace. In the clear ſemen itſelf only a few ſmall bodies were now ſeen moving; next day, theſe were ſtill farther diminiſhed; and after this nothing was to be ſeen but globules, without the leaſt appearance of motion. Moſt of the above-mentioned appearances are ſhown fig. 10, 11, 12, 13, 14, 15, 16. Fig. 17, and 18. repreſent an appearance of the globules in another experiment, in which they arranged themſelves in troops, and paſſed very quickly over the field of the microſcope. In this experiment they were found to proceed from a ſmall quantity of gelatinous mucilage.

From theſe experiments, M. Buffon concludes, that what have been called *ſpermatic animals*, are not creatures really endowed with life, but ſomething proper to compoſe a living creature; and he diſtinguiſhed them by the name of *organic particles*. The ſame individual kinds of animals he declares he has found in the fluids ſeparated from the ovaria of females: and for the truth of this appeals to the teſtimony of Mr Needham, who was an eye witneſs of his experiments. He alſo brings

51 Needham's experiment on the milt of the calmar. an additional proof of his doctrine from Mr Needham's obſervation on the milt of the *calmar*, a ſpecies of cuttle fiſh. Here the ſpermatic animals, at leaſt what have the only appearance of life, are vaſtly larger than in any other creature, ſo as to be plainly viſible to the naked eye. When magnified, they appear as at fig. 19. and 20. *a*. Their firſt appearance is at fig. 19. *a* and *b*, when they reſemble ſprings encloſed in a tranſparent caſe. Theſe ſprings were equally perfect at firſt as afterwards; only in time they contracted themſelves, and became like a kind of ſcrew. The head of the caſe is a ſpecies of valve which opens outward, and through which every thing within may be forced out. It contains, beſides, another valve *b*, a little barrel *c*, and a ſpongy ſubſtance *de*. Thus the whole machine conſiſts of an outer tranſparent cartilaginous caſe *a*, the ſuperior extremity of which is terminated by a round head formed by the caſe itſelf, and performs the office of a valve. This external caſe contains a tranſparent tube: which includes the ſpring, a piſton or valve, a little barrel, and a ſpongy ſubſtance. The ſcrew occupies the ſuperior part of the tube and caſe, the piſton and barrel are ſituated in the middle, and the ſpongy ſubſtance occupies the inferior part. Theſe machines pump the liquor of the milt; the ſpongy ſubſtance is full of this liquor; and, before the animal ſpawns, the whole milt is only a congeries of theſe bodies which have ſucked up all the liquor of it. Whenever theſe ſmall machines are taken out of the body of the animal, and put in water, or expoſed to the air, they begin to act, as repreſented fig. 19. and 20.; the ſpring mounts up, and is followed by the piſton, the barrel, and the ſpongy ſubſtance which contains the liquor: and, as ſoon as the ſpring and the tube in which it is contained begin to iſſue out of the caſe, the ſpring plaits, and the whole internal apparatus moves, till the ſpring, the piſton, and the barrel, have entirely eſcaped from the caſe. When this is effected, all the reſt inſtantly follow, and the milty liquor which had been pumped in, and confined in the ſpongy ſubſtance, runs out through the barrel.

Animalcule. Fig. 20.

According to this account, the milt of the calmar contains no animalcules; and therefore we may from analogy conclude, that the ſmall moving bodies which are to be ſeen in the ſemen of other animals, are not really creatures endowed with life. M. Buffon extends the analogy ſtill further; and concludes, that all the moving bodies which are to be found in the infuſions either of animal or vegetable ſubſtances are of a ſimilar nature. "To diſcover (ſays he) whether all the parts of animals, and all the ſeeds of plants, contained moving organic particles, I made infuſions of the fleſh of different animls, and of the ſeeds of more than 20 different ſpecies of vegetables; and after remaining ſome days in cloſe glaſſes, I had the pleaſure of ſeeing organic moving particles in all of them. In ſome they appeared ſooner, in others later; ſome preſerved their motions for months, and others ſoon loſt it. Some at firſt produced large moving globules reſembling animals, which changed their figure, ſplit, and became gradually ſmaller. Others produced only ſmall globules, whoſe motions were extremely rapid; and others produced filaments, which grew longer, ſeemed to vegetate, and then ſwelled and poured forth torrents of moving globules."

52 Concluſion againſt the exiſtence of animalcules.

This laſt obſervation gave riſe to a new ſyſtem. Baron Munchanſen, perceiving that the laſt-mentioned moving globules, after moving for ſome time, began again to vegetate, concluded that they were firſt animals and then plants. This ſtrange hypotheſis Mr Ellis has overturned in the paper already quoted; in which he aſſerts, that they are no other than the ſeeds of that genus of fungi called *mucor* or *mouldineſs*, and that their motion is owing to numbers of minute animalcules attacking them for food. "Having (ſays he), at the requeſt of Dr Linnæus, made ſeveral experiments

53 Baron Munchanſen's theory.

54 Diſproved by Mr Ellis.

Animalcule.

on the infuſion of muſhrooms in water, in order to prove the theory of Baron Munchanſen, that their ſeeds are firſt animals, and then plants (which he takes notice of in his Syſtem of Nature, p. 1326, under the genus of chaos, by the name of *chaos fungorum ſeminum*), it appeared evidently, that the ſeeds were put into motion by very minute animalcules, which proceeded from the putrefaction of the muſhroom: for by pecking at theſe ſeeds, which are reddiſh, light, round bodies, they moved them about with great agility in a variety of directions; while the little animals themſelves were ſcarcely viſible, till the food they had eaten had diſcovered them. The ſatisfaction I received from clearing up this point, led me into many other curious and intereſt experiments.

"The ingenious Mr Needham ſuppoſes theſe little tranſparent ramified filaments, and jointed or coralloid bodies, which the microſcope diſcovers to us on the ſurface of moſt animal and vegetable infuſions when they become putrid, to be zoophytes, or branched animals; but to me they appear after a careful ſcrutiny with the beſt glaſſes, to be of that genus of fungi called *mucor*, or *mouldineſs*; many of which Michelius has figured, and Linnæus has accurately deſcribed.

"Their vegetation is ſo amazingly quick, that they may be perceived in the microſcope even to grow and feed under the eye of the obſerver.

"Mr Needham has pointed out to us a ſpecies that is very remarkable for its parts of fructification. (See Philoſophical Tranſactions, vol. xlv. tab. 5. fig. 3. a, A.) This, he ſays, proceeds from an infuſion of bruiſed wheat.

"I have ſeen the ſame ſpecies ariſe from the body of a dead fly, which was become putrid by lying floating for ſome time in a glaſs of water, where ſome flowers had been, in the month of Auguſt 1768. This ſpecies of mucor ſends forth a maſs of tranſparent filamentous roots; from whence ariſe hollow ſtems, that ſupport little oblong oval ſeed veſſels, with a hole on the top of each. From theſe I could plainly ſee minute globular ſeeds iſſue forth in great abundance with an claſtic force, and turn about in the water as if they were animated.

"Continuing to view them with ſome attention, I could juſt diſcover, that the putrid water which ſurrounded them was full of the minuteſt animalcula; and that theſe little creatures began to attack the ſeeds of the mucor for food, as I have obſerved before in the experiment on the ſeeds of the larger kind of fungi or muſhrooms. This new motion continued the appearance of their being alive for ſome time longer: but, ſoon after, many of them aroſe to the ſurface of the water, remaining there without motion; and a ſucceſſion of them afterwards coming up, they united together in little thin maſſes, and floated to the edge of the water, remaining there quite inactive during the time of obſervation.

"As this diſcovery cleared up many doubts which I had received from reading Mr Needham's learned diſſertation, I put into the glaſs ſeveral other dead flies; by which means this ſpecies of mucor was propagated ſo plentifully, as to give me an opportunity of frequently trying the ſame experiment to my full ſatisfaction.

"Laſtly, Theſe jointed coralloid bodies, which Mr Needham calls *chaplets*, and *pearl necklaces*, I have ſeen frequently very diſtinctly. Theſe appear not only on an infuſion of bruiſed wheat when it becomes putrid, but on moſt other bodies when they throw up a viſcid ſcum and are in a ſtate of putrefaction. Theſe, then, are evidently no more than the moſt common mucor, the ſeeds of which are everywhere floating in the air; and bodies in this ſtate afford them a natural proper ſoil to grow upon. Here they ſend downwards their fine tranſparent ramified roots into the moiſture which they float upon; and from the upper part of the ſcum, their jointed coralloid branches riſe full of ſeed into little groove-like figures. When a ſmall portion of theſe branches and ſeeds are put into a drop of the ſame putrid water upon which the ſcum floats, many of theſe millions of little animalcula with which it abounds, immediately ſeize them as food, and turn them about with a variety of motions, as in the experiments on the ſeeds of the common muſhrooms, either ſingly, or two or three ſeeds connected together; anſwering exactly to Mr Needham's deſcription, but evidently without any motion of their own, and conſequently not animated."

Animalcule.

55 Mr Buffon's opinion of different kinds of animalcules.

M. Buffon, however, is not content with denying life only to thoſe beings where the ſigns of it are the moſt equivocal; but includes in the ſame rank of organic particles, almoſt every animal too ſmall to be diſcovered by the naked eye, and even ſome of thoſe whoſe motions are evidently perceptible to the eye. "Almoſt all microſcopic animals," ſays he, "are of the ſame nature with the moving bodies in the ſeminal fluids and infuſions of animal and vegetable ſubſtances. The eels in paſte, in vinegar, &c. are all of the ſame nature, and derived from the ſame origin. There are, perhaps, as many beings that either live or vegetate, produced by a fortuitous aſſemblage of organic particles, as by a conſtant and ſucceſſive generation. Some of them, as thoſe of the calmar, are only a kind of machines, which, though exceedingly ſimple, are very active. Others, as the ſpermatic animalcules, ſeem to imitate the movements of animals. Others reſemble vegetables in their manner of growth and extenſion. There are others, as thoſe of blighted wheat, which at pleaſure can be made alternately either to live or die, and it is difficult to know to what they ſhould be compared. There are ſtill others, and in great numbers, which are at firſt a kind of animals, then become a ſpecies of vegetables, and again return alternately to their vegetable ſtate. The eels in paſte have no other origin than the union of the organic particles of the moſt eſſential part of the grain. The firſt eels that appear are certainly not produced by other eels; but though they are not propagated themſelves, they fail not to engender other living eels. By cutting them with the point of a lancet, we diſcover ſmaller eels iſſuing in great numbers out of their bodies. The body of this animal ſeems to be only a ſheath or ſac, containing a multitude of ſmaller animals, which perhaps are other ſheaths of the ſame kind, in which the organic matter is aſſimilated into the form of eels."

56 His reaſoning inconcluſive.

Though we can by no means pretend to account for the appearance of theſe animalcules, yet we cannot help obſerving, that our ignorance of the cauſe of any phenomenon is no argument againſt its exiſtence. Though we are not able to account in a ſatisfactory manner for the

Animalcule.

the origin of the native Americans, we ſuppoſe M. Buffon himſelf would reckon it abſurd to maintain that the Spaniards on their arrival there found only *organic particles* moving about in diſorder. The caſe is the very ſame with the eels in paſte. They are exceedingly minute in compariſon with us; but, with the ſolar microſcope, Mr Baker has made them aſſume a more reſpectable appearance, ſo as to have a diameter of an inch and a half, or two inches, and a length proportionable. They ſwam up and down very briſkly; the motion of their inteſtines was plainly viſible; when the water dried up, they died with apparent agonies, and their mouths gaped very wide. Were we to find a creature of the ſize of this magnified eel, gaſping in a place where water had lately been, we certainly would never conclude it to be an *organic particle*, or a fortuitous aſſemblage of them; but a fiſh. Why then ſhould we conclude otherwiſe with regard to the eel while in its natural ſtate, than that it is a little fiſh? In reaſoning on this ſubject, we ought always to remember, that, however eſſential the diſtinction of bodies into great and ſmall may appear to us, they are not ſo to the Deity; with whom, as Mr Baker well expreſſes himſelf, "an atom is as a world, and a world but as an atom."—Were the Deity to exert his power for a little, and give a natural philoſopher a view of a quantity of paſte filled with eels, from each of whoſe bodies the light was reflected as when it paſſes through a ſolar microſcope; inſtead of imagining them organic particles, the paſte would appear like a little mountain; he would probably look upon the whole as a monſtrous aſſemblage of ſerpents, and be afraid to come near them. Wherever, therefore, we diſcover beings to appearance endowed with the principle of ſelf-preſervation, or whatever elſe we make the characteriſtic of animals, neither the ſmallneſs of their ſize, nor the impoſſibility of our knowing how they come there, ought to cauſe us doubt of their being really animated. —At the ſame time, it muſt alſo be remembered, that *motion* is not always a characteriſtic of animal life, even though the moving bodies ſhould avoid one another, or any ſeeming obſtacle placed in their way. We know, that inanimate bodies, when electrified, will avoid others endowed with an electricity of the ſame kind, and adhere to thoſe which have the oppoſite one. As we are by no means acquainted with the utmoſt powers of electricity, but on the contrary, from what we do know of it have all the reaſon in the world to conclude that it can produce effects utterly beyond our comprehenſion, it is impoſſible for us to know what ſhare it may have in producing the motions obſerved in vegetable infuſions, or in the ſemen of animals.—We may alſo further obſerve, that though in Mr Ellis's experiment of the boiled potato he took it for granted that every ſeed of animal life would be deſtroyed by the boiling water, yet even this cannot be proved; nay, on the contrary, it hath been proved by undeniable experiments, that the human body itſelf hath endured a heat of 240 degrees of Fahrenheit (28 degrees above that of boiling water) without injury. The eggs of theſe animalcula might therefore be ſtrong enough to reſiſt the heat hitherto uſed in Mr Ellis's or any other experiment.

A conſiderable objection to the exiſtence of animalcules in the ſemen, or any other part of animal bodies, muſt ariſe from the total excluſion of air, which is found ſo neceſſary to the life of larger animals. Some inſtances, however, have been obſerved of large animals being found in ſuch ſituations as they could not poſſibly have enjoyed the leaſt benefit from the air for a great number of years; and in this ſtate they have not only lived, but lived much longer than they would otherwiſe have done.

Animalcule.

57 Animals ſometimes found living in ſolid bodies.

In Toulon harbour and road, are found ſolid hard ſtones, and perfectly entire; containing, in different cells, ſecluded from all communication with the air, ſeveral living ſhell fiſh, of an exquiſite taſte, called *Dactyli*, i. e. Dates: to come at theſe fiſh, the ſtones are broken with mauls. Alſo, along the coaſt of Ancona, in the Adriatic, are ſtones uſually weighing about 50 pounds, and ſometimes even more; the outſide rugged, and eaſily broken, but the inſide ſo hard, as to require a ſtrong arm and an iron maul to break them; within them, and in ſeparate niches, are found ſmall ſhell fiſh, quite alive, and very palatable, called *Solenes* or *Cappe lunghe*. Theſe facts are atteſted by Gaſſendi, Blondel, Mayol, the learned biſhop of Sulturara, and more particularly by Aldrovandi a phyſician of Bologna. The two latter ſpeak of it as a common fact which they themſelves ſaw.

In the volume for 1719, of the Academy of Sciences at Paris, is the following paſſage:

"In the foot of an elm, of the bigneſs of a pretty corpulent man, three or four feet above the root, and exactly in the centre, has been found a live toad, middle ſized, but lean, and filling up the whole vacant ſpace: no ſooner was a paſſage opened, by ſplitting the wood, than it ſcuttled away very haſtily: a more firm and ſound elm never grew; ſo that the toad cannot be ſuppoſed to have got into it. The egg whence it was formed, muſt, by ſome very ſingular accident, have been lodged in the tree at its firſt growth. There the creature had lived without air, feeding on the ſubſtance of the tree, and growing only as the tree grew. This is atteſted by Mr Hubert, profeſſor of philoſophy at Caen."

The volume for the year 1731 has a ſimilar obſervation, expreſſed in theſe words:

"In 1719, we gave an account of a fact, which, though improbable, was well atteſted; that a toad had been found living and growing in the ſtem of a middling elm, without any way for the creature to come out or to have got in. M. Seigne, of Nantes, lays before the academy a fact juſt of the very ſame nature, except that, inſtead of an elm, it was an oak, and larger than the elm, which ſtill heightens the wonder. He judges, by the time requiſite for the growth of the oak, that the toad muſt have ſubſiſted in it, without air, or any adventitious aliment, during 80 or 100 years. M. Seigne ſeems to have known nothing of the fact in 1719."

With the two foregoing may be claſſed a narrative of Ambroſe Parée, chief ſurgeon to Henry III. king of France, who, being a very ſenſible writer, relates the following fact, of which he was an eye witneſs:

"Being (ſays he) at my ſeat, near the village of Meudon, and overlooking a quarryman whom I had ſet to break ſome very large and hard ſtones; in the middle of one we found a huge toad, full of life, and without any viſible aperture by which it could get

Animalcule, Animated.

there. I began to wonder how it received birth, had grown, and lived; but the labourer told me, it was not the firſt time he had met with a toad, and the like creatures, within huge blocks of ſtone, and no viſible opening or fiſſure."

Obſervations of living toads, found in very hard and entire ſtones, occur in ſeveral authors, particularly Baptiſt Fulgoſa doge of Genoa, the famous phyſicians Agricola and Horſtius, and Lord Verulam: others give very ſpecious accounts of ſnakes, frogs, crabs, and lobſters, being found alive, encloſed within blocks of marble, rocks, and large ſtones.

An inſtance ſimilar to theſe, of the truth of which we have no reaſon to doubt, was obſerved in this country in the year 1773, where a large toad was found in the middle of a piece of coal having not the leaſt viſible crack or fiſſure.

58 The ſubject ſtill obſcure.

Upon the whole, therefore, though philoſophers are not yet able to diſcover how theſe minute creatures are produced; yet, that there really are animals much ſmaller than what we can diſcern with our naked eye, ſeems to be indiſputable. The ſubject, however, is ſtill evidently obſcure, and will no doubt require the utmoſt attention of philoſophers, as well as further improvements in the conſtruction of microſcopes, fully to inveſtigate it.

Animalcula are ſaid to be the cauſe of various diſorders. The itch, from ſeveral experiments, is affirmed to be a diſorder ariſing from the irritations of a ſpecies of animalcula found in the puſtules of that ailment; whence the communication of it by contact from one to another is eaſily conceived, as alſo the reaſon of the cure being effected by cutaneous applications. On this foundation ſome have attributed the ſmallpox and meaſles, and infectious diſeaſes; others the epilepſy, &c. to animalcules. Langius goes farther, and pretends to reduce all diſeaſes in general to the ſame principle. A late writer at Paris, who aſſumed the title of an Engliſh phyſician, has done more. He not only accounts for all diſeaſes, but for the operations of all medicines, from the hypotheſis of animalcules. He has peculiar animals for every diſeaſe; ſcorbutic animalcules, podagrical animalcules, variolous animalcules, &c. all at his ſervice. *Journ. des Sçav.* tom. lxxxii. p. 535, &c.

But as moſt diſcoveries in natural philoſophy have laid a foundation for the warm imaginations of ſome men to form viſionary theories, to the great prejudice of real knowledge; ſo thoſe relating to animalcula have been drawn in, however improperly, to ſupport the moſt whimſical and chimerical ſyſtems.

Animalcules, Inviſible.—Naturaliſts ſuppoſe another ſpecies or order of inviſible animalcules, viz. ſuch as eſcape the cognizance even of the beſt microſcopes, and give many probable conjectures in relation to them. Reaſon and analogy give ſome ſupport to the exiſtence of infinite imperceptible animalcules. The naked eye, ſay ſome, takes in from the elephant to the mite; but there commences a new order reſerved only for the microſcope, which comprehends all theſe from the mite to thoſe 27 millions of times ſmaller; and this order cannot be yet ſaid to be exhauſted, if the microſcope be not arrived at its laſt perfection. See further on this ſubject the article Microscope.

ANIMATED, or Animate, in a general ſenſe, denotes ſomething endowed with animal life. It alſo imports a thing to be impregnated with vermine or animalcules. Animated ‖ Anjou.

Animated Horſe Hairs. See *Horse Hairs.*

ANIMATION ſignifies the informing an animal body with a ſoul.—The different hypotheſes of phyſicians and philoſophers, concerning the time of animation, have had their influence on the penal laws made againſt artificial abortions: it having been made capital to procure miſcarriage in the one ſtate, while in the other it was only deemed a venial crime. The emperor Charles V. by a conſtitution publiſhed in 1532, put the matter on another footing; inſtead of the diſtinction of an animated and unanimated fœtus, he introduced that of a vital and non-vital fœtus, as a thing of more obvious and eaſy deciſion, and not depending on any ſyſtem either of creation, traduction, or infuſion. Accordingly a fœtus is ſaid, in a legal ſenſe, to be animated, when it is perceived to ſtir in the womb; which uſually happens about the middle of the term of geſtation.

ANIME, in *Heraldry*, a term uſed when the eyes of a rapacious creature are borne of a different tincture from the creature itſelf.

Anime, a reſin exſuding from the trunk of a large American tree, called by Piſo *jetaiba*, by the Indians *courbaril*, (a ſpecies of Hymenæa). This reſin is of a tranſparent amber colour, a light agreeable ſmell, and little or no taſte. It diſſolves entirely, but not very readily, in rectified ſpirit of wine; the impurities, which are often in large quantity, remaining behind. The Brazilians are ſaid to employ anime in fumigations for pains and aches proceeding from a cold cauſe: with us, it is rarely, if ever, made uſe of for any medicinal purpoſes.

ANIMETTA, among eccleſiaſtical writers, denotes the cloth wherewith the cup of the euchariſt is covered.

ANINGA, in *Commerce*, a root which grows in the Antilles iſlands, and is pretty much like the China plant. It is uſed by ſugar bakers for refining the ſugar.

ANJOU, a province and duchy of France before the revolution, bounded on the eaſt by Touraine, on the ſouth by Poictou, on the weſt by Bretagne, and on the north by Maine. It is now included under the departments of the Mayne and Loire, and the Sarte and Mayenné. It is 70 miles in length, and in breadth 60. Through this province run five navigable rivers: the Loire, which divides it into two parts; the Vienne, the Toue, the Mayenne, and the Sarte.

The air is temperate, and the country agreeably diverſified with hills and meadows. There are 33 foreſts of oak trees mixed with beech. The country produces white wine, wheat, barley, rye, oats, peaſe, beans, flax, hemp, walnuts, and ſome cheſnuts. In Lower Anjou they make cyder. There are fruit trees of all kinds, and paſture proper for horſes. The greateſt riches of the province conſiſts in cows, oxen, and ſheep. There are ſeveral coal and iron mines; and yet there are but two forges in the whole province. There are quarries of marble and of ſlate; as well as quarries of white ſtone, proper for building, on the ſide of the river Loire. Here are alſo ſeveral ſaltpetre works and ſome glaſs-houſes. The remarkable towns,

beſides


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 4.
Fig. 11.
Fig. 13.
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Fig. 43.
Fig. 34.
Fig. 36.
Fig. 39.
Fig. 40.
Fig. 41.
Fig. 38.
Fig. 37.
A. Bell. Priv. Mal. Sculptor fecit.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

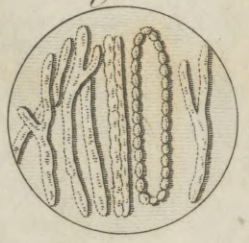

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 16.

Fig. 17.

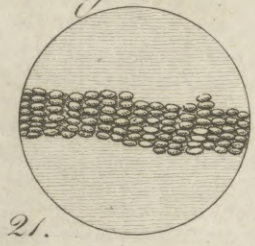

Fig. 18.

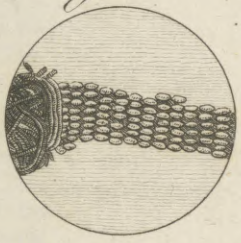

Fig. 21.

Spermatic Animalcula of the Dog. | Spermatic Animalcula of the Rabbit.

According to the first Edition of Lewenhoek.

Fig. 22.

ANGUINUM OVUM.

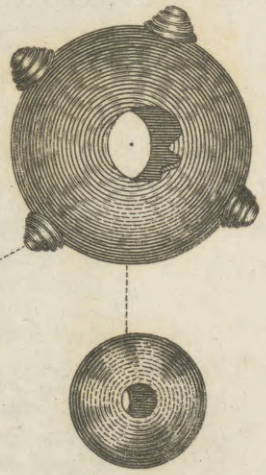

Fig. 19.

Fig. 23.

ARÆOMETER.

Fig. 20.

A. Bell Prin. Mal. Sculptor fecit.

Anio ‖ Anna.

beſides Angers the capital, are Saumur, Briſac, Pons de Cea, La Fleche, and Beaufort.

ANIO, (Cicero, Horace, Priſcian); ANIEN, (Statius); now *il Teverone:* a river of Italy, which falls into the Tiber, three miles to the north of Rome, not far from Antemnæ. It riſes in a mountain near Treba, (Pliny); and running through the country of the Æquiculi, or Æqui, it afterwards ſeparated the Latins from the Sabines; but nearer its mouth, or confluence, it had the Sabines on each ſide. It forms three beautiful lakes in its courſe, (Pliny). In the territories of Tibur it falls from a great height, and there forms a very rapid cataract; hence the epithet *præceps*, and hence the ſteam cauſed by its fall, (Horace). *Anienus* is the epithet formed from it, (Virgil, Propertius). *Anienus* is alſo the god of the river, (Propertius, Statius).

ANISUM or ANISE. See PIMPINELLA, BOTANY *Index*.

ANKER, a liquid meaſure at Amſterdam. It contains about 32 gallons Engliſh meaſure.

ANKLE, in *Anatomy*, the joint which connects the foot to the leg.—We have an account of the menſes being regularly evacuated at an ulcer of the ankle, *Edin. Med. Obſ.* vol. iii. art. 29.

ANN, or ANNAT, in *Scots Law*, is half a year's ſtipend, which the law gives to the executors of miniſters of the church of Scotland, over and above what was due to the miniſter himſelf for his incumbency.

ANNA, one of the three principalities into which Arabia Deſerta is divided.

ANNA, one of the chief cities of the above principality, and formerly a famed mart-town, is ſituated in Lat. 33. 57. and E. Long. 42. 10. on the river Euphrates, in a fruitful and pleaſant ſoil. It has two ſtreets, which are divided by the river. That on the Meſopotamia ſide is about two miles long, but thinly peopled, and by none but tradeſmen; that on the oppoſite ſide is about ſix miles in length, and it is there that the principal inhabitants of the city dwell. Every houſe has ſome ground belonging to it; and theſe grounds are loaded with noble fruit trees, as lemons, oranges, citrons, quinces, figs, dates, pomegranates, olives, all very large and in great plenty. Some of the flat grounds are ſown with corn and other grain, which yield likewiſe a conſiderable crop. This city is the common rendezvous of all the robbers that infeſt the country, and from which they diſperſe themſelves into all parts of the deſert. Here they meet to conſult; here they hold their grand council, and deliberate where to rob next with ſucceſs. It is with great difficulty that the Turkiſh aga, and the janizaries, who are kept here, can levy the tribute impoſed by the Turks on all the commodities carried through this city, which is one of the great thoroughfares for the paſſing of the caravans that go to and from Aleppo, Tripoli, Damaſcus, Bagdad, and ſome other parts of the Turkiſh empire.

ANNA *Comnena*, daughter of the emperor Alexius Comnenus I. was not leſs diſtinguiſhed by her elevated rank than by her mental qualifications. Her ſuperiority of mind began early to diſplay itſelf. Deſpiſing and neglecting the effeminacy and voluptuouſneſs of the court in which ſhe was educated, ſhe directed her attention to literary purſuits. Indulging her favourite ſtudies, ſhe ſolicited the acquaintance of the more eminent philoſophers of that period.

Anna ‖ Annals.

But the purſuits of literature did not induce her entirely to abandon ſociety; ſhe gave her hand to Nicephorus Bryennius, a young nobleman of a reſpectable family. This accompliſhed woman was, however, actuated with unjuſtifiable ambition; and, during the laſt illneſs of her father, ſhe united with the empreſs Irene, in attempting to prevail upon that monarch to diſinherit his own ſon, and give the crown to her huſband. The affection and virtue of the father prevailed over female addreſs and intrigue. But the ambition of Comnena was not diminiſhed; for ſhe entered into a conſpiracy to depoſe her brother; and when her huſband diſplayed a timidity and heſitation in this unjuſt enterpriſe, ſhe exclaimed, that "Nature had miſtaken their ſexes, for he ought to have been the woman."

Either through the vigilance of her brother, or the timidity of her huſband, the treaſonable plot was diſcovered, and Anna puniſhed with the confiſcation of all her property. But generoſity has an opportunity of diſplaying its real nature when an enemy is vanquiſhed; thus was the generoſity of her brother diſplayed on the preſent occaſion, by returning all her property. Aſhamed, however, of her baſe conduct, ſhe retired from court, and never more poſſeſſed any influence there. Diſappointed ambition took ſhelter among the walks of literature, and ſhe employed herſelf in her ſolitude in writing the hiſtory of her father's reign. This production of her pen is ſtill extant, and compoſes a part of the collection of the Byzantine hiſtorians. The flores of rhetoric are ranſacked to embelliſh this work, and every effort made to enrich it with ſcience; but the general complexion of it is rather like an apology, than an impartial narrative. It muſt, however, be acknowledged, that ſhe is not more partial than many other Latin hiſtorians, and that her hiſtory contains many valuable facts and obſervations. (*Gen. Biog.*)

ANNABON. See ANNOBON.

ANNALE, in the church of Rome, a term applied to the maſſes celebrated for the dead during a whole year.

ANNALIS CLAVUS, the nail which the prætor, conſul, or dictator, drove into the wall of Jupiter's temple annually upon the ides of September, to ſhow the number of years. But this cuſtom was ſuperſeded by reckoning years by conſulſhips. The ceremony was ſometimes performed to avert the plague, &c.

ANNALS, in matters of *Literature*, a ſpecies of hiſtory, which relates events in the chronological order wherein they happened. They differ from perfect hiſtory in this, that annals are but a bare relation of what paſſes every year, as a journal is of what paſſes every day; whereas hiſtory relates not only the tranſactions themſelves, but alſo the cauſes, motives, and ſprings of actions. Annals require nothing but brevity; hiſtory demands ornament.—Cicero informs us of the origin of annals. To preſerve the memory of events, the *Pontifex Maximus*, ſays he, wrote what paſſed each year, and expoſed it on tables in his own houſe, where every one was at liberty to read: this they called

annales

Annan. *annales maximi;* and hence the writers who imitated this ſimple method of narrating facts were called *annaliſts.*

ANNAN, the capital of Annandale, a diviſion of Dumfrieſhire in Scotland; a ſmall town, containing 500 or 600 inhabitants, and ſituated on a river of the ſame name, in W. Long. 3°. N. Lat. 54. 40. This place, which is a royal borough, has ſome trade in wine, and exports annually between 20 and 30,000 Winchester buſhels (10 and 15,000 bolls) of corn. Veſſels of about 250 tons can come within half a mile of the town; and of 60, as high as the bridge; which conſiſts of five arches, defended by a gateway. A fabric for carding and ſpinning of cotton has lately been erected, and the town begins to increaſe. Here was formerly a caſtle; which was built by the Bruces, after they became lords of Annandale. Upon the death of David II. the ſon of King Robert, in 1371, this caſtle (Lochmaben), and the lordſhip of Annandale, came to Thomas Randolph earl of Murray, and went with his ſiſter Agnes to the Dunbars, earls of March: after their forfeiture it went to the Douglaſſes, who alſo loſt it by the ſame fate; and then having come to Alexander duke of Albany, he, for rebelling againſt his brother King James III. and pundering the fair of Lochmaben in 1484, was alſo forfeit. Since which time it continued in the hands of the king, and became the great key of the weſt border.

The ſtewarty or diſtrict of Annandale, of which Lochmaben caſtle was the chief fortalice, is a fertile vale, 24 miles long, and about 14 miles broad. From its vicinity to England, and the continual incurſions and predatory wars of the borderers, the greateſt part of it was uncultivated and common: but ſince the beginning of the preſent century, or rather within the laſt thirty years, all theſe waſtes and commons have been divided and brought into culture, and the country has aſſumed a new appearance; which may be aſcribed not only to the diviſion of the commons, but likewiſe to the improvement made in the roads, and particularly in the great weſtern road from Edinburgh to London by Moffat, Gratney, and Carliſle, running through this vale, and carried on by ſome gentlemen of the country, after they had obtained an act of parliament for levying a toll to defray the expence of making and keeping it in repair.

Annandale formed a part of the Roman province of Valentia; and Severus's wall ending here, it abounds with Roman ſtations and antiquities. The camps at Birrens in Middlebie, and on the hill of Burnſwark, are ſtill entire, and their form is preſerved; and the traces and remains of a military road are now viſible in different parts of the country. The ruins of the houſe or caſtle of Auchincaſs, in the neighbourhood of Moffat, once the ſeat of that potent baron, Thomas Randolp, earl of Murray, lord of Annandale, and regent of Scotland in the minority of David II. covers above an acre of ground, and even now conveys an idea of the plan and ſtrength of the building. The ancient caſtle of Comlongan, formerly belonging to the Murrays, earls of Annandale, and now to Lord Stormont, is ſtill in a tolerable ſtate of preſervation; but except this caſtle and that of Hoddam, moſt of the other old fortalices and towers are now taken down, or in ruins.

Annandale is a marquiſate belonging to the Johnſtones, and the chief of the name. Annand, Annano.

ANNAND, William, dean of Edinburgh in Scotland, the ſon of William Annand miniſter of Air, was born at Air in 1633. Five years after, his father was obliged to quit Scotland with his family, on account of their loyalty to the king, and adherence to the epiſcopal government eſtabliſhed by law in that country. In 1651, young Annand was admitted a ſcholar in Univerſity college in Oxford; and though he was put under the care of a preſbyterian tutor, yet he took all occaſions to be preſent at the ſermons preached by the loyal divines in and near Oxford. In 1656, being then bachelor of arts, he received holy orders from the hands of Dr Thomas Fulwar, biſhop of Ardfert or Kerry in Ireland, and was appointed preacher at Weſton on the Green near Biceſter in Oxfordſhire, where he met with great encouragement from Sir Francis Norris, lord of that manor. After he had taken his degree of maſter of arts, he was preſented to the vicarage of Leighton-Buzzard in Bedfordſhire; where he diſtinguiſhed himſelf by his edifying manner of preaching, till 1662, when he went into Scotland, in quality of chaplain to John earl of Middleton, the king's high commiſſioner to the church of that kingdom. In the latter end of the year 1663, he was inſtituted to the Tolbooth church at Edinburgh, and from thence was removed ſome years after to the Tron church of that city, which is likewiſe a prebend. In April 1676, he was nominated by the king to the deanery of Edinburgh; and in 1685, he commenced doctor of divinity in the univerſity of St Andrew's. He wrote, 1. *Fides Catholica;* or, The Doctrine of the Catholic Church, in eighteen grand Ordinances, referring to the word, ſacraments, and prayer, in purity, number, and nature, catholically maintained, and publicly taught, againſt heretics of all ſorts. Lond. 1661-2, 4to. 2. Solutions of many proper and profitable queſtions, ſuitable to the nature of each Ordinance, &c. printed with the Fides Catholica. 3. *Panem Quotidianem;* or, A ſhort Diſcourſe, tending to prove the legality, decency, and expediency, of ſet forms of prayers in the Churches of Chriſt, with a particular Defence of the Book of Common Prayer of the Church of England. Lond. 1661. 4to. 4. *Pater Noſter*, Our Father; or, The Lord's Prayer explained, the ſenſe thereof, and duties therein, from Scripture, Hiſtory, and the Fathers, methodically cleared, and ſuccinctly opened. Lond. 1670, 8vo. 5. *Myſterium Pietatis;* or, The Myſtery of Godlineſs, &c. Lond. 1672, 8vo. 6. *Doxologia;* or, Glory to the Father, the Church's Hymn, reduced to glorifying the Trinity. Lond. 1672, 8vo. 7. *Dualitas;* or, A twofold ſubject diſplayed and opened, conducible to godlineſs and peace in order: Firſt, *Lex loquens*, the honour and dignity of magiſtracy, with the duties thereupon, &c.; Secondly, *Duorum Unitas;* or, The agreement of magiſtracy and miniſtry at the election of the honourable magiſtrates at Edinburgh and opening of the Dioceſan Synod of the Reverend Clergy there. Edin. 1674, 4to. Dr Annand died the 13th of June 1689, and was honourably interred in the Grey Friars church in Edinburgh.

ANNANO, a ſtrong fort of Italy, in the duchy of Milan.

Annapolis 1 Anne.

Milan. It has been twice taken by the French; but was reſtored to the duke of Savoy in 1706. It is ſeated on the river Tanaro, in E. Long. 8. 30. N. Lat. 44. 40.

ANNAPOLIS, the chief town in Maryland, in North America; which as yet is but mean, becauſe the people in this province chooſe to live on their plantations, as in Virginia. St Mary's was once the capital of the province of Maryland, and the town of Annapolis was known by the name of *Severn*. It received its preſent name in 1694, when it was made a port town, and the reſidence of a collector and naval officer. W. Long. 78. 10. N. Lat. 38. 25.

Annapolis Royal, a town of Nova Scotia, is ſeated in the bay of Fundy; and, though a mean place, was formerly the capital of the province. It has one of the fineſt harbours in America, capable of containing 1000 veſſels at anchor in the utmoſt ſecurity. The place is alſo protected by a fort and garriſon. At the bottom of the harbour is a point of land, which divides two rivers; and on each ſide there are pleaſant meadows, which in ſpring and autumn are covered with all ſorts of freſh water fowl. There is a trade carried on by the Indians with furs, which they exchange for European goods. W. Long. 64. 5. N. Lat. 45. 10.

ANNATES, among eccleſiaſtical writers, a year's income of a ſpiritual living.

Theſe were, in ancient times, given to the pope through all Chriſtendom, upon the deceaſe of any biſhop, abbot, or pariſh clerk, and were paid by his ſucceſſor. At the Reformation they were taken from the pope, and veſted in the king; and, finally, Queen Anne reſtored them to the church, by appropriating them to the augmentation of poor livings.

ANNE, queen of Great Britain, ſecond daughter of King James II. by his firſt wife, Anne Hyde, was born in 1664. In 1683, ſhe married George, prince of Denmark, by whom ſhe had ſeveral children, but none of them arrived at the age of maturity. On the death of King William, ſhe aſcended the throne, A. D. 1702, and her reign comprehends one of the moſt illuſtrious periods of Engliſh hiſtory. Poſſeſſed, however, of a very feeble character, which did not permit her to act for herſelf, this period is the reign of her counſellors, and favourites; and ſhe exhibited no decided inclination which could influence ſtate affairs, except a ſtrong deſire for tory principles, both in church and ſtate. In the commencement of her reign, being entirely governed by the ducheſs of Marlborough, ſhe was induced to follow out the premeditated deſigns of her predeceſſors with reſpect to Louis XIV. king of France, and for many years, repeated ſucceſs attended her armies with glory. Theſe were at length after a fruitleſs protraction of hoſtilities, terminated by the peace of Utrecht, in 1713. This peace was chiefly owing to the acquired influence of a female favourite of the oppoſite party. By an act of the legiſlature in the year 1706, the union of the Engliſh and Scottiſh nations was formed, which event contributed more than the former towards the proſperity of the kingdom. Yet theſe ſucceſsful events prevented not the contention of parties which prevailed during the greateſt part of her reign. And about the cloſe of it, when this ſpirit was juſt on the eve of breaking into a flame, the queen manifeſted an ardent deſire, that the exiled part of her family ſhould ſucceed to the throne, and ſo conduced towards the ſuperiority of the tories, as that they were inclined to puſh to the utmoſt extremity their plans, with reſpect to the government both of the church and ſtate. The death of Queen Anne in Auguſt 1714, of a dropſy, in the fiftieth year of her age, and thirteenth of her reign, was therefore, equally to the diſappointment of the one, and to the triumph of the other. In her private ſtation ſhe ſupported the character of an amiable woman, and not devoid of underſtanding, although her indolence and yielding temper prevented her from exerting it. She was generally well beloved by her ſubjects, whoſe prejudices coincided with her own, and the title of the *Good Queen Anne* beſt expreſſes their ſentiments. Although her own diſpoſitions, and accompliſhments had no ſhare in the honour, yet this age was rendered a ſort of Auguſtan age of Britiſh literature, on account of the ſeveral eminent writers who flouriſhed under her reign (*Gen. Biog.*)

Anne.

Anne *Boleyn*, queen of Henry VIII. king of England, daughter of Sir Thomas Boleyn, a nobleman of a powerful family, and numerous alliances. The daughter of the duke of Norfolk was her mother, and during the reign of the former king her father had been honoured with ſeveral embaſſies. Mary the king's ſiſter, who married Lewis XII. king of France, carried over this lady with her at an early age, where ſhe imbibed the freedom, the vivacity, and the openneſs of manners of that nation. After the death of Lewis, that queen returned to England, and Anne continued to attend her royal miſtreſs. Having ſome time after left her ſervice, ſhe was introduced into the family of the ducheſs of Alençon. In addition to all her acquired accompliſhments, ſhe poſſeſſed the greateſt perſonal elegance, and was highly famed in that age.

Hiſtory does not explicitly mention whether or not, it was on her account, but upon her return to England the king expreſſed his ſcruples concerning his union with Catharine of Arragon. Enamoured, however, of Anne, he expreſſed his attachment to her; but ſhe was poſſeſſed of too much virtue and policy, to confer any improper favours. This prudent and virtuous reſtraint only increaſed the paſſion of Henry; and placing her at court, he diſtinguiſhed her by many marks of royal favour. The impetuous king at length came to the reſolution to divorce his queen, to make way for his favourite Anne. In this inſtance, the injury done to that queen proved the cauſe of the final ſeparation of England from the dominion of the pope. Various delays and difficulties occurring to the divorce, Henry privately married Anne during the month of November 1532, and in April following he publicly declared her queen of England. The famous queen Elizabeth was the firſt fruits of this marriage, who was born the September following. For ſome time ſhe enjoyed a conſiderable ſhare of the royal favour, and ſhe made uſe of that influence in ſubduing the haughty prelate Wolſey, and widening the breach between the king and the pope. But this favour was not of long continuance; for the king, ever varying in his temper, and diſappointed at her being brought to bed of a dead male child, imbibed a new paſſion for Jane Seymour; and troubled at the evil inclinations of the catholics, he allowed the jealouſy of conjugal affection to enter his boſom, which her thoughtleſs demeanour tended in

St Anne's day, Annealing.

a great meaſure to realize. The king's jealouſy ſtill increaſing, ſhe was accuſed of adultery with ſeveral of the houſehold officers, and even with her own brother, Lord Rochfort. She was accordingly tried on a charge of high treaſon, and although proof was very ſcanty, yet ſhe was condemned to be beheaded; which ſentence was executed in May 1536. Her behaviour on that occaſion was a ſingular mixture of firmneſs and unuſual levity. She avowed being guilty of many exceſſes, yet to the laſt reſolutely denied any ſerious guilt. Although her character has been greatly depreciated by ſeveral authors, yet a letter written by her to the king after condemnation, gives a much higher idea of her character than theſe partial accounts would endeavour to convey.

The important part which ſhe and her daughter acted in the Reformation has drawn upon her memory many malignant and vicious ſtories, by thoſe of the catholic party, who were likewiſe induced to this by the expectation of being conducive to the injury of Proteſtaniſm, by ſtigmatizing the various characters and motives of its promoters. Theſe various accounts are however, for the moſt part refuted by facts univerſally known, or have no evidence or probability by which they may be ſupported. Reſpecting her innocence of the charge on which ſhe loſt her life, it is a matter of uncertainty, yet it appears to be leſs certain that ſhe was guilty than that her huſband was a bloody and capricious tyrant. (*Gen. Biog.*)

St Anne's Day, a feſtival of the Chriſtian church, celebrated by the Latins on the 26th of July, but by the Greeks on the 9th of December. It is kept in honour of Anne or Anna, mother of the Virgin Mary.

ANNEALING, by the workmen called *nealing*, is particularly uſed in making glaſs: it conſiſts in placing the bottles, &c. whilſt hot, in a kind of oven or furnace, where they are ſuffered to cool gradually: they would otherwiſe be too brittle for uſe.—Metals are rendered hard and brittle by hammering: they are therefore made red hot, in order to recover their malleability; and this is called *nealing*.

The difference between unannealed and annealed glaſs, with reſpect to brittleneſs, is very remarkable. When an unannealed glaſs veſſel is broken, it often flies into a ſmall powder, with a violence ſeemingly very unproportioned to the ſtroke it has received. In general, it is in greater danger of breaking from a very ſlight ſtroke than from one of ſome conſiderable force. One of thoſe veſſels will often reſiſt the effects of a piſtol bullet dropt into it from the height of two or three feet; yet a grain of ſand falling into it will make it burſt into ſmall fragments. This takes place ſometimes immediately on dropping the ſand into it: but often the veſſel will ſtand for ſeveral minutes after, ſeemingly ſecure; and then, without any new injury, it will fly to pieces. If the veſſel be very thin, it does not break in this manner, but ſeems to poſſeſs all the properties of annealed glaſs.

The ſame phenomena are ſtill more ſtrikingly ſeen in glaſs drops or tears. They are globular at one end, and taper to a ſmall tail at the other. They are the drops which fall from the melted maſs of glaſs on the rods on which the bottles are made. They drop into the tubs of water which are uſed in the work; the greater part of them burſt immediately in the water. When thoſe that remain entire are examined, they diſcover all the properties of unannealed glaſs in the higheſt degree. They will bear a ſmart ſtroke on the thick end without breaking; but if the ſmall tail be broken, they burſt into ſmall powder with a loud exploſion. They appear to burſt with more violence, and the powder is ſmaller, in an exhauſted receiver than in the open air. When they are annealed, they loſe theſe properties. Annealing.

Glaſs is one of thoſe bodies which increaſe in bulk when paſſing from a fluid to a ſolid ſtate. When it is allowed to cryſtallize regularly, the particles are ſo arranged, that it has a fibrous texture: it is elaſtic, and ſuſceptible of long-continued vibrations; but when a maſs of melted glaſs is ſuddenly expoſed to the cold, the ſurface cryſtallizes, and forms a ſolid ſhell round the interior fluid parts: this prevents them from expanding when they become ſolid. They, therefore, have not the opportunity of a regular cryſtallization; but are compreſſed together with little mutual coheſion: On the contrary, they preſs outward to occupy more ſpace, but are prevented by the external cruſt. In conſequence of the effort of expanſion in the internal parts, the greater number of glaſs drops burſt in cooling; and thoſe which remain entire are not regularly cryſtallized. A ſmart ſtroke upon them communicates a vibration to the whole maſs, which is nearly ſynchronous in every part: and therefore the effort of expanſion has little more effect than if the body were at reſt; but the ſmall tail and the ſurface only are regularly cryſtallized. If the tail be broken, this communicates a vibration along the cryſtallized ſurface, without reaching the internal parts. By this they are allowed ſome expanſion; and overcoming the coheſion of the thin outer ſhell, they burſt it, and are diſperſed in powder.

In an unannealed glaſs veſſel, the ſame thing takes place. Sometimes the vibration may continue for a conſiderable time before the internal parts overcome the reſiſtance. If the veſſel be very thin, the regular cryſtallization extends through the whole thickneſs; or at leaſt the quantity of compreſſed matter in the middle is ſo inconſiderable as to be incapable of burſting the external plate.

By the proceſs of annealing, the glaſs is kept for ſome time in a ſtate approaching to fluidity; the heat increaſes the bulk of the cryſtallized part, and renders it ſo ſoft, that the internal parts have the opportunity of expanding and forming a regular cryſtallization.

A ſimilar proceſs is now uſed for rendering kettles and other veſſels of caſt iron leſs brittle: of it the ſame explanation may be given. The greater number of metals diminiſh in bulk when they paſs from a fluid to a ſolid ſtate; iron, on the contrary, expands.

When caſt iron is broken, it has the appearance of being compoſed of grains: forged or bar iron appears to conſiſt of plates. Forged iron has long been procured, by placing a maſs of caſt iron under large hammers, and making it undergo violent and repeated compreſſion. A proceſs is now uſed for converting caſt iron into forged, by heat alone. The caſt iron is placed in an air furnace, and kept for ſeveral hours in a degree of heat, by which it is brought near to a fluid ſtate. It is then allowed to cool gradually, and is found to be converted into forged iron. This proceſs

is

Annealing is conducted under a patent; although, if Reaumur's experiments upon caſt iron be conſulted, it will appear not to be a new diſcovery.

By theſe experiments it is aſcertained, that if caſt iron be expoſed for any length of time to a heat conſiderably below its melting point, the texture and properties are not changed: but if it be kept in a heat near the melting point, the ſurface ſoon becomes lamellated like forged iron; and the lamellated ſtructure extends farther into the maſs in proportion to the length of time in which it is expoſed to that degree of heat. When it is continued for a ſufficient time, and then allowed to cool gradually, it is found to poſſeſs the lamellated ſtructure throughout.

Caſt iron, then, is brittle, becauſe it has not had the opportunity of cryſtallizing regularly. When it is expoſed to cold while fluid, the ſurface becoming ſolid, prevents the inner parts from expanding and arranging themſelves into regular cryſtals. When caſt iron is brought near to the melting point, and continued for a ſufficient length of time in that degree of heat, the particles have the opportunity of arranging themſelves into that form of cryſtals by which forged iron is diſtinguiſhed, and by which it poſſeſſes coheſion and all its properties.

There appears, therefore, to be no other eſſential difference between forged and caſt iron, except what ariſes from the cryſtallization. Caſt iron is indeed often not ſufficiently purified from other ſubſtances which are mixed with the calx. It appears alſo to contain a conſiderable quantity of calx unreduced; for during the proceſs for converting it into forged iron, by heat alone, a pale flame ariſes from the metal till near the end of the proceſs. This is owing to fixed air which the heat forces off from the calx. The expulſion of this air reduces the calx, and thereby frees the metal from that injurious mixture.

That this explanation of the annealing of iron is probable, appears alſo from the well-known fact of forged iron being incomparably more difficult of fuſion than caſt iron. A piece of forged iron requires a very violent heat to melt it; but when it is reduced to a ſmall powder, it melts in a much lower degree of heat. Iron diminiſhes in bulk when it paſſes into a fluid ſtate, while moſt other metals increaſe in volume. The expanſion which heat occaſions in bringing them to their melting point, will be favourable to their fluidity by gradually bringing the particles to the ſame ſtate of ſeparation in which they are when the maſs is fluid; but the expanſion of iron by heat removes it farther from that ſtate, and keeps it in the ſtate which is favourable to the continuance of it in a cryſtallized form. It will not melt till the heat expand it ſo much that the coheſion of cryſtallization be overcome. When it is reduced to a minute powder before it be expoſed to the heat, it melts ſooner. The cryſtals having been deſtroyed, that coheſion has no effect in preventing it from paſſing into a ſtate of fluidity.

Upon the ſame principles may be explained the almoſt peculiar property of welding poſſeſſed by iron, and the converſion of forged iron into ſteel.

But perhaps they may alſo be applied to platina, a metal which has lately gained much attention. It poſſeſſes ſome of the properties of iron. It is ſtill more difficult of fuſion than that metal. It is ſuſceptible of being welded. The natural grains of it can ſcarcely be melted in the focus of the moſt powerful burning glaſs; but when it is diſſolved in aqua-regia, and precipitated by potaſh, it has been melted in ſmall globules by the blowpipe. When precipitated by muriate of ammoniac, it has been melted in a conſiderable maſs in the heat of a furnace; but it is ſaid to be hard and brittle. Annecy, Anneſley.

Many attempts have been made to procure a maſs of it in a malleable ſtate, but without ſucceſs. It is ſaid that the proceſs is now diſcovered by a chemiſt in Spain. The treatment of the metal is probably very ſimple. Perhaps it only conſiſts in precipitating it in a minute powder from aqua-regia, expoſing it to a ſtrong heat which melts it, and keeping it for ſome time in a ſtate nearly fluid, that it may, like iron, cryſtallize regularly: by this it will poſſeſs all its metallic properties.

ANNECY, a city of Savoy, ſeated between Chamberry and Geneva, on the banks of a lake of the ſame name, from whence run ſeveral brooks, which flow through the town, and uniting at length, form a river. There are piazzas in moſt of the ſtreets of the town, which ſerve to ſhelter the inhabitants from rain. It has ſeveral collegiate and pariſh churches, as well as convents for men and women. The lake is about nine miles long and four broad. E. Long. 6. 12. N. Lat. 45. 53.

ANNESLEY, Arthur, earl of Angleſey, and lord privy ſeal in the reign of King Charles II. was the ſon of Sir Francis Anneſley, Baronet, Lord Mount-Norris, and Viſcount Valentia, in Ireland; and was born at Dublin on the 10th of July 1614. He was for ſome time at the univerſity of Oxford, and afterwards ſtudied the law at Lincoln's Inn. He had a conſiderable ſhare in the public tranſactions of the laſt century; for in the beginning of the civil war he ſat in the parliament held at Oxford; but afterwards became reconciled to the oppoſite party, and was ſent commiſſioner to Ulſter, to oppoſe the deſigns of the rebel Owen Roe Oneal. He engaged in ſeveral other affairs with great ſucceſs. He was preſident of the council of ſtate after the death of Oliver, and was principally concerned in bringing about the Reſtoration; ſoon after which, King Charles II. raiſed him to the dignity of a baron, by the title of Lord Anneſley, of Newport-Pagnel, Bucks; and a ſhort time after he was made earl of Angleſey. During that reign he was employed in ſome very important affairs, was made treaſurer of the navy, and afterwards lord privy ſeal. In October 1680, his lordſhip was charged by one Dangerfield, in an information delivered upon oath, at the bar of the houſe of commons, with endeavouring to ſtifle evidence in relation to the Popiſh plot, and to promote the belief of a Preſbyterian one. The uneaſineſs he received from this attack did not prevent his ſpeaking his opinion freely of thoſe matters in the houſe of lords, particularly in regard to the Popiſh plot. About the ſame time he anſwered the Lord Caſtlehaven's Memoirs, in which that nobleman endeavoured to paint the Iriſh rebellion in the lighteſt colours; and a ſharp diſpute was raiſed, which ended in the ſeal's being taken from him. He was a perſon of great abilities, had uncommon learning, and was well acquainted with the conſtitution and laws of England. He wrote, beſides his Animadverſions on Caſtlehaven's

Annexation, Annihilation.

Memoirs, 1. The Privileges of the Houſe of Lords and Commons ſtated. 2. A Diſcourſe on the Houſe of Lords. 3. Memoirs. 4. The Hiſtory of the Troubles in Ireland, from the rebellion in 1641 till the Reſtoration. 5. Truth unveiled, in behalf of the Church of England;—and ſome other works. He died in April 1686, in the 73d year of his age; and was ſucceeded by his ſon James.

ANNEXATION, in *Law*, a term uſed to imply the uniting of lands or rents to the crown.

ANNIHILATION, the act of reducing any created being into nothing.

Chriſtians, Heathens, Jews, Siameſe, Perſians, divines, philoſophers, &c. have their peculiar ſyſtems, ſentiments, conjectures, not to ſay dreams, concerning annihilation; and we find great diſputes among them about the reality, the poſſibility, the means, meaſures, prevention, ends, &c. of annihilation.

The firſt notions of the production of a thing from, or reduction of it to, nothing, Dr Burnet ſhows, aroſe from the Chriſtian theology; the words *creation* and *annihilation*, in the ſenſe now given to them, having been equally unknown to the Hebrews, the Greeks, and the Latins.

The ancient philoſophers in effect denied all annihilation as well as creation, reſolving all the changes in the world into new modifications, without ſuppoſing the production of any thing new, or deſtruction of the old. By daily experience, they ſaw compounds diſſolved; and that in their diſſolution nothing periſhed but their union or connexion of parts: when in death the body and ſoul were ſeparated, the man they held was gone, but that the ſpirit remained in its original the great ſoul of the world, and the body in its earth from whence it came; theſe were again wrought by nature into new compoſitions, and entered new ſtates of being which had no relation to the former.

The Perſian bramins hold, that after a certain period of time, conſiſting of 71 joogs, God not only annihilates the whole univerſe, but every thing elſe, angels, ſouls, ſpirits, and all, by which he returns to the ſame ſtate he was in before the creation; but that, having breathed a while, he goes to work again, and a new creation ariſes, to ſubſiſt 71 joogs more, and then to be annihilated in its turn. Thus they hold there have been almoſt an infinite number of worlds: but how many joogs are elapſed ſince the laſt creation, they cannot certainly tell; only in an almanack written in the Shanſcrit language in 1670, the world is ſaid to be then 3,892,771 years old from the laſt creation.

The Siameſe heaven is exactly the hell of ſome Socinians and other Chriſtian writers; who, ſhocked with the horrible proſpect of eternal torments, have taken refuge in the ſyſtem of annihilation. This ſyſtem ſeems countenanced by Scripture; for that the words *death*, *deſtruction*, and *periſhing*, whereby the puniſhment of the wicked is moſt frequently expreſſed in Scripture, do moſt properly import annihilation and an utter end of being. To this Tillotſon anſwers, that theſe words, as well as thoſe correſponding to them in other languages, are often uſed, both in Scripture and other writings, to ſignify a ſtate of great miſery and ſuffering, without the utter extinction of the miſerable. Thus God is often ſaid in Scripture to bring *deſtruction* on a nation, when he ſends judgment upon them, but without exterminating or making an end of them. So, in other languages, it is frequent, by *periſhing*, to expreſs a perſon's being made miſerable; as in that known paſſage in Tiberius's letter to the Roman ſenate: *Ita me dii, deæque omnes, pejus perdant, quam hodie perire me ſentio.* As to the word *death*, a ſtate of miſery which is as bad, or worſe, than death may properly enough be called by that name; and thus the puniſhment of wicked men after the day of judgment is in the book of Revelation frequently called the *ſecond death*. Annihilation.

Some Chriſtian writers allow a long time of the moſt terrible torments of ſinners; and after that ſuppoſe that there ſhall be an utter end of their being. Of this opinion Irenæus appears to have been; who, according to M. du Pin, taught that the ſouls, at leaſt of the wicked, would not ſubſiſt eternally; but that, after having undergone their torments for a certain period, they would at laſt ceaſe to be at all. But Tillemont, Petit, Didier, and others, endeavour to defend Irenæus from this imputation, as being too favourable to the wicked.

It has been much diſputed among divines, whether, at the conſummation of all things, this *earth* is to be annihilated, or only purified, and fitted for the habitation of ſome new order of beings. Gerard in his Common Places, and Hakewil in his Apology, contend earneſtly for a total abolition or annihilation. Ray, Calmet, and others, think the ſyſtem of renovation or reſtitution more probable, and more conſonant to Scripture, reaſon, and antiquity. The fathers who have treated on the queſtion are divided; ſome holding that the univerſe ſhall not be annihilated, but only its external face changed; others aſſerting, that the ſubſtance of it ſhall be deſtroyed.

How widely have the ſentiments of mankind differed as to the poſſibility and impoſſibility of annihilation! According to ſome, nothing ſo difficult; it requires the infinite power of the Creator to effect it: ſome go further, and ſeem to put it out of the power of God himſelf. According to others, nothing ſo eaſy: Exiſtence is a ſtate of violence; all things are continually endeavouring to return to their primitive nothing; it requires no power at all; it will do itſelf; nay, what is more, it requires an infinite power to prevent it.

Many authors conſider preſervation as a continual reproduction of a thing, which, ſubſiſting no longer of itſelf, would every moment return into nothing. Gaſſendi on the contrary aſſerts, that the world may indeed be annihilated by the ſame power which firſt created it, but that to continue it there is no occaſion for any power of preſervation.

Some divines, of which number the learned Biſhop King ſeems to be, hold annihilation for the greateſt of all evils, worſe than even the utmoſt torments of hell flames; while others, with ſome of the eaſtern philoſophers, acknowledge annihilation for the ultimate pitch of happineſs human nature is capable of; that ſovereign good, that abſolute beatitude, ſo long vainly ſought for by the philoſophers, is found here. No wonder it had been ſo long concealed; for who would have thought of looking for the *ſummum bonum*, where others have placed the ſum of miſery?

The ſaid prelate propoſes it as a queſtion, Whether ſuffering eternal torments be a greater evil than not exiſting? He thinks it highly probable, that the damned will

Anni
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Annobon.

will be ſuch fools, that feeling their own miſery in the moſt exquiſite degree, they will rather applaud their own conduct, and chooſe to be, and to be what they are, rather than not to be at all; fond of their condition, however wretched, like people enraged, they will perſiſt in their former ſentiments without opening their eyes to their folly, and perſevere by way of indignation and revenge. Mr Bayle refutes him on this head; but might, one would think, have ſaved himſelf the trouble.

The Talapoins hold it the ſupreme degree of happineſs to have the ſoul totally annihilated, and freed from the burden and ſlavery of tranſmigrations. They ſpeak of three Talapoins, who, after a great number of tranſmigrations, became gods; and when arrived at this ſtate, procured this further reward of their merit, to be annihilated. The ultimate reward of the higheſt perfection man can arrive at is *neiurepan*, or annihilation; which at length is granted to thoſe who are perfectly pure and good, after their ſouls have wandered many thouſand years through various bodies.

ANNI NUBILES, in *Law*, denotes the marriageable age of a woman, viz. after ſhe has arrived at twelve.

ANNIVERSARY, the annual return of any remarkable day. Anniverſary days, in old times, more particularly denoted thoſe days in which an office was yearly performed for the ſouls of the deceaſed, or the martyrdom of the ſaints was yearly celebrated in the church.

ANNOBON, a ſmall iſland of Africa, on the coaſt of Loango, belonging to the Portugueſe. It lies in E. Long. 5. 10. S. Lat. 1. 50. and receives its name from being diſcovered on New year's day. According to Pyrard, it is about five or ſix French leagues in compaſs; but Baudrand ſays, it is ten leagues round. Here are two high mountains, the tops of which being continually covered with clouds, occaſion frequent rains. On the ſouth-eaſt of the iſland are two rocks; one of which is low, and upon a level with the ſurface of the ſea; the other higher and larger, but both dangerous in the night to ſhipping; but between them the channel is deep and clear. Theſe rocks are inhabited by vaſt numbers of birds, ſo tame, that the ſailors frequently catch them with their hands. On the ſame ſide of the iſland is a convenient watering place at the foot of a rivulet, which tumbles from the mountains down to a valley covered with orange and citron trees, &c. and affording a pleaſant and refreſhing ſhade; but the road on the north-weſt ſide is difficult and dangerous, though moſt frequented by ſhips who have no intention of touching upon the continent. In either place it is difficult to take in a ſufficient quantity of water, on account of the violent breakings of the ſea, and a ſtone intrenchment erected by the negroes, from which they annoy all ſtrangers that attempt to land. The true road for ſhipping lies on the north-eaſt ſide, where they may anchor in ſeven, ten, thirteen, or ſixteen fathoms, on a fine ſand cloſe to the land, oppoſite to the village where the negroes have thrown up their intrenchments.

The climate is wholeſome, and the air clear and ſerene for the greateſt part of the year. Every part of the iſland is watered by pleaſant brooks, and freſh water ſprings, which, however, at the new and full moons, or in all high tides, acquire a brackiſhneſs. The banks of every rivulet are covered with palms, whence the inhabitants extract their wine by inciſion. Here are a number of fertile valleys, which produce Turkey corn, rice, millet, yams, potatoes, &c. and afford paſture for abundance of oxen, ſheep, goats, &c. Poultry and fiſh alſo abound here; but the only mercantile production is cotton, which is eſteemed equal in quality to any produced in India, though the quantity is ſmall.

Anno
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Annual.

In the year 1605, the Dutch admiral Matelief found 200 negroes, and two Portugueſe, on Annobon, moſt of them able to bear arms, expert in the uſe of them, and trained up in military diſcipline. La Croix ſays, it has a town oppoſite to the road that contains above 100 houſes, the whole ſurrounded by a parapet. Moſt of their dwellings are cane huts. In the whole iſland there is not a ſingle houſe built of ſtone, and only two of wood, which belong to the Portugueſe. All the inhabitants are meanly clothed; the women go bareheaded, and have alſo the upper part of the body naked, modeſty being defended by a piece of linen wrapt under their ſtomach, and falling down in the form of a petticoat, or wide apron, to the knees. As to the men, they wear only a linen girdle round the loins, with a ſmall flat before. The women carry their children on their backs, and ſuckle them over the ſhoulder. All the inhabitants are ſubject to the Portugueſe governor, who is the chief perſon in the iſland; at the ſame time that the negroes have their own chief ſubordinate to him. They are all rigid Catholics, having either been compelled or perſuaded by the arguments of the Portugueſe to embrace; and, like all other converts, they are bigotted in proportion to the novelty of the belief, and their ignorance of the true tenets.

ANNO DOMINI, i. e. the year of our Lord; the computation of time from our Saviour's incarnation.

ANNOMINATION, in *Rhetoric*, the ſame with what is otherwiſe called *paronomaſia*. See PARONOMASIA.

ANNONA, in *Roman Antiquity*, denotes proviſion for a year of all ſorts, as of fleſh, wine, &c. but eſpecially of corn. Annona is likewiſe the allowance of oil, ſalt, bread, fleſh, corn, wine, hay, and ſtraw, which was annually provided by the contractors for the maintenance of an army.

ANNONA, the *Cuſtard Apple*. See BOTANY *Index*.

ANNONÆ PRÆFECTUS, in *Antiquity*, an extraordinary magiſtrate, whoſe buſineſs it was to prevent a ſcarcity of proviſion, and to regulate the weight and fineneſs of bread.

ANNONAY, a ſmall town of France, in the department of Ardeche, formerly Upper Vivarais, ſeated on the river Deunre. E. Long. 4. 52. N. Lat. 45. 15.

ANNOT, a ſmall city on the mountains of Provence in France. E. Long. 7. 0. N. Lat. 44. 4.

ANNOTATION, in matters of literature, a brief commentary, or remark, upon a book or writing, in order to clear up ſome paſſage, or draw ſome concluſion from it.

ANNOTTA. See ANOTTA.

ANNUAL, in a general ſenſe, an appellation given to whatever returns every year, or is always performed within that ſpace of time.

Annual Motion of the Earth. See ASTRONOMY.

Annual Leaves, are ſuch leaves as come up afreſh in the ſpring, and periſh in winter. Theſe ſtand oppoſed to *Evergreens*.

Annual ‖ Annuity.

Annual Plants, called alſo ſimply *annuals*, are ſuch as only live their year, i. e. come up in the ſpring and die again in the autumn; and accordingly are to be recruited every year.

ANNUALRENT is uſed, in *Scots Law*, to denote a yearly profit due by a debtor in a ſum of money to a creditor for the uſe of it.

Right of Annualrent, in *Scots Law*, the original method of burdening lands with a yearly payment for the loan of money, before the taking of intereſt for money was allowed by ſtatute.

ANNUEL OF NORWAY, of which mention is made in the acts of parliament of King James III. was an annual payment of an hundred merks ſterling, which the kings of Scotland were obliged to pay to the kings of Norway, in ſatisfaction for ſome pretenſions which the latter had to the Scottiſh kingdom, by virtue of a conveyance made thereof by Malcolm Kenmore, who uſurped the crown after his brother's deceaſe. This annuel was firſt eſtabliſhed in 1266: in conſideration whereof the Norwegians renounced all title to the ſucceſſion to the iſles of Scotland. It was paid till the year 1468, when the annuel, with all its arrears, was renounced in the contract of marriage between King James III. and Margaret daughter of Chriſtian I. king of Norway, Denmark, and Sweden.

ANNUITY, a ſum of money, payable yearly, half-yearly, or quarterly, to continue a certain number of years, for ever, or for life.

An annuity is ſaid to be in arrear, when it continues unpaid after it falls due. And an annuity is ſaid to be in reverſion, when the purchaſer, upon paying the price, does not immediately enter upon poſſeſſion; the annuity not commencing till ſome time after.

Intereſt on annuities may be computed either in the way of ſimple or compound intereſt. But compound intereſt, being found moſt equitable, both for buyer and ſeller, the computation by ſimple intereſt is univerſally diſuſed.

I. *Annuities for a certain time.*

PROBLEM 1. Annuity, rate, and time, given; to find the amount, or ſum of yearly payments, and intereſt.

RULE. Make 1 the firſt term of a geometrical ſeries, and the amount of 1l. for a year the common ratio; continue this ſeries to as many terms as there are years in the queſtion; and the ſum of this ſeries is the amount of 1l. annuity for the given years; which, multiplied by the given annuity, will produce the amount ſought.

EXAMPLE. An annuity of 40l. payable yearly, is forborn and unpaid till the end of 5 years: What will then be due, reckoning compound intereſt at 5 *per cent.* on all the payments then in arrear?

1 5 5 4 5
1 : 1.05 : 1.1025 : 1.157625 : 1.21550625? whoſe ſum is 5.525631251.; and 5.25563125 × 40 = 221.02525=221l. 0s. 6d. the amount ſought.

The amount may alſo be found thus: Multiply the given annuity by the amount of 1l. for a year; to the product add the given annuity, and the ſum is the amount in two years; which multiply by the amount of 1l. for a year; to the product add the given annuity, and the ſum is the amount in 3 years, &c. The former queſtion wrought in this manner follows: Annuity.

40 am. in 1 year.	126.1 am. in 3 years.
1.05	1.05
42.00	132.405
40	40
82 am. in 2 years.	172.405 am. in 4 years.
1.05	1.05
86.10	181.02525
40	40
126.1 am. in 3 years.	221.02525 am. in 5 years.

If the given time be years and quarters, find the amount for the whole years, as above: then find the amount of 1l. for the given quarters; by which multiply the amount for the whole years; and to the product add ſuch a part of the annuity as the given quarters are of a year.

If the given annuity be payable half yearly, or quarterly, find the amount of 1l. for half a year or a quarter; by which find the amount for the ſeveral half-years or quarters, in the ſame manner as the amount for the ſeveral years is found above.

PROB. 2. Annuity, rate, and time given; to find the preſent worth, or ſum of money that will purchaſe the annuity.

RULE. Find the amount of the given annuity by the former problem; and then, by compound intereſt, find the preſent worth of this amount, as a ſum due at the end of the given time.

EXAMP. What is the preſent worth of an annuity of 40l. to continue 5 years, diſcounting at 5 *per cent.* compound intereſt?

By the former problem, the amount of the given annuity for 5 years, at 5 *per cent.* is 221.02525; and by compound intereſt, the amount of 1l. for 5 years, at 5 *per cent.* is 1.2762815625.

And, 1.2762815625)221.02525000(173.179= 173l. 3s. 7d. the preſent worth ſought.

The preſent worth may be alſo found thus: By compound intereſt, find the preſent worth of each year by itſelf, and the ſum of theſe is the preſent worth ſought. The former example done in this way follows:

1.2762815625)40.000000000	(31.3410
1.21550625)40.0000000	(32.9080
1.157625)40.00000	(34.5535
1.1025)40.000	(36.2811
1.05)40.0	(38.0952
Preſent worth	173.1788

If the annuity to be purchaſed be in reverſion, find firſt the preſent worth of the annuity, as commencing immediately, by any of the methods taught above; and then, by compound intereſt, find the preſent worth of that preſent worth, rebating for the time in reverſion; and this laſt preſent worth is the anſwer.

EXAMP.

Annuity. EXAMP. What is the preſent worth of a yearly penſion or rent of 75l. to continue 4 years, but not to commence till three years hence, diſcounting at *5 per cent.*?

.05 : 1 : : 75 : 1500
1.05 × 1.05 × 1.05 × 1.05 = 1.21550625
1.21550625)1500.00000(1234.05371
1500
1234.05371

265.94629, preſent worth of the annuity, if it was to commence immediately.

1.05 × 1.05 × 1.05 = 1.157625 *L. s. d.*
1.157625)265.94629(229.7344 = 229 14 8¼

PROB. 3. Preſent worth, rate, and time given; to find the annuity.

RULE. By the preceding problem, find the preſent worth of 1l. annuity for the rate and time given; and then ſay, As the preſent worth thus found to 1l. annuity, ſo the preſent worth given to its annuity; that is, divide the given preſent worth by that of 1l. annuity.

EXAMP. What annuity, to continue 5 years will 173l. 3s. 7d. purchaſe, allowing compound intereſt at *5 per cent.*?

.05 : 1 : : 1 : 20l.
1.05 × 1.05 × 1.05 × 1.05 × 1.05 = 1.276281562 5
1.276281562 5)20.00000000(15.6705
20
15.6705

4.3295 preſent worth of 1l annuity.
4.329)173.179(40l. annuity. *Anſ.*

II. *Annuities for ever, or freehold Eſtates.*

In freehold eſtates, commonly called *annuities in fee-ſimple*, the things chiefly to be conſidered are, 1. The annuity or yearly rent. 2. The price or preſent worth. 3. The rate of intereſt. The queſtions that uſually occur on this head will fall under one or other of the following problems.

PROB. 1. Annuity and rate of intereſt given, to find the price.

As the rate of 1l. to 1l. ſo the rent to the price.

EXAMP. The yearly rent of a ſmall eſtate is 40l: What is it worth in ready money, computing intereſt at 3½ *per cent.*?

As .035 : 1 : : 40 : 1142.857142 = *L.*1142 17 1½.

PROB. 2. Price and rate of intereſt given, to find the rent or annuity.

As 1l. to its rate, ſo the price to the rent.

EXAMP. A gentleman purchaſes an eſtate for 4000l. and has 4½ *per cent.* for his money: Required the rent?

As 1 : .045 : : 4000 : 1 : 180l. rent ſought.

PROB. 3. Price and rent given, to find the rate of intereſt.

As the price to the rent, ſo 1 to the rate.

EXAMP. An eſtate of 180l. yearly rent is bought ſo 4000l.: What rate of intereſt has the purchaſer for his money?

As 4000 : 180l. : : 1 : .045 rate ſought. Annuity.

PROB. 4. The rate of intereſt given, to find how many years purchaſe an eſtate is worth.

Divide 1 by the rate, and the quot is the number of years purchaſe the eſtate is worth.

EXAMP. A gentleman is willing to purchaſe an eſtate, provided he can have 2½ *per cent.* for his money: How many years purchaſe may he offer?

.025)1.000(40 years purchaſe. *Anſ.*

PROB. 5. The number of years purchaſe, at which an eſtate is bought or ſold, given; to find the rate of intereſt.

Divide 1 by the number of years purchaſe, and the quot is the rate of intereſt.

EXAMP. A gentleman gives 40 years purchaſe for an eſtate: What intereſt has he for his money?

40)1.000(.025 rate ſought.

The computations hitherto are all performed by a ſingle diviſion or multiplication, and it will ſcarcely be perceived that the operations are conducted by the rules of compound intereſt; but when a reverſion occurs, recourſe muſt be had to tables of annuities on compound intereſt.

PROB. 6. The rate of intereſt, and the rent of a freehold eſtate in reverſion, given; to find the preſent worth or value of the reverſion.

By Prob. 1. find the price or preſent worth of the eſtate, as if poſſeſſion was to commence preſently; and then, by the Tables, find the preſent value of the given annuity, or rent, for the years prior to the commencement; ſubtract this value from the former value, and the remainder is the value of the reverſion.

EXAMP. A has the poſſeſſion of an eſtate of 130l. *per annum*, to continue 20 years; B has the reverſion of the ſame eſtate from that time for ever: What is the value of the eſtate, what the value of the 20 years poſſeſſion, and what the value of the reverſion, reckoning compound intereſt at 6 *per cent.*?

By Prob. 1. .06)130.00(2166.6666 value of the eſtate.
By Tables 1491.0896 val. of the poſſeſſion.

675.5770 val. of the reverſion.

PROB. 7. The price or value of a reverſion, the time prior to the commencement, and rate of intereſt, given, to find the annuity or rent.

By the Tables, find the amount of the price of the reverſion for the years prior to the commencement; and then by Prob. 3. find the annuity which that amount will purchaſe.

EXAMP. The reverſion of a freehold eſtate, to commence 20 years hence, is bought for 675.577l. compound intereſt being allowed at 6 *per cent.*: Required the annuity or rent?

By the Tables the amount of 675.577l. for 20 years, at 6 *per cent.* is } *L.* 2166.6
By Prob. 2. 2166.6 × .06 = 130.0 rent ſought.

III. *Life Annuities.*

THE value of annuities for life is determined from obſervations made on the bills of mortality. Dr Halley, Mr

Annuity. Mr Simpſon, and Monſ. de Moivre, are gentlemen of diſtinguiſhed merit in calculations of this kind.

Dr Halley had recourſe to the bills of mortality at Breſlaw, the capital of Sileſia, as a proper ſtandard for the other parts of Europe, being a place pretty central, at a diſtance from the ſea, and not much crowded with traffickers or foreigners. He pitches upon 1000 perſons all born in one year, and obſerves how many of theſe were alive every year, from their birth to the extinction of the laſt, and conſequently how many died each year, as in the firſt of the following Tables; which is well adapted to Europe in general. But in the city of London there is obſerved to be a greater diſparity in the births and burials than in any other place, owing probably to the vaſt reſort of people thither, in the way of commerce, from all parts of the known world. Mr Simpſon, therefore, in order to have a table particularly ſuited to this populous city, pitches upon 1280 perſons all born in the ſame year, and records the number remaining alive each year till none were in life.

It may not be improper, however, to obſerve, that however perfect tables of this ſort may be in themſelves, and however well adapted to any particular climate, yet the concluſions deduced from them muſt always be uncertain, being nothing more than probabilities, or conjectures drawn from the uſual period of human life. And the practice of buying and ſelling annuities on lives, by rules founded on ſuch principles, may be juſtly conſidered as a ſort of lottery or chance work, in which the parties concerned muſt often be deceived. But as eſtimates and computations of this kind are now become faſhionable, we ſhall ſubjoin ſome brief account of ſuch as appear moſt material.

Dr Halley's Table on the Bills of Mortality at Breſlaw.

Age.	*Perſ. liv.*	*Age.*	*Perſ. liv.*	*Age.*	*Perſ. liv.*	*Age.*	*Perſ. liv.*
1	1000	24	573	47	377	70	142
2	855	25	567	48	367	71	131
3	798	26	560	49	357	72	120
4	760	27	553	50	346	73	109
5	732	28	546	51	335	74	98
6	710	29	539	52	324	75	88
7	692	30	531	53	313	76	78
8	680	31	523	54	302	77	68
9	670	32	515	55	292	78	58
10	661	33	507	56	282	79	49
11	653	34	499	57	272	80	41
12	646	35	490	58	262	81	34
13	640	36	481	59	252	82	28
14	634	37	472	60	242	83	23
15	628	38	463	61	232	84	20
16	622	39	454	62	222	85	15
17	616	40	445	63	212	86	11
18	610	41	436	64	202	87	8
19	604	42	427	65	192	88	5
20	598	43	417	66	182	89	3
21	592	44	407	67	172	90	1
22	586	45	397	68	162	91	0
23	579	46	387	69	152		

Annuity.

Mr Simpſon's Table on the Bills of Mortality at London.

Age.	*Perſ. liv.*	*Age.*	*Perſ. liv.*	*Age.*	*Perſ. liv.*	*Age.*	*Perſ. liv.*
0	1280	24	434	48	220	72	59
1	870	25	426	49	212	73	54
2	700	26	418	50	204	74	49
3	635	27	410	51	196	75	45
4	600	28	402	52	188	76	41
5	580	29	394	53	180	77	38
6	564	30	385	54	172	78	35
7	551	31	376	55	165	79	32
8	541	32	367	56	158	80	29
9	532	33	358	57	151	81	26
10	524	34	349	58	144	82	23
11	517	35	340	59	137	83	20
12	510	36	331	60	130	84	17
13	504	37	322	61	123	85	14
14	498	38	313	62	117	86	12
15	492	39	304	63	111	87	10
16	486	40	294	64	105	88	8
17	480	41	284	65	99	89	6
18	474	42	274	66	93	90	5
19	468	43	264	67	87	91	4
20	462	44	255	68	81	92	3
21	455	45	246	69	75	93	2
22	448	46	237	70	69	94	1
23	441	47	228	71	64	95	0

From the preceding Tables the probability of the continuance or extinction of human life is eſtimated as follows.

1. The probability that a perſon of a given age ſhall live a certain number of years, is meaſured by the proportion which the number of perſons living at the propoſed age has to the difference between the ſaid number and the number of perſons living at the given age.

Thus, if it be demanded, what chance a perſon of 40 years has to live ſeven years longer? from 445, the number of perſons living at 40 years of age in Dr Halley's table, ſubtract 377, the number of perſons living at 47 years of age, and the remainder 68 is the number of perſons that died during theſe ſeven years; and the probability or chance that the perſon in the queſtion ſhall live theſe 7 years is as 377 to 68, or nearly as $5\frac{1}{2}$ to 1. But, by Mr Simpſon's table, the chance is ſomething leſs than that of 4 to 1.

2. If the year to which a perſon of a given age has an equal chance of arriving before he dies, be required, it may be found thus: Find half the number of perſons living at the given age in the tables, and in the column of age you have the year required.

Thus, if the queſtion be put with reſpect to a perſon of 30 years of age, the number of that age in Dr Halley's table is 531, the half whereof is 265, which is found in the table between 57 and 58 years; ſo that a perſon of 30 years has an equal chance of living between 27 and 28 years longer.

3. By the tables the premium of inſurance upon lives may in ſome meaſure be regulated.

Thus,

Annuity. Thus, the chance that a perſon of 25 years has to live another year, is, by Dr Halley's table, as 80 to 1; but the chance that a perſon of 50 years has to live a year longer is only 30 to 1; and, conſequently, the premium for inſuring the former ought to be the premium for inſuring the latter for one year, as 30 to 80, or as 3 to 8.

PROB. I. To find the value of an annuity of 1l. for the life of a ſingle perſon of any given age.

Monſ. de Moivre, by obſerving the decreaſe of the probabilities of life, as exhibited in the table, compoſed an algebraic theorem or canon, for computing the value of any annuity for life; which canon we here lay down by way of

RULE. Find the complement of life; and, by the tables, find the value of 1l. annuity for the years denoted by the ſaid complement; multiply this value by the amount of 1l. for a year, and divide the product by the complement of life; then ſubtract the quot from 1; divide the remainder by the intereſt of 1l. for a year; and this laſt quot will be the value of the annuity ſought, or, in other words, the number of years purchaſe the annuity is worth.

EXAMP. What is the value of an annuity of 1l. for an age of 50 years, intereſt at 5 *per cent.*?

86
50 age given.
—
36 complement of life.

By the tables, the value is, 16.5468
Amount of 1l. for a year, 1.05

827340
165468

Complement of life, 36)17.374140(.482615
From unity, viz. 1.000000
Subtract .482615

Intereſt of 1l. .05).517385(10.3477 value ſought.

By the preceding problem is conſtructed the following Table.

The value of 1l. annuity for a ſingle life.

Age.	3 *per c.*	3½ *per c.*	4 *per c.*	4½ *per c.*	5 *per c.*	6 *per c.*
9=10	19.87	18.27	16.88	15.67	14.60	12.80
8=11	19.74	18.16	16.79	15.59	14.53	12.75
7=12	19.60	18.05	16.64	15.51	14.47	12.70
13	19.47	17.94	16.60	15.43	14.41	12.65
6=14	19.33	17.82	16.50	15.35	14.34	12.60
15	19.19	17.71	16.41	15.27	14.27	12.55
16	19.05	17.59	16.31	15.19	14.20	12.50
5=17	18.90	17.46	16.21	15.10	14.12	12.45
18	18.76	17.33	16.10	15.01	14.05	12.40
19	18.61	17.21	15.99	14.92	13.97	12.35
4=20	18.46	17.09	15.89	14.83	13.89	12.30
21	18.30	16.96	15.78	14.73	13.81	12.20
22	18.15	16.83	15.67	14.64	13.72	12.15
23	17.99	16.69	15.55	14.54	13.64	12.10
3=24	17.83	16.56	15.43	14.44	13.55	12.00
25	17.66	16.42	15.31	14.34	13.46	11.95

Annuity.

The value of 1l. annuity for a ſingle life.

Age.	3 *per c.*	3½ *per c.*	4 *per c.*	4½ *per c.*	5 *per c.*	6 *per c.*
26	17.50	16.28	15.19	14.23	13.37	11.90
27	17.33	16.13	15.04	14.12	13.28	11.80
28	17.16	15.98	14.94	14.02	13.18	11.75
29	16.98	15.83	14.81	13.90	13.09	11.65
30	16.80	15.68	14.68	13.79	12.99	11.60
2=31	16.62	15.53	14.54	13.67	12.88	11.50
32	16.44	15.37	14.41	13.55	12.78	11.40
33	16.25	15.21	14.27	13.43	12.67	11.35
34	16.06	15.05	14.12	13.30	12.56	11.25
35	15.86	14.89	13.98	13.17	12.45	11.15
36	15.67	14.71	13.82	13.04	12.33	11.05
37	15.46	14.52	13.67	12.90	12.21	11.00
38	15.29	14.34	13.52	12.77	12.09	10.90
1=39	15.05	14.16	13.36	12.63	11.96	10.80
40	14.84	13.98	13.20	12.48	11.83	10.70
41	14.63	13.79	13.02	12.33	11.70	10.55
42	14.41	13.59	12.85	12.18	11.57	10.45
43	14.19	13.40	12.68	12.02	11.43	10.35
44	13.96	13.20	12.50	11.87	11.29	10.25
45	13.73	12.99	12.32	11.70	11.14	10.10
46	13.49	12.78	12.13	11.54	10.99	10.00
47	13.25	12.56	11.94	11.37	10.84	9.85
48	13.01	12.36	11.74	11.19	10.68	9.75
49	12.76	12.14	11.54	11.00	10.51	9.60
50	12.51	11.92	11.34	10.82	10.35	9.45
51	12.26	11.69	11.13	10.64	10.17	9.30
52	12.00	11.45	10.92	10.44	9.99	9.20
53	11.73	11.20	10.70	10.24	9.82	9.00
54	11.46	10.95	10.47	10.04	9.63	8.85
55	11.18	10.69	10.24	9.82	9.44	8.70
56	10.90	10.44	10.01	9.61	9.24	8.55
57	10.61	10.18	9.77	9.39	9.04	8.35
58	10.32	9.91	9.52	9.16	8.83	8.20
59	10.03	9.64	9.27	8.93	8.61	8.00
60	9.73	9.36	9.01	8.69	8.39	7.80
61	9.42	9.08	8.75	8.44	8.16	7.60
62	9.11	8.79	8.48	8.19	7.93	7.40
63	8.79	8.49	8.20	7.94	7.68	7.20
64	8.46	8.19	7.92	7.67	7.43	6.95
65	8.13	7.88	7.63	7.39	7.18	6.75
66	7.79	7.56	7.33	7.12	6.91	6.50
67	7.45	7.24	7.02	6.83	6.64	6.25
68	7.10	6.91	6.75	6.54	6.36	6.00
69	6.75	6.57	6.39	6.23	6.07	5.75
70	6.38	6.22	6.06	5.92	5.77	5.50
71	6.01	5.87	5.72	5.59	5.47	5.20
72	5.63	5.51	5.38	5.26	5.15	4.90
73	5.25	5.14	5.02	4.92	4.82	4.60
74	4.85	4.77	4.66	4.57	4.49	4.30
75	4.45	4.38	4.29	4.22	4.14	4.00

The

Annuity.

The value of 1l. annuity for a ſingle life.

Age.	3 *per c.*	3½ *per c.*	4 *per c.*	4½ *per c.*	5 *per c.*	6 *per c.*
76	4.05	3.98	3.91	3.84	3.78	3.65
77	3.63	3.57	3.52	3.47	3.41	3.30
78	3.21	3.16	3.11	3.07	3.03	2.95
79	2.78	2.74	2.70	2.67	2.64	2.55
80	2.34	2.31	2.28	2.26	2.23	2.15

The above table ſhows the value of an annuity of one pound for a ſingle life, at all the current rates of intereſt; and is eſteemed the beſt table of this kind extant, and preferable to any other of a different conſtruction. But yet thoſe who ſell annuities have generally one and a half or two years more value, than ſpecified in the table, from purchaſers whoſe age is 20 years or upwards.

Annuities of this ſort are commonly bought or ſold at ſo many years purchaſe: and the value aſſigned in the table may be ſo reckoned. Thus the value of an annuity of one pound for an age of 50 years, at 3 *per cent.* intereſt, is 12.51; that is, 12l. 10s. or twelve and a half years purchaſe. The marginal figures on the left of the column of age ſerve to ſhorten the table, and ſignify, that the value of an annuity for the age denoted by them is the ſame with the value of an annuity for the age denoted by the numbers before which they ſtand. Thus the value of an annuity for the age of 9 and 10 years is the ſame; and the value of an annuity for the age of 6 and 14, for the age of 3 and 24, &c. is the ſame. The further uſe of the table will appear in the queſtions and problems following.

Quest. 1. A perſon of 50 years would purchaſe an annuity for life of 200l.: What ready money ought he to pay, reckoning intereſt at 4½ *per cent.*?

	L.
By the table the value of 1l. is	10.8
Multiply by	200
Value to be paid in ready money,	2164.00 *Anſ.*

Quest. 2. A young merchant marries a widow lady of 40 years of age, with a jointure of 300l. a-year, and wants to diſpoſe of the jointure for ready money: What ſum ought he to receive, reckoning intereſt at 3½ *per cent.*?

	L.
By the table, the value of 1l. is	13.98
	300
Value to be received in ready money,	4194.00 *Anſ.*

Prob. 2. To find the value of any annuity for the joint continuance of two lives, one life failing, the annuity to ceaſe.

Here there are two caſes, according as the ages of the two perſons are equal or unequal.

1. If the two perſons be of the ſame age, work by the following

Rule. Take the value of any one of the lives from the table; multiply this value by the intereſt of 1l. for a year; ſubtract the product from 2; divide the foreſaid value by the remainder; and the quot will be the value of 1l. annuity, or the number of years purchaſe ſought. Annuity.

Examp. What is the value of 100l. annuity for the joint lives of two perſons, of the age of 30 years each, reckoning intereſt at 4 *per cent*?

By the table, one life of 30 years is	14.68
Multiply by	.04
Subtract the product	.5872
From	2.0000
Remains	1.4128

And 1.4128)14.68(10.39 value of 1l. annuity.
And 10.39 × 100=1039 the value ſought.

2. If the two perſons are of different ages, work as directed in the following

Rule. Take the values of the two lives from the table; multiply them into one another, calling the reſult the firſt product; then multiply the ſaid firſt product by the intereſt of 1l. for a year, calling the reſult the ſecond product; add the values of the two lives, and from their ſum ſubtract the ſecond product; divide the firſt product by the remainder, and the quot will be the value of 1l. annuity, or the number of years purchaſe ſought.

Examp. What is the value of 70l. annuity for the joint lives of two perſons, whereof one is 40 and the other 50 years of age, reckoning intereſt at 5 *per cent.*?

By the table, the value of 40 years is	11.83
And the value of 50 years is	10.35
Firſt product,	122.4405
Multiply by	.05
Second product,	6.122025
Sum of the two lives,	22.180000
Second product deduct,	6.122025
Remainder,	16.057975

And 16.057975)122.4405(7.62 value of 1l. annuity.
70

533.40 value ſought.

Prob. 3. To find the value of an annuity upon the longeſt of two lives? that is, to continue ſo long as either of the perſons is in life.

Rule. From the ſum of the values of the ſingle lives ſubtract the value of the joint lives, and the remainder will be the value ſought.

Examp. What is the value of an annuity of 1l. upon the longeſt of two lives, the one perſon being 30, and the other 40 years of age, intereſt at 4 *per cent.*?

By the table, 30 years is	14.68
40 years is	13.20
Value of their joint lives, by Prob. 2. Caſe 2. is	27.88 9.62
Value ſought,	18.26

If

Annuity. If the annuity be any other than 1l. multiply the anſwer found as above by the given annuity.

If the two perſons be of equal age, find the value of their joint lives by Caſe 1. of Prob. 2.

Prob. 4. To find the value of the next preſentation to a living.

Rule. From the value of the ſucceſſor's life ſubtract the joint value of his and the incumbent's life, and the remainder will be the value of 1l. annuity; which multiplied by the yearly income, will give the ſum to be paid for the next preſentation.

Examp. A enjoys a living of 100l. *per annum*, and B would purchaſe the ſaid living for his life after A's death: The queſtion is, What he ought to pay for it, reckoning intereſt at 5 *per cent.* A being 60, and B 25 years of age?

		L.
By the table, B's life is	-	13.46
Joint value of both lives, by Prob. 2. is		6.97
The value of 1l. annuity,	-	6.49
Multiply by	-	100
Value of next preſentation,	-	649.00

The value of a direct preſentation is the ſame as that of any other annuity for life, and is found for 1l. by the table; which being multiplied by the yearly income, gives the value ſought.

Prob. 5. To find the value of a reverſion for ever, after two ſucceſſive lives; or to find the value of a living after the death of the preſent incumbent and his ſucceſſor.

Rule. By Prob. 3. find the value of the longeſt of the two lives, and ſubtract that value from the value of the perpetuity, and the remainder will be the value ſought.

Examp. A, aged 50, enjoys an eſtate or living of 100l. *per annum*; B, aged 30, is entitled to his lifetime of the ſame eſtate after A's death; and it is propoſed to ſell the eſtate juſt now, with the burden of A and B's lives on it: What is the reverſion worth, reckoning intereſt at 4 *per cent.*?

		L.
By the table, A's life of 50 is	-	11.34
B's life of 30 is	-	14.68
	Sum,	26.02
Value of their joint lives, found by Prob. 2. Caſe 2. is	-	8.60
Value of the longeſt life,	-	17.42 ſub.
From the value of the perpetuity,		25.00
Remains the value of 1l. reverſion,		7.58
Multiply by		100
Value of the reverſion,	- -	758.00

Prob. 6. To find the value of the joint continuance of three lives, one life failing, the annuity to ceaſe.

Rule. Find the ſingle values of the three lives from the table; multiply theſe ſingle values continually, calling the reſult the product of the three lives; multiply that product by the intereſt of 1l. and that product again by 2, calling the reſult the double product; then, from the ſum of the ſeveral products of the lives, taken two and two, ſubtract the double product; divide the product of the three lives by the remainder, and the quot will be the value of the three joint lives. Annuity.

Examp. A is 18 years of age, B 34, and C 56; What is the value of their joint lives, reckoning intereſt at 4 *per cent.*?

By the table, the value of A's life is 16.1, of B's 14. 12, and of C's 10.01.

161. × 14.12 × 10.01 = 2275.6, product of the three lives.
.04

91.024
2

182.048, double product.

Product of A and B, 16.1 × 14.12 × 227.33
A and C, 16.1 × 10.01 = 161.16
B and C, 14.12 × 10.00 = 141.34

Sum of all, two and two,	-	529.83
Double product ſubtract,	-	182.048
Remainder,	-	347.782

And 347.782)2275.600(6.54 value ſought.

Prob. 7. To find the value of an annuity upon the longeſt of three lives.

Rule. From the ſum of the values of the three ſingle lives taken from the table, ſubtract the ſum of all the joint lives, taken two and two as found by Prob. 2. and to the remainder add the value of the three joint lives, as found by Prob. 6. and that ſum will be the value of the longeſt life ſought.

Examp. A is 18 years of age, B 34, and C 56: What is the value of the longeſt of theſe three lives, intereſt at 4 *per cent.*?

By the table, the ſingle value of A's life is	16.1
ſingle value of B's life is	14.12
ſingle value of C's life is	10.01
Sum of the ſingle values,	40.23
By Prob. 2. the joint value of A and B is	10.76
joint value of A and C is	8.19
joint value of B and C is	7.65
Sum of the joint lives,	26.60
Remainder, -	13.63
By Prob. 6. the value of the 3 joint lives is	6.54
Value of the longeſt of the 3 lives. -	20.17

Other problems might be added, but theſe adduced are ſufficient for moſt purpoſes. The reader probably may wiſh that the reaſon of the rules, which, it muſt be owned, are intricate, had been aſſigned: but this could not be done without entering deeper into the ſubject than was practicable in this place. See Chances.

Annuities. *Annuities*, (*Borrowing upon;*) one of the methods employed by government for raiſing ſupplies.

Of this there are two methods; that of borrowing upon annuities for terms of years, and that of borrowing upon annuities for lives.

During the reigns of King William and Queen Anne, large ſums were frequently borrowed upon annuities for terms of years, which were ſometimes longer and ſometimes ſhorter. In 1693, an act was paſſed for borrowing one million upon an annuity of 14 *per cent.* or of 140,000l. a-year for 16 years. In 1691, an act was paſſed for borrowing a million upon annuities for lives, upon terms which in the preſent times would appear very advantageous. But the ſubſcription was not filled up. In the following year the deficiency was made good by borrowing upon annuities for lives at 14 *per cent.* or at little more than ſeven years purchaſe. In 1695, the perſons who had purchaſed thoſe annuities were allowed to exchange them for others of 96 years, upon paying into the exchequer 63 pounds in the hundred; that is, the difference between 14 *per cent.* for life, and 14 *per cent.* for 96 years, was ſold for 63 pounds, or for four and a half years purchaſe. Such was the ſuppoſed inſtability of government, that even theſe terms procured few purchaſers. In the reign of Queen Anne, money was upon different occaſions borrowed both upon annuities for lives and upon annuities for terms of 32, of 89, of 98, and of 99 years. In 1719, the proprietors of the annuities for 32 years were induced to accept in lieu of them South Sea ſtock to the amount of eleven and a half years purchaſe of the annuities, together with an additional quantity of ſtock equal to the arrears which happened then to be due upon them. In 1720, the greater part of the other annuities for terms of years both long and ſhort were ſubſcribed into the ſame fund. The long annuities at that time amounted to 666,821l. 8s. 3½d. a-year. On the 5th of January 1775, the remainder of them, or what was not ſubſcribed at that time, amounted only to 136,453l. 12s. 8d.

During the two wars which began in 1739 and in 1755, little money was borrowed either upon annuities for terms of years, or upon thoſe for lives. An annuity for 98 or 99 years, however, is worth nearly as much money as a perpetuity, and ſhould, therefore, one might think, be a fund for borrowing nearly as much. But thoſe who, in order to make family ſettlements, and to provide for remote futurity, buy into the public ſtocks, would not care to purchaſe into one of which the value was continually diminiſhing; and ſuch people make a very conſiderable proportion both of the proprietors and purchaſers of ſtock. An annuity for a long term of years, therefore, though its intrinſic value may be very nearly the ſame with that of a perpetual annuity, will not find nearly the ſame number of purchaſers. The ſubſcribers to a new loan, who mean generally to ſell their ſubſcription as ſoon as poſſible, prefer greatly a perpetual annuity redeemable by parliament, to an irredeemable annuity for a long term of years of only equal amount. The value of the former may be ſuppoſed always the ſame, or very nearly the ſame; and it makes, therefore, a more convenient transferable ſtock than the latter.

During the two laſt mentioned wars, annuities, either for terms of years or for lives, were ſeldom granted but as premiums to the ſubſcribers to a new loan, over and above the redeemable annuity to intereſt upon the credit of which the loan was ſuppoſed to be made. They were granted, not as the proper fund upon which the money was borrowed; but as an additional encouragement to the lender. Annuities.

Annuities for lives have occaſionally been granted in two different ways; either upon ſeparate lives, or upon lots of lives, which in French are called *Tontines*, from the name of their inventor. When annuities are granted upon ſeparate lives, the death of every individual annuitant diſburdens the public revenue ſo far as it was affected by his annuity. When annuities are granted upon tontines, the liberation of the public revenue does not commence till the death of all the annuitants comprehended in one lot, which may ſometimes conſiſt of twenty or thirty perſons, of whom the ſurvivors ſucceed to the annuities of all thoſe who die before them; the laſt ſurvivor ſucceeding to the annuities of the whole lot. Upon the ſame revenue more money can always be raiſed by tontines than by annuities for ſeparate lives. An annuity, with a right of ſurvivorſhip, is really worth more than an equal annuity for a ſeparate life; and from the confidence which every man naturally has in his own good fortune, the principle upon which is founded the ſucceſs of all lotteries, ſuch an annuity generally ſells for ſomething more than it is worth. In countries where it is uſual for government to raiſe money by granting annuities, tontines are upon this account generally preferred to annuities for ſeparate lives. The expedient which will raiſe moſt money, is almoſt always preferred to that which is likely to bring about in the ſpeedieſt manner the liberation of the public revenue.

In France a much greater proportion of the public debts conſiſts in annuities for lives than in England. According to a memoir preſented by the parliament of Bourdeaux to the king in 1764, the whole public debt of France is eſtimated at twenty-four hundred millions of livres; of which the capital, for which annuities for lives had been granted, is ſuppoſed to amount to three hundred millions, the eighth part of the whole public debt. The annuities themſelves are computed to amount to thirty millions a-year, the fourth part of one hundred and twenty millions, the ſuppoſed intereſt of that whole debt. It is not the different degrees of anxiety in the two governments of France and England for the liberation of the public revenue, which occaſions this difference in their reſpective modes of borrowing; it ariſes altogether from the different views and intereſts of the lenders.

In Britain, the ſeat of government being in the greateſt mercantile city in the world, the merchants are generally the people who advance money to government. By advancing it they do not mean to diminiſh, but, on the contrary, to increaſe their mercantile capitals; and unleſs they expected to ſell with ſome profit their ſhare in the ſubſcription for a new loan, they never would ſubſcribe. But if by advancing their money they were to purchaſe, inſtead of perpetual annuities, annuities for lives only, whether their own or thoſe of other people, they would not always be ſo likely to ſell them with a profit. Annuities upon their own lives they would always ſell with loſs; becauſe no man will give for an annuity upon the life

Annuities ‖ Annunciada.

life of another whoſe age and ſtate are nearly the ſame with his own, the ſame price which he would give for one upon his own. An annuity upon the life of a third perſon, indeed, is, no doubt, of equal value to the buyer and the ſeller; but its real value begins to diminiſh from the moment it is granted, and continues to do ſo more and more as long as it ſubſiſts. It can never, therefore, make ſo convenient a transferable ſtock as a perpetual annuity, of which the real value may be ſuppoſed always the ſame, or very nearly the ſame.

In France, before the revolution, the ſeat of government not being in a great mercantile city, merchants did not make ſo great a proportion of the people who advance money to government. The people concerned in the finances, the farmers general, the receivers of the taxes which were not in farm, the court bankers, &c. made the greater part of thoſe who advance their money in all public exigencies. Such people were commonly men of mean birth, but of great wealth, and frequently of great pride. They were too proud to marry their equals, and women of quality diſdained to marry them. They frequently reſolved, therefore, to live bachelors; and having neither any families of their own, nor much regard for thoſe of their relations, whom they were not always very fond of acknowledging, they deſired only to live in ſplendour during their own time, and were not unwilling that their fortune ſhould end with themſelves. The number of rich people, beſides, who were either averſe to marry, or whoſe condition of life rendered it either improper or inconvenient for them to do ſo, was much greater in France than in England. To ſuch people, who had little or no care for poſterity, nothing could be more convenient than to exchange their capital for a revenue, which is to laſt juſt as long, and no longer, than they wiſh it to do.

ANNUITY OF TEINDS, in *Scots Law*, a certain proportion of the teinds of erected benefices formerly payable to the crown, but now gone into diſuſe.

ANNULAR, in a general ſenſe, ſomething in the form of, or reſembling, a ring. It is alſo a peculiar denomination of the fourth finger, commonly called the *ring finger*.

ANNULET, in *Architecture*, a ſmall ſquare member in the Doric capital, under the quarter round.

ANNULET is alſo a narrow flat moulding, which is common to divers places of the columns, as in the baſes, capitals, &c. It is the ſame member which Vitruvius calls a *fillet*; Palladio, a *liſtil* or *cincture*; Scamozzi, and Mr Brown, a *ſupercilium*, *liſt*, *tinea*, *eyebrow*, *ſquare*, *rabbit*. See ARCHITECTURE.

ANNULET, a little circle, borne as a charge in coats of arms, as alſo added to them as a *difference*. Among the Romans it repreſented liberty and nobility. It alſo denotes ſtrength and eternity, by reaſon of its circular form.

When this figure is added as a difference, ſome authors aſſert, that it ſerves to remind the bearer to achieve great actions.

ANNULLING, a term ſometimes uſed for cancelling or making void a deed, ſentence, or the like.

ANNUNCIADA, ANNUNTIADA, or ANNUNCIATA, an order of knighthood in Savoy, firſt inſtituted by Amadeus I. in the year 1409: their collar was of 15 links, interwoven one with another, in form of a true lover's knot; and the motto, F. E. R. T. ſignifying, *Fortitudo ejus Rhodum tenuit*. Amadeus VIII. gave the name *Annunciada* to this order, which was formerly known by that of *the knot of love*; changing at the ſame time the image of St Maurice patron of Savoy, which hung at the collar, for that of the Virgin Mary; and, inſtead of the motto above mentioned, ſubſtituting the words of the angel's ſalutation. Annunciada ‖ Anolympiades.

ANNUNCIADA is alſo the title of ſeveral religious orders, inſtituted at different times, and at different places, in honour of the annunciation. See the next article.

ANNUNCIATION, the tidings brought by the angel Gabriel to the Virgin Mary of the incarnation of Chriſt.

ANNUNCIATION is alſo a feſtival, kept by the church on the 25th of March, in commemoration of theſe tidings. This feſtival appears to be of very great antiquity. There is mention made of it in a ſermon which goes under the name of *Athanaſius*. Others carry it up to the time of Gregory Thaumaturgus, becauſe there is a ſermon likewiſe attributed to him upon the ſame ſubject. But the beſt critics reject both theſe writings as ſpurious. However, it is certain, this feſtival was obſerved before the time of the council of Trullo, in which there is a canon forbidding the celebration of all feſtivals in lent, excepting the Lord's day, and the feaſt of the annunciation: ſo that we may date its original from the ſeventh century.

In the Romiſh church, on this feaſt, the pope performs the ceremony of marrying or cloiſtering a certain number of maidens, who are preſented to him in the church, clothed in white ſerge, and muffled up from head to foot: An officer ſtands by, with purſes containing notes of 50 crowns for thoſe who make choice of marriage, and notes of a hundred for thoſe who chooſe to veil.

ANNUNCIATION is likewiſe a title given by the Jews to part of the ceremony of the paſſover.

ANNUNCIATOR, the name of an officer in the church of Conſtantinople. It was his buſineſs to inform the people of the feſtivals that were to be celebrated.

ANODYNE, (from *α* privative, and *ὀδυνω*, *doleo*; or *α* neg. and *ὠδυνη*, *pain*), a term applied to medicines which eaſe pain, and procure ſleep. They are divided into three ſorts, viz. 1. Parerogics, or ſuch as aſſuage pain. 2. Hypnotics, or ſuch as relieve by procuring ſleep. 3. Narcotics, or ſuch as eaſe the patient by ſtupifying him.

Opiates and narcotics deſtroy ſenſation. Some hypnotics and paregorics, as nitre, camphor, &c. procure eaſe and ſleep by removing the offending cauſe. Camphor is ſaid to be the beſt anodyne in nervous caſes and at the decline of fevers. The doſes of theſe medicines are generally regulated by the pulſe.

ANOINTERS, a religious ſect in ſome parts of England, ſo called from the ceremony they uſed of anointing all perſons before they admitted them into their church. They founded their opinion of anointing upon the fifth of James, ver. 14. and 15.

ANOLYMPIADES, in *Antiquity*, a name given by the Elians to thoſe Olympic games which had been celebrated under the direction of the Piſæans and Arcadians. The Elians claimed the ſole right of mana-

Anomaliſtical Year ‖ Anomeans.

ging the Olympic games, in which they ſometimes met with competitors. The hundred and fourth Olympiad was celebrated by order of the Arcadians, by whom the Elians were at that time reduced very low: this, as well as thoſe managed by the inhabitants of Piſa, they called ανολυμπιαδας, that is, "unlawful Olympiads;" and left them out of their annals, wherein the names of their victors and other occurrences were regiſtered.

ANOMALISTICAL YEAR, in *Aſtronomy*, the time that the earth takes to paſs through her orbit: it is alſo called the *Periodical Year*. The ſpace of time belonging to this year is greater than the tropical year, on account of the proceſſion of the equinoxes. See ASTRONOMY.

ANOMALOUS, a term applied to whatever is irregular, or deviates from the rule obſerved by other things of the like nature.

ANOMALOUS Verbs, in *Grammar*, ſuch as are not conjugated conformably to the paradigm of their conjugation. They are found in all languages. In Latin, the verb *lego* is the paradigm of the third conjugation; and runs thus, *lego, legis, legit:* by the ſame rule it ſhould be *fero, feris, ferit;* but we ſay *fero, fers, fert: fero*, then, is an anomalous verb. In Engliſh the irregularity relates often to the preter tenſe and paſſive participle: for example, *give*, were it formed according to rule, would make *gived* in the preter tenſe and paſſive participle; whereas, in the former, it makes *gave*, and in the latter *given*.

ANOMALY, in *Aſtronomy*, an irregularity in the motion of the planets, whereby they deviate from the aphelion or apogee.

ANOMIA, in *Zoology*, a genus of inſects belonging to the order of vermes teſtacea. The ſhell is bivalve, and the valves are unequal. One valve is perforated near the hinge; affixed by that perforation to ſome other body. There are 25 ſpecies of the anomia; of which only two are natives of the Britiſh ſeas, viz. 1. The ephippium, with the habit of an oyſter; the one ſide convex, the other flat; perforated; adherent to other bodies, often to oyſter ſhells, by a ſtrong tendinous ligature; colour of the inſide perlaceous. Size, near two inches diameter. 2. The ſquammula, with ſhells reſembling the ſcales of fiſh; very delicate, and ſilvery; much flatted; perforated; very ſmall. Adheres to oyſters, crabs, lobſters, and ſhells. This ſpecies of the genus are commonly called *Beaked Cockles*. No name has been given to the fiſh that inhabits it; for the recent ſhells of this kind are ſo very rare, that there is ſcarcely one to be found perfect. They are perhaps, as well as that which has given its form to the *cornu ammonis*, inhabitants of the deepeſt parts of the ocean; conſequently it muſt be ſome extraordinary agitation of that great body of water that can bring them at all to our knowledge in in their recent ſtate.

The foſſil ſpecies of the *Anomia* genus are uncommonly numerous in this iſland, in our chalk pits and limeſtone quarries; and in Glouceſterſhire they are as common on the ploughed lands as pebbles on other places.

ANOMOEANS, in *Eccleſiaſtical Hiſtory*, the name by which the pure Arians were called in the fourth century, in contradiſtinction to the Semi-Arians. The word is formed from the Greek, ανομοιος, *different, diſſimilar:* For the pure Arians aſſerted, that the Son was of a nature different from, and in nothing like, that of the Father: whereas the Semi-Arians acknowledged a likeneſs of nature in the Son; at the ſame time that they denied, with the pure Arians, the conſubſtantiality of the Word. The Semi-Arians condemned the Anomœans in the council of Seleucia; and the Anomœans in their turn condemned the Semi-Arians in the councils of Conſtantinople and Antioch, eraſing the word ομοιος, *like*, out of the Formula of Rimini and that of Conſtantinople.

Anomorhomboidia ‖ Anorexia.

ANOMORHOMBOIDIA, in *Natural Hiſtory*, the name of a genus of ſpars; the word is derived from the Greek ανωμαλης, *irregular*, and ρομβοειδης, a *rhomboidal* figure. The bodies of this genus are pellucid cryſtalline ſpars of no determinate or regular external form, but always breaking into regularly rhomboidal maſſes; eaſily fiſſile, and compoſed of plates running both horizontally and perpendicularly through the maſſes, but cleaving more readily and evenly in a horizontal, than in a perpendicular direction; the plates being ever compoſed of irregular arrangements of rhomboidal concretions. Of this genus there are five known ſpecies. 1. A white, bright, and ſhattery one; found in great quantities in the lead mines of Derbyſhire, Yorkſhire, and Wales. 2. A milk-white, opaque, and ſhattery one, found in ſome parts of France, and very plentifully in Germany, and ſometimes in Wales and Scotland, and in the hills of Yorkſhire. 3. A hard, dull, and ſnow-white one, found in ſome of the mines in Derbyſhire, and in many of our northern counties. 4. A hard, gray, and pellucid one, found in the lead mines of Yorkſhire, and very common in Germany. And, 5. A pellucid and colourleſs one; this is found in the lead mines of Derbyſhire and Yorkſhire. All theſe in ſome degree have the double refraction of the iſland cryſtal. See *ISLAND cryſtal*.

ANONIS, in *Botany*. See ONONIS.

ANONYMOUS, ſomething that is nameleſs, or of which the name is concealed. It is a term uſually applied to books which do not expreſs the author's name, or to authors whoſe names are unknown.

ANONYMOUS in *Commerce*. Partnerſhips in trade in France are ſtyled anonymous, when they are not carried on under any particular name, but wherein each of the partners trades viſibly on his own account, and in his own name; after which all the partners give one another an account of their profit or loſs in trade. Theſe ſorts of partnerſhips are concealed, and known only to the parties themſelves.

ANONYMOUS Partnerſhips in Trade, are alſo in France, ſuch, wherein perſons of fortune and quality depoſite ſums of money, in order to ſhare of the profits and loſs. To this end thoſe who furniſh the capital have no trouble in carrying on the trade, nor do their names appear to be any way intereſted therein.

ANONYMOUS, in *Law*. The ſending anonymous letters demanding money, &c. is felony by the Black Act, 9 Geo. I. cap. xxii.

ANOREXIA, ANOREXY, (from α negative, and ορεξις, *appetite*); a want of appetite, or a loathing of food. The diſorder is either original or ſymptomatic. When it is original, its cauſes are bad diet, too free drinking, voraciouſneſs, &c.: In which caſes, a vomit or two of ipecacuanha may be taken; and temperance, a light but cordial nouriſhing diet, and daily exerciſe, perſiſted

Anoſſi. perſiſted in, will generally effect a recovery. But it is more frequently a ſymptom of ſome other diſorder; and then the cure depends on the removal of the original one.

ANOSSI, a province of the iſland of Madagaſcar, lying between Lat. 23. 18. and 26. 0. S. It is watered by many rivers, moſt of which run into the *Franchere*, *Ramevatte*, or *Immour*, the ſpring of which is in a mountain called *Manghage*, and diſcharges itſelf into the ſea in Lat. 25. 18. S. The mouth of this river is often ſtopped, and the courſe to the ſea interrupted, unleſs kept open by the overflowings of great rains and high tides. The water runs ſalt one league above the mouth, particularly in a free communication with the ſea. A lake, called *Ambou*, is formed at the mouth, half a league wide, with depth ſufficient for any ſhip if the mouth of the river was kept open. Next in bigneſs to the Franchere, is the Manghaſia, which ſprings from a mountain called *Siliva*, and empties itſelf into the ſea, where large ſhips may ride at anchor. Crocodiles breed in theſe and all the other rivers of the iſland.

Between the two rivers above mentioned lies Cape St Romain, half a mile diſtant from the mouth of the Franchere, and which runs from the north-weſt ſix or ſeven leagues into the ſea. When the cape is paſſed the coaſt forms a great bay, in the ſhape of a croſs, which extends to the mouth of a river called *Dian Panouge* or *Pitorah*. In the middle of this bay the land runs out, and almoſt forms a peninſula called *Tholangare*. Fort Dauphin lies to the north of this peninſula, and Port Dauphin over againſt it. This province has ſeveral other peninſulas and ſmall iſlands belonging to it. The country is beautiful; abounds in fruit trees; is fertile in paſtures for cattle; and, if carefully cultivated, would produce all the neceſſaries of life. It is ſurrounded by high mountains, which are covered with woods and ſhrubs; but, about four miles diſtant from Fort Dauphin, the adjacent hills are quite deſtitute of verdure. The French often dug in this neighbourhood, expecting to meet with mines of gold and ſilver, particularly in one mountain where ſeveral ſprings flow near each other and empty themſelves into a neighbouring river. In this river they found ſeveral ſtones and heaps intermixed with yellow clay, with a great quantity of black and white ſpangles ſhining like ſilver, which they carefully pounded and waſhed, but without effect. About 60 yards above theſe ſprings the graſs, and every ſort of vegetable, appears half dried and yellow, from a metalline ſulphur, which gives that aſpect; but the top of the mountain is covered with a freſh and beautiful verdure. It is ſaid that the Portugueſe found gold at the foot of this mountain on the north ſide, but that the place they had dug was filled up by the chiefs of the country after the Portugueſe had been driven out.

The province of Anoſſi is inhabited by three different ſorts of whites, and four ſorts of negroes. The whites are diſtinguiſhed by the names of *Rohandrians*, *Anacandrians*, and *Ondzatſi*. The whites are diſtinguiſhed from the negroes by the general name of *Zaferamini* or *Rahimini*; and the Rohandrians are diſtinguiſhed above the other whites. When they proceed to an election of a ſovereign, whom they call *Ompiandrian*, or *Dian Bahouache*, he is choſen from the Rohandrian race. Next to him the others hold the rank of princes, and are honoured as ſuch by all the reſt of the ſubjects. The Anacandrians are deſcendants of the chiefs, but who have degenerated, and are accounted the baſtards of princes, or thoſe who are deſcended from a Rohandrian and any inferior white or black woman. Theſe are likewiſe called by the name of *Ontempaſſemaca*, or people from the ſandy parts of Mecca, from whence, they ſay, came the Rohandrians. Both the Rohandrians and Anacandrians wear long hair, which hangs down in curls; and enjoy the privilege of killing beaſts. The Ondzatſi, or loweſt claſs of whites, are deſcended from the baſtards of the Anacandrians. Theſe are all fiſhermen, and are allowed to kill no land animal except a chicken. Anoſſi.

The four claſſes of negroes are named *Voadziri*, *Lohavohits*, *Ontſoa* and *Ondeves*. The Voadziri, the moſt powerful and the richeſt, are maſters of ſeveral villages, and deſcended from the original lords of the country. They enjoy the privilege of killing beaſts, when at a diſtance from the whites, and no Rohandrian or Anacandrian in the village. The Lohavohits are deſcendants from the Voadziri, and alſo lords; but with this difference, that the one commands a whole diſtrict, and the juriſdiction of the others extends only to their own village and family. They are alſo permitted to kill thoſe beaſts they intend to eat, when at a diſtance from the whites. The Ontſoa are next to the Lohavohits, and are their near relations. The Ondeves are the loweſt of all, being originally ſlaves by father and mother. The Voadziri, Lohavohits, and Ontſoa, enjoy the privilege of ſubmitting themſelves, on the death of their lord or king, to any chief they pleaſe. In return for ſuch homage, the new lord makes them a preſent, in conſequence of which he becomes heir to all their poſſeſſions. Hence the lower claſſes both of whites and blacks, when death approaches, are under the greateſt concern and anguiſh of mind, well knowing that their lords will not fail to deprive their children of every thing they poſſeſs. The Ondeves have not the ſame liberty with the others; but, in times of famine, the chiefs are obliged to ſupply them with neceſſaries; which if they fail to do, they have the liberty of ſubmitting themſelves to new maſters. The inhabitants of this province have no temples, and very little appearance of religion; only they keep up a cuſtom of immolating beaſts upon particular occaſions, as in ſickneſs, planting yams or rice, on aſſemblies, &c. They offer the firſt born beaſt to the devil and to God, naming the devil firſt, in this manner, *Dianbilis Aminhanhabare*, or "Lord Devil and God."—There are ſeveral towns on the river Franchere; and near this river the Portugueſe had a fort built upon a ſteep rock, and ſeveral buildings below, with encloſures, which furniſhed all ſorts of neceſſaries for their ſubſiſtence; but they were all maſſacred by the natives.

This province ſeems originally to have been inhabited by negroes. The whites or Zaferamini ſettled in it about 200 years ago, and conquered the negroes. But they themſelves were conquered by the French, though under the government of a king whom they honoured as a god. In 1642, Captain Rivault obtained a permiſſion to eſtabliſh a colony in this part of the iſland; and accordingly he took poſſeſſion of it in the name of the king of France, in the month of September, that ſame

year.

Anotta. year. The French landed 200 men, well armed, and provided with ſtore of ammunition and other neceſſaries for building a fort, which they immediately ſet about; but no ſooner did the natives obſerve their intention, than they uſed their utmoſt art to prevent their deſign from taking effect. This created a war, in which the French were victors; and, the natives becoming in time much better reconciled to them, they intermarried, and lived up and down in ſeveral towns at ſome diſtance from one another, not above five or ſix in a place. This tranquillity laſted for ſome years; but at laſt the natives, growing jealous, reſolved to free themſelves from a foreign yoke; and accordingly formed a conſpiracy to cut off all the French in one day; which they ſoon after effected, not leaving a ſingle perſon alive. In 1644 the above-mentioned Fort Dauphin was erected in Lat. 25. 6. S. Many buildings were erected, behind the fort, adjoining to the governor's houſe, with great encloſures that produced every ſort of fruit and kitchen herb. In 1656 it was accidentally deſtroyed by fire; but was ſoon after repaired, and ſtill continues, notwithſtanding the cataſtrophe above mentioned, and its garriſon carries on frequent wars with the natives.

ANOTTA, or ARNOTTA, in dyeing, an elegant red colour, formed from the pellicles or pulp of the ſeeds of the BIXA, a tree common in South America. It is alſo called *Terra Orleana*, and *Roucou*.

The manner of making anotta is as follows: The red ſeeds, cleared from the pods, are ſteeped in water for ſeven or eight days, or longer, till the liquor begins to ferment; then ſtrongly ſtirred, ſtamped with wooden paddles and beaters, to promote the ſeparation of the red ſkins; this proceſs is repeated ſeveral times, till the ſeeds are left white. The liquor, paſſed through cloſe cane ſieves, is pretty thick, of a deep red colour, and a very ill ſmell; in boiling, it throws up its colouring matter to the ſurface in form of ſcum, which is afterwards boiled down by itſelf to a due conſiſtence, and made up while ſoft into balls. The anotta commonly met with among us, is moderately hard and dry, of a brown colour on the outſide, and a dull red within. It is difficultly acted upon by water, and tinges the liquor only of a pale browniſh yellow colour. In rectified ſpirit of wine, it very readily diſſolves, and communicates a high orange or yellowiſh red. Hence it is uſed as an ingredient in varniſhes, for giving more or leſs of an orange caſt to the ſimple yellows. Alkaline ſalts render it perfectly ſoluble in boiling water, without altering its colour. Wool or ſilk boiled in the ſolution acquire a deep, but not a very durable, orange dye. Its colour is not changed by alum or by acids, any more than by alkalies: but when imbibed in cloth, it is diſcharged by ſoap, and deſtroyed by expoſure to the air. It is ſaid to be an antidote to the poiſonous juice of manioc or caſſava.—Labat informs us, that the Indians prepare an anotta greatly ſuperior to that which is brought to us, of a bright ſhining red colour, almoſt equal to carmine: that, for this purpoſe, inſtead of ſteeping and fermenting the ſeeds in water, they rub them with the hand, previouſly dipped in oil, till the pellicles come off, and are reduced into a clear paſte; which is ſcraped off from the hands with a knife, and laid on a clean leaf in the ſhade to dry. De Laet, in his notes on Margrave's Natural Hiſtory of Brazil, mentions alſo two kinds of anotta; one of a permanent crimſon colour, uſed as a fucus or paint for the face; and another which gives a colour inclining more to that of ſaffron. This laſt, which is our anotta, he ſuppoſes to be a mixture of the firſt ſort with certain reſinous matters, and with the juice of the root of the tree. The wax or pulp in which the ſeeds are encloſed is a cool agreeable rich cordial, and has been long in uſe among the Indians and Spaniards in America, who ſtill mix it with their chocolate, both to heighten the flavour and raiſe the colour. It is ſaid to be a ſucceſsful remedy in bloody fluxes. The roots have much the ſame properties with the wax; but theſe are obſerved to work more powerfully by the urinary paſſages: they are uſed by ſome people in their broths, and ſeem to anſwer all the purpoſes of the pulp, but in a more faint degree. See BIXA, BOTANY *Index*.

Anout || Anſarians.

ANOUT, a ſmall iſland in the Schagerrack, or that part of the ſea of Denmark which has Norway on the north, Jutland on the weſt, and the iſle of Zeeland on the ſouth; it lies in 13. 0. E. Long. and 56. 36. N. Lat.

ANSÆ, in *Aſtronomy*, implies the parts of Saturn's ring projecting beyond the diſk of the planet.—The word is Latin, and properly ſignifies *handles*; theſe parts of the ring appearing like handles to the body of the planet.

ANSARIANS, a people of Syria, ſo called in the country, but ſtyled in De l'Iſle's maps *Enſarians*, and in thoſe of D'Anville, *Naſſaris*. The territory occupied by theſe Anſaria is that chain of mountains which extends from Antakia to the rivulet called *Nahr-el-Kabir*, or the Great River. The hiſtory of their origin, though little known, is yet inſtructive. The following account is from the *Bibliotheque Orientale* of Aſſemani, a writer who has drawn his materials from the beſt authorities.

"In the year of the Greeks 1202 (A. D. 891), there lived at the village of Naſar, in the environs of Koufa, an old man, who, from his faſtings, his continual prayers, and his poverty, paſſed for a ſaint. Several of the common people declaring themſelves his partizans, he ſelected from among them twelve diſciples to propagate his doctrine. But the commandant of the place, alarmed at his proceedings, ſeized the old man, and confined him in priſon. In this reverſe of fortune, his ſituation excited the pity of a girl who was ſlave to the gaoler, and ſhe determined to give him his liberty. An opportunity ſoon offered to effect her deſign. One day when the gaoler was gone to bed intoxicated, and in a profound ſleep, ſhe gently took the keys from under his pillow, and after opening the door to the old man, returned them to their place unperceived by her maſter: the next day when the gaoler went to viſit his priſoner, he was extremely aſtoniſhed at finding he had made his eſcape, and the more ſo ſince he could perceive no marks of violence. He therefore judiciouſly concluded he had been delivered by an angel, and eagerly ſpread the report, to avoid the reprehenſion he merited: the old man, on the other hand, aſſerted the ſame thing to his diſciples, and preached his doctrines with more earneſtneſs than ever. He even wrote a book, in which, among other things, he ſays, 'I, ſuch a one, of the village of Naſar, have ſeen Chriſt who is the word of God, who is Ahmad, ſon of Mohammed, ſon of Hanafa, of the race of Ali;

who

Anſarians ‖ Anſelm.

who alſo is Gabriel: and he ſaid to me, Thou art he who readeth (with underſtanding); thou art the man who ſpeaketh truth; thou art the camel which preſerveth the faithful from wrath; thou art the beaſt which carrieth their burden; thou art the (Holy) Spirit, and John, the ſon of Zachary. Go, and preach to men that they make four genuflections in praying; two before the riſing of the ſun, and two before his ſetting, turning their faces towards Jeruſalem: and let them ſay, three times, God Almighty! God Moſt High! God Moſt Great! Let them obſerve only the ſecond and third feſtival; let them faſt but two days annually; let them not waſh the prepuce, nor drink beer, but as much wine as they think proper; and laſtly, let them abſtain from the fleſh of carnivorous animals. This old man paſſing into Syria, propagated his opinions among the lower orders of the country people, numbers of whom believed in him: And after a few years he went away, and nobody ever knew what became of him."

Such was the origin of theſe Anſarians, who are, for the moſt part, inhabitants of the mountains beforementioned.

The Anſaria are divided into ſeveral tribes or ſects; among which are diſtinguiſhed the Shamſia, or adorers of the ſun; the Kelbia, or worſhippers of the dog; and the Kadmouſia, who are ſaid to pay a particular homage to that part in women which correſponds to the priapus.

Many of the Anſaria believe in the metempſychoſis; others reject the immortality of the ſoul; and in general, in that civil and religious anarchy, that ignorance and rudeneſs which prevail among them, theſe peaſants adopt what opinions they think proper, following the ſect they like beſt, and frequently attaching themſelves to none.

Their country is divided into three principal diſtricts farmed by the chiefs called *Mokaddamim*. Their tribute is paid to the pacha of Tripoli, from whom they annually receive their title. Their mountains are in general not ſo ſteep as thoſe of Lebanon, and conſequently are better adapted to cultivation; but they are alſo more expoſed to the Turks; and hence, doubtleſs, it happens, that with greater plenty of corn, tobacco, wines, and olives, they are more thinly inhabited than thoſe of their neighbours the MARONITES and the DRUZES.

ANSE, an ancient town of France, in the Lyonois, ten miles north of Lyons. Long. 6. 55. N. Lat. 45. 55.

ANSELM, archbiſhop of Canterbury, in the reigns of William Rufus and Henry I. He was born in the year 1033, at Aoſt, a town in Savoy at the foot of the Alps. He became a monk in the abbey of Bec in Normandy; of which he was afterwards choſen prior, and then abbot. In the year 1092, he was invited over to England by Hugh earl of Cheſter; and in the year following was prevailed on, as we are told, with great difficulty, to accept the archbiſhopric of Canterbury. He enjoined celibacy on the clergy; for which he was baniſhed by King Rufus, but recalled by Henry at his coming to the crown. He refuſed to conſecrate ſuch biſhops as were inveſted by the king, according to Pope Urban's decree; flatly denying it to be the king's prerogative; for this he was outed again; till, the pope and king agreeing, he was recalled in 1107. In ſhort, from the day of his conſecration to that of his death, he was continually employed in fighting the prerogative of the church againſt that of the crown; and for that purpoſe ſpent much of his time in travelling backwards and forwards between England and Rome, for the advice and direction of his Holineſs. At the council of Bari, in the kingdom of Naples, the pope being puzzled by the arguments of the Greeks againſt the Holy Ghoſt's proceeding from the Father, he called upon Anſelm, who was preſent and he diſcuſſed their objections with great applauſe. Prieſts call him a reſolute ſaint; to other people he appears to have been an obſtinate and inſolent prieſt. He wrought many miracles, if we believe the author of his life, both before and after his death, which happened at Canterbury, in the 76th year of his age, anno 1109. He was canonized in the reign of Henry VII. Anſelm, though we may diſregard him as a ſaint, deſerves to be remembered as one of the principal revivers of literature, after three centuries of profound ignorance.

Anſer ‖ Anſibarii.

His works have been printed in different years, and at different places, viz. Nuremb. 1491. Paris 1544 and 1549. Venice 1549. Cologne 1573 and 1612. Lyons 1630. But the beſt is that of Father Gerberon, printed at Paris 1675. It is divided into three parts; the firſt contains dogmatical tracts, and is entitled *Monologia*; the ſecond contains practical and devotional tracts; the third part conſiſts of letters, in four books.

ANSER, he trivial name of a ſpecies of anas. See ANAS, ORNITHOLOGY *Index*.

ANSER, in *Aſtronomy*, a ſmall ſtar, of the fifth or ſixth magnitude, in the milky way, between the ſwan and eagle, firſt brought into order by Hevelius.

ANSERES, the name which Linnæus gives to his third order of birds. See ORNITHOLOGY *Index*.

ANSIBARII, or ANSIVARII, an ancient people of Germany, ſituated ſomewhere in the neighbourhood of the Chauci. All we know of their hiſtory is, that, in the reign of the emperor Nero, they were driven from their own poſſeſſions by the Chauci. Being then in a forlorn condition, they took poſſeſſion of ſome uninhabited lands, which had been uſed as paſture for the horſes of the Roman ſoldiers. They were led by one Boiocalus, a man of great valour, and of known fidelity to the Romans. He remonſtrated to the Romans, who objected to their taking poſſeſſion of theſe lands, That the territory in diſpute was large; and requeſted, that it might be allowed to an unhappy people driven from their own habitations: that, at the ſame time, wide tracts might be retained for the horſes and cattle of the ſoldiers to graze in; that it was inconſiſtent with humanity to famiſh men in order to feed beaſts, &c.. and at laſt, lifting up his eyes to heaven, he aſked the celeſtial luminaries how they could behold a deſolate ſoil, and if they would not more juſtly let looſe the ſea to ſwallow up uſurpers, who had engroſſed the whole earth? To this the Roman commander, Avitus, replied, That the weakeſt muſt ſubmit to the ſtrongeſt; and that ſince the gods, to whom they had appealed, had left the ſovereign judgment to the Romans, they were reſolved to ſuffer no other judges than themſelves. To Boiocalus himſelf, however, he privately offered lands as a reward for his long attachment to the Romans; but this offer the brave German rejected, as a price for betraying

Anſiko. betraying his people: adding, "A place to live in we may want, but a place to die in we cannot." The Anſibarii now invited the neighbouring nations to join them againſt the Romans; but they, dreading the power of that nation, refuſed to give them any aſſiſtance: upon which they applied to the neighbouring nations, begging leave to ſettle in their territories; but being everywhere driven out as enemies and intruders, theſe unhappy people were reduced to wander up and down till every one of them periſhed.

ANSIKO, a kingdom of Africa, bounded on the weſt by the river Umbre which runs into the Zaire, the kingdom of Wangua, and the Amboes who border on Loango; on the north, by ſome deſerts of Nubia; and on the ſouth, by Songo and Sonda, provinces of Congo. Here are great numbers of wild beaſts, as lions, rhinoceroſes, &c. and many copper mines. The king of Anſiko, or the great Macoco, commands 13 kingdoms, and is eſteemed the moſt powerful monarch in Africa. The inhabitants of Angola have a tradition, that this is the proper country of the Giagas, who came originally from Sierra Leona, and overran, like a torrent, the whole coaſt as far as Benguela; that, being weakened by numerous battles, and unable to force the defiles in order to return to Sierra Leona, they arrived on the borders of Monomotapa, where being defeated, they were forced to remain in the provinces of Anſiko. Be this as it will, the Anſikans yield not in the leaſt to the Giagas in fierceneſs and barbarity. They are ſo accuſtomed to the eating of human fleſh, that it is aſſerted they have markets where it is publicly ſold, and that there are no other graves for the dead than the bellies of the living. They try the courage of their priſoners of war by ſhooting at them as at marks, directing their arrows above or around their heads; and whoever diſcovers the leaſt ſigns of fear, is immediately devoured without remedy. Thoſe who appear intrepid and reſolute, have their noſes and ears bored, and two fore teeth of the upper jaw drawn. They are then improved in barbarity, by accuſtoming them to the moſt horrid cruelties.

The Anſikans are neat, well proportioned, and ſtrong; wandering about from place to place, without either ſowing or reaping. They are dreaded for their extreme brutality, and never traded with by the Europeans. Their language is barbarous, and difficult to be learned, even by the inhabitants of Congo. The moſt diſtinguiſhed among them wear red and black caps of Portugueſe velvet: the lower ranks go naked from the waiſt upwards: and, to preſerve their health, anoint their bodies with a compoſition of pounded white ſandal wood and palm oil. Their arms are battle axes, and ſmall but very ſtrong bows, adorned with ſerpents ſkins. Their ſtrings are made of ſupple and tender ſhoots of trees, that will not break, and their arrows of hard and light wood. Theſe people, who kill birds flying, ſhoot with ſuch ſurpriſing ſwiftneſs, that they can diſcharge 28 arrows from the bow before the firſt falls to the ground. With equal dexterity they manage their battle axes; one end of which is ſharpened and cuts like a wedge, and the other flattened like a mallet, with a handle ſet between, about half the length of the iron, rounded at the end like an apple, and covered with the ſkin of a ſerpent.—The current money in this country is the zimbis or ſhell, which is

Anſo, Anſon. liſhed for, and paſſes among ſeveral African nations.—They worſhip the ſun as their chief deity; whom they repreſent by the figure of a man, and the moon by that of a woman. They have alſo an infinite number of inferior deities, each individual having a particular idol whom he addreſſes on certain occaſions.

ANSLO, a ſea port town of Norway, in the province of Aggerhuys, with a biſhop's ſee. The ſupreme court of juſtice is held here for Norway. It is ſeated on a bay of the ſame name. E. Long. 10. 14. N. Lat. 59. 24.

ANSON, George, a gentleman whoſe merit and good fortune, as a naval commander, exalted him to the rank of nobility. He was the ſon of William Anſon, Eſq; of Huckborough, in Staffordſhire; and, ſhowing an early inclination for the ſea, received a ſuitable education. The firſt command he enjoyed was that of the Weaſel ſloop in 1722; but the moſt memorable action of his life, and the foundation of his future good fortune, took place on his receiving the command of five ſhips, a ſloop, and two victuallers, equipped to annoy the Spaniards in the South ſeas, and to co-operate with Admiral Vernon acroſs the iſthmus of Darien; an expedition the principal object of which failed by the unaccountable delay in fitting him out. He ſailed, however, in Sept. 1740; doubled Cape Horn in a dangerous ſeaſon; loſt moſt of his men by the ſcurvy; and with only one remaining ſhip, the Centurion, croſſed the great Pacific ocean. If no conſiderable national advantage reſulted from this voyage, Commodore Anſon made his own fortune, and enriched his ſurviving companions, by the capture of a rich galleon on her paſſage from Acapulco to Manilla; with which he returned home round the Cape of Good Hope. If he was lucky in meeting this galleon, he was no leſs fortunate in eſcaping a French fleet then cruiſing in the Channel, by ſailing through it during a fog. He arrived at Spithead in June 1744. In a ſhort time after his return, he was appointed rear-admiral of the blue, and one of the lords of the admiralty. In April 1745, he was made rear-admiral of the white, and the following year vice-admiral of the blue; at which time he was choſen to repreſent the borough of Heydon in parliament. In 1747, being on board the Prince George of 90 guns, in company with Admiral Warren, and 12 other ſhips, he intercepted, off Cape Finiſterre, a powerful fleet, bound from France to the Eaſt and Weſt Indies; when, by his valour and conduct, he again enriched himſelf and his officers, and at the ſame time ſtrengthened the Britiſh navy, by taking ſix men of war and four Eaſt Indiamen, not one of them eſcaping. The French admiral, M. Jonquiere, on preſenting his ſword to the conqueror, ſaid, *Monſieur, vous avez vaincu l'Invincible, et la Gloire vous ſuit*: "Sir, you have conquered the Invincible, and Glory follows you;" pointing to the ſhips, named the *Invincible* and the *Glory*, he had taken. For his ſignal ſervices, his late majeſty created him baron of Soberton in Hants. The ſame year he was appointed vice-admiral of the red; and, on the death of Sir John Norris, was made vice-admiral of England. In 1748 he was made admiral of the blue: he was afterwards appointed firſt lord of the admiralty, and was at length made admiral and commander in chief of his majeſty's fleet; in which rank